

# Chapter 3

## The Consequences of the Second World War and the Stalinist Repression

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In 20 years, from one census to the next, the population of Ukraine went from 30.9 million inhabitants in 1939 (RAN 1992) to 41.9 million in 1959 (TsSU 1962). However, this steep population growth is merely apparent, since it resulted essentially from major changes to the borders of the Republic of Ukraine.

### 3.1 Estimating the 1939 Population Within Present-Day Borders

#### 3.1.1 Total Population

Firstly, under the German-Soviet (Molotov-Ribbentrop) Pact, Soviet troops occupied south-eastern regions of Poland from September 1939. The population of the territories concerned is known from the 1931 Polish Census (GUSRP 1937): 3.1 million inhabitants for the voivodeship of Lwow, 1.5 million for that of Stanislawow, 1.6 million for Tarnopol and 2.1 million for Volhynia. We also have an estimate, by

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voivodeship, of the population of Poland in 1939 within its 1945 borders (Ledermann 1947). By comparing the population counted in the 1931 Census with the estimated population for 1939, we obtained – for all the Polish voivodeships that did not undergo any territorial changes between 1931 and 1945 – a mean growth rate of about 10%. We can assume that this growth rate was also that of the territories lost by Poland in 1939 and to apply it to the four voivodeships gained by Ukraine. In total these four voivodies would therefore have had a total of 9.1 million inhabitants in 1939. However, part of the voivodeship of Lwow remained Polish, forming the new voivodeship of Rzeszow, whose estimated 1939 population was 2.1 million inhabitants (Ledermann 1947). So the Polish territories annexed by Ukraine in 1939 had 7.0 million inhabitants (Tables 3.1 and 3.2).

Secondly, in 1940, the Romanian border underwent complex readjustment: Ukraine gained Bessarabia and Northern Bukovina from Romania, but in 1940 also the Soviet Republic of Moldavia was created. Separate from Ukraine, it was made up of the former Moldavian Autonomous Republic (more or less to-day Transnistria), which up to then had belonged to Ukraine, and Northern Bessarabia. On 1 July 1939, the population of Bessarabia was estimated at 3.2 million inhabitants and that of Northern Bukovina at around 574,000<sup>1</sup> (ICS 1940). Therefore, Ukraine gained 3.8 million inhabitants from Romania, but the creation of the Republic of Moldavia took away 2.4 million, of whom 599,000 were in pre-1939 Ukrainian territory and 1.8 million in Bessarabia (Tables 3.1 and 3.2).

In addition, in 1945, Subcarpathian Ruthenia (separated from Czechoslovakia and added to Hungary in 1939) was attached to Ukraine (as Zakarpatskaia Province). The population of this province was 725,000 inhabitants at the time of the 1930 Czechoslovak census. By adding 1931–1938 births and subtracting deaths for the same period, we were able to estimate the population of this province at 829,000 inhabitants in 1939.<sup>2</sup> Finally, in 1954, Russia ceded Crimea, which had 1.1 million inhabitants at the time of the 1939 Soviet Census (Tables 3.1 and 3.2), to Ukraine.

So, in 1939, Ukraine within its present-day borders would have had a population 10.3 million higher than it had within its 1939 borders (41.2 million instead of 30.9). This estimate is significantly higher than the 40.5 million given by TsSU (the Central Statistical Directorate) (1962), but, curiously, the latter did not include Subcarpathian Ruthenia in its total (there does not seem to have been an available estimate), and this more or less accounts for the difference.

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<sup>1</sup>Northern Bukovina consisted of the provinces of Cernauti (318,000 inhabitants) and Storjinet (186,000) and part of the province of Radauti (total 179,000). Here we have estimated the last at 70,000 inhabitants, since in the following year the Romanian Yearbook gave only some 107,000 for that province (ICS 1940, 1941). The total therefore amounts to 574,000 people.

<sup>2</sup>For 1931–1936, births and deaths come from the Czechoslovak Yearbook for 1938 (OSRT 1938). We assumed the corresponding total numbers for 1937 and 1938 to be equal to the mean of the 4 preceding years. We also took migration out of the province to be negligible.

**Table 3.1** Ukraine's acquisitions and losses, from 1939 to 1954

Country and region concerned	Ukraine's acquisitions		Ukraine's losses	
	Date	Population in 1939 (in thousands)	Date	Population in 1939 (in thousands)
Poland				
<i>Lwow (part)</i>	9-1939	1,140		
<i>Stanislawow</i>	9-1939	1,628		
<i>Tarnopol</i>	9-1939	1,760		
<i>Volhynia</i>	9-1939	2,295		
Total		7,022		
Romania				
<i>Bessarabia</i>	6-1940	3,173		
<i>Northern Bukovina</i>	1942	574		
Total		3,747		
Hungary				
<i>Subcarpathian Ruthenia</i>	1945	829		
Moldavia				
<i>Romanian part</i>			8-1940	1,853
<i>Ukrainian part</i>			8-1940	599
Total				2,452
Russia				
<i>Crimea</i>	1954	1,124		
Total gains and losses		12,722		2,452
Net total (gains – losses)		+ 10,270		

Thus, from 1939 to 1959, the population of Ukraine increased by hardly more than half a million (from 41.2 to 41.9 million). This general stagnation over 20 years was above all a consequence of the Second World War, but it also related to subsequent events, in particular the 1947 famine and the deportations in the 1940s and 1950s. All things considered, growth in the 1950s only just compensated for the exceptional losses resulting from these events.

### 3.1.2 *Distribution by Sex and Age*

We have an estimate of the distribution of the population by sex and single year of age in 1939 'in the present-day territory' of Ukraine, discovered in the TsSU archives in Kiev by Serhii Pyrozshkov. The total population is that given by TsSU publications, in particular of the 1959 Census (TsSU 1962). It is therefore very probable that this age distribution relates to TsSU's total population estimate, given above, and we assume that it differs from our own total estimate by 700,000 because Subcarpathian Ruthenia was not taken into account. Assuming that Subcarpathian Ruthenia's age-sex structure does not differ excessively from that of the other territories

**Table 3.2** Changes in Ukraine's borders since 1938

From when it joined the Soviet Union to the eve of the Second World War, the Ukrainian Soviet Socialist Republic occupied much less extensive territory than Ukraine does now. It lacked not only Crimea, which was then part of the Russian Soviet Socialist Republic, but also Southern Bessarabia and Northern Bukovina (both part of Romania), and Subcarpathian Ruthenia (a province of Czechoslovakia), as well as Volhynia and Eastern Galicia, which were Polish provinces.

Just after Hitler's invasion of western Poland, in accordance with secret clauses in the German-Soviet Pact of 1939, the Red Army invaded eastern Poland, of which two provinces, Volhynia and Eastern Galicia, were annexed to Ukraine (September 1939). A year later (June 1940), Ukraine also annexed the Romanian provinces of Northern Bukovina and Southern Bessarabia. However, by comparison with its present-day territory, it still lacked Subcarpathian Ruthenia and Crimea.

After the German invasion, Ukraine lost Eastern Galicia, which formed the territory of Lemberg under German protection. Not only were Northern Bukovina and Bessarabia returned to Romania, but the latter also annexed Transnistria. One part of the rest of Ukraine (including Crimea, which was taken from Russia) then formed the Reichskommissariat of Ukraine, with the other part placed directly under German military administration.



(continued)

**Table 3.2** (continued)

After the War, the Ukrainian Soviet Socialist Republic not only recovered its 1940 territory but also annexed Subcarpathian Ruthenia, retaking it from Hungary, which had taken it from Czechoslovakia in 1939. However, Ukraine also ceded Crimea back to the Russian Soviet Socialist Republic.



After Stalin's death, Khrushchev, who had been leader of the Communist Party of Ukraine for a long time, brought Crimea back under Ukrainian administration. Despite Russia's attempts to recover the province after the break-up of the USSR, Crimea remains part of independent Ukraine.



annexed by Ukraine in the early 1940s, we distributed the difference in proportion to the age distribution of the population of these territories.<sup>3</sup>

### 3.2 Estimating Births and Deaths for 1939–1940 and for 1945–1953 Within Present-Day Borders

As is the case for population, commonly published data on births and deaths vary with the changes in borders (Table 3.3). Birth and death statistics within present-day borders began from 1953, since Crimea was included in data for the Ukraine from that year onwards. From 1947 to 1952, statistics covered the whole of the

<sup>3</sup>The age-sex structure of the population of these new territories was obtained by comparing the population in the 1939 census with TsSU's estimate of the 1939 population within 1959 borders. However, we did not include Crimea, for which the 1939 Soviet census gave us the 1939 age-sex structure directly, in this comparison.

**Table 3.3** Main datasets used to reconstruct demographic trends between 1939 and 1959

Data	Sources
<b>Populations</b>	
1939 Census population by sex and year of age, Ukraine within 1939 borders (see previous section)	RGAE, fonds 1562, series 336, file 604
Total 1939 population of Ukraine by sex, within 1959 borders (excluding Subcarpathian Ruthenia), estimated by TsSU	TsSU 1962
1939 population of Ukraine by sex and year of age, Ukraine within 1959 borders (minus Subcarpathian Ruthenia), estimated by TsSU <sup>a</sup>	TsSU archives, Kiev
1959 Census population of Ukraine by sex and year of age	Previously unpublished census table, computed using mechanical tabulation
<b>Births</b>	
1939 and 1940 births by sex, Ukraine within 1939 borders (before incorporation of Polish provinces)	RGAE, fonds 1562, series 329, files 262, 396
1939 and 1940 births according to mother's age, Ukraine within 1939 borders (before incorporation of Polish provinces)	RGAE, fonds 1562, series 329, files 264, 399
1945 and 1946 births by sex, Ukraine within 1945 borders after separation of Moldavia (not including Subcarpathian Ruthenia)	RGAE, fonds 1562, series 329, files 1882, 2229
Births from 1947 to 1952 by sex, Ukraine within 1945 borders (including Subcarpathian Ruthenia)	RGAE, fonds 1562, series 329, files 2648, 3157, 3807, 4703, series 33, files 412, 1061
Births from 1953 to 1958 by sex, Ukraine within 1954 borders (after incorporation of Crimea)	RGAE, fonds 1562, series 33, files 1695, 2185, 2638, series 27, files 211, 353, 479
Births by sex in Crimea, 1939, 1940 and from 1945 to 1952	RGAE, fonds 1562, series 329, files 262, 396, 1456, 1883, 2229, 2648, 3157, 3807, 4703, series 33, files 412, 1061
Fertility rates for 1939–1959 by mother's age group, calculated from retrospective surveys in 1960 and 1967	Sifman 1974
<b>Deaths</b>	
1939 and 1940 deaths by sex and year of age, Ukraine within 1939 borders (before incorporation of Polish provinces)	RGAE, fonds 1562, series 329, files 267, 400
1945 and 1946 deaths by sex and year of age, Ukraine within 1945 borders after separation of Moldavia (not including Subcarpathian Ruthenia)	RGAE, fonds 1562, series 33, files 2638
Deaths from 1947 to 1952 by sex and year of age, Ukraine within 1945 borders (including Subcarpathian Ruthenia)	RGAE, fonds 1562, series 33, files 2638

(continued)

**Table 3.3** (continued)

Data	Sources
Deaths from 1953 to 1958 by sex and year of age, Ukraine within 1954 borders (after incorporation of Crimea)	RGAE, fonds 1562, series 33, files 2638, 2641, series 27, files 217, 359
1952 deaths by sex and year of age, Crimea	RGAE, fonds 1562, series 329, files 1066
Migration	
Immigrants to cities/towns according to (urban or rural) place of departure and emigrants from cities/towns according to (urban or rural) place of arrival by sex and age group(s), 1946–1958	RGAE, fonds 1562, series 20, files 681, 752, 831, 897, 956, 1006, 1049, 1090, series 27, files 38, 131, 250, 392; 524
Total number of urban immigrants and emigrants according to region of arrival or departure (republics other than Ukraine, Ukrainian provinces), 1946–1958 <sup>b</sup>	RGAE, fonds 1562, series 20, files 676, 748, 828, 953, 1003, 1047, 1087, series 27, files 36, 129, 248, 389, 522

<sup>a</sup>This distribution by age and sex relates to the 40.5 million inhabitants estimated by TsSU (1962). Unfortunately, we do not have any indication of the way it was obtained

<sup>b</sup>In reality, since this table is so large, we obtained only a copy of the line giving total migration inside Ukraine, which allowed us, by deduction from the above, to find outward migration

present-day territory minus Crimea. In 1945 and 1946, Subcarpathian Ruthenia was also missing. No statistics at all are available for 1941–1944. In 1939 and 1940, they related only to the pre-1939 territory.

### 3.2.1 Deaths

Death statistics by age throughout all these years include a fairly significant<sup>4</sup> number of deaths at unknown age. We distributed these in proportion to the total numbers of deaths at known ages.

The statistics available for Crimea for the years 1939, 1940 and 1945–1952 give total deaths by sex and deaths at age under 1, also by sex. After having distributed deaths by age at 1 year and over pro rata to the distributions available for Ukraine, we added these data to the Ukraine data.

For all the other territories annexed to Ukraine, no statistics are available to cover the years before they were included in Ukrainian statistics. In order to take this into account in the life tables corresponding to present-day territory, the total numbers were systematically increased by a coefficient corresponding to the ratio between the 1939 population in the present-day territory and the population at the same period excluding the annexed territories. As far as the former Polish and Romanian territories are concerned, this relates only to the years 1939 and 1940. For Subcarpathian Ruthenia, the process also involves the years 1945 and 1946.

<sup>4</sup>The proportion of deaths at unknown age was in the order of 1% in 1939 and 1940; it increased to 1.7% in 1945, only to diminish gradually to less than one per thousand in 1955.

### 3.2.2 *Births*

Firstly, we added registered births by sex in Crimea, for all the years 1939–1940 and 1945–1952, to those in Ukraine within its contemporary borders.

Since we had births according to mother's age in the old territory for 1939, we were able to calculate age-specific fertility rates for that year and apply them to the population of the new territory in order to find births within present-day borders. 1940 births in the new territory were then estimated from births registered in the old territory (Ukraine+Crimea) on the basis of the difference observed in 1939.<sup>5</sup> Calculated in this way, registered births in the present-day territory came to 1.40 million in 1939 and 1.18 million in 1940. This drop from 1 year to the next is fairly startling, in the absence of any events that might explain an abrupt fall in fertility. Nor can it be explained by the adjustment of the data to fit the new territory, since the same discrepancy exists between births registered in the old territory. This prompts questions about degradation in the quality of registration of births by ZAGS from 1940 – an issue we shall return to later.

For the years 1945 and 1946, for which births in Subcarpathian Ruthenia alone are missing, we proceeded as for deaths, in proportion to the change in total population.

## 3.3 A Reconstruction in Two Stages

An initial, very broad, assessment has been published (Pyrozhev 1996), estimating population losses in Ukraine between 1939 and 1959 at 9.7 million. However, this combines losses due to mortality crises with those attributable to birth deficits and to migration. In order to track trends in life expectancy over this period, it is necessary to reconstruct more fully the different components of population change, as we did in Chap. 2 for the inter-War period.

At the outset, the task is more difficult than for the 1930s, since the period to be covered is much longer and more unsettled, and the data gathered are more disparate. Once the available information on population and natural increase has been reconstructed within present-day borders, two main gaps are left: the total lack of population statistics for 1941–1944 and the partial nature of the data on migration, which focus on urban movements. Moreover, allowance must be made for under-registration of certain events.

If we could have followed the same logic as for the earlier period, we would have started by projecting the 1939 population up to 1959 on the basis of supposedly

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<sup>5</sup>As we know the number of births registered in Crimea in 1939 and 1940, here we used, for births in the old territory, births in Ukraine within the borders of that time, plus births in Crimea.



normal fertility and mortality trends, and then compared the results with the total numbers recorded in the 1959 Census in order to obtain an initial general estimate of total losses for the period 1939–1959; we would then have done our best to break this down according to the part played by each of the three components of population change. However, the period of 20 years separating 1939 from 1959 is a long one, and the major events that led to exceptional losses took place only in the first decade. It therefore seems more reasonable to start by using the available standard data for the 1950s to assess a 1949 population by sex and age, and to apply our earlier reasoning only to the decade 1939–1949.

### 3.4 Estimating 1949 Population by Sex and Age

For the late 1940s and the 1950s, we have complete data on births and deaths and a picture of urban migration. To make a backward projection of estimated populations in the years before the 1959 Census, we had to hypothesize about the quality of registration of these events. As far as migration was concerned, we had to start from existing data in order to reconstruct outward migration statistics by sex and age.

#### 3.4.1 *Estimating Under-Registration of Deaths*

As we have said before (in Chap. 2), Chap. 4 will include a full discussion of the quality of registration of deaths in 1938–1939 and for the years after 1959. It is apparent from this that corrections must be made to infant mortality on the one hand and to old-age mortality on the other.

In the end, the two corrections made to *infant mortality* consisted of increasing the rate registered in 1938–1939 by 5% and the 1959 rate by 10.6%. In fact, these corrections, which essentially relate to neonatal mortality, are very dependent on the level of total infant mortality. We therefore simply estimated the correction coefficients to be applied to deaths from 1949 to 1958, accepting that they varied according to registered mortality in a linear fashion between the two values adopted for 1938–1939 and 1959 (Table 3.4).

For correction of *old-age* mortality, it seemed to us that the levels of 1958 under-registration estimated in the next chapter for each sex and age over 70 years could also be applied to the whole of the 1950s.

#### 3.4.2 *Estimating Outward Migration*

For the post-War period, partial statistics for migration flows are available from 1946 onwards. They are based on the use of registers maintained at passport offices, where every holder of a *propiska* [residence permit] was obliged to declare each

**Table 3.4** Total numbers of annual infant deaths, corrected to take into account under-registration (1949–1959)

Year	Registered deaths	Registered births	Uncorrected infant mortality rate	Correction coefficient	Estimated deaths at under age 1
1949	70,666	911,641	82.1	1.087	76,814
1950	63,298	844,585	73.0	1.091	69,058
1951	65,841	858,052	77.1	1.089	71,701
1952	62,245	846,434	73.2	1.091	67,909
1953	51,109	795,652	62.9	1.095	55,964
1954	53,215	845,128	64.2	1.095	58,270
1955	45,262	792,696	55.9	1.098	49,698
1956	38,189	822,569	47.0	1.102	42,084
1957	35,997	847,781	42.9	1.103	39,704
1958	32,851	873,483	38.0	1.106	36,333
1959	32,007	880,552	36.4	1.106	35,399

change of main residence. Since only the urban population was subject to this *propiska* regime, inter-urban, rural-urban and urban-rural migration were recorded, but not intra-rural migration.

Two types of tables based on these statistics are available (see Table 3.3). The first gives the distribution of migrants by sex and age, for each year, without distinguishing migration inside Ukraine from external migration. The second distributes the totals for all ages according to places of arrival and departure (regions throughout the USSR, and abroad), and therefore provides a way of separating – at least at this level – internal movements from external movements.<sup>6</sup> Nevertheless, the problem of how to measure migration from rural Ukraine to out of Ukraine (whether to urban or rural destinations) and migration into rural Ukraine from outside Ukraine has still not been solved.

However, since 1950, TsSU's annual estimates of the total population of Ukraine have also been available; it is reasonable to assume that these have taken into account estimated migration from rural Ukraine to towns and cities outside Ukraine and vice versa, since these moves would have been recorded in statistics for other republics. By comparing these annual population estimates to annual natural increases, we were able to recover the overall estimates for external migration used by TsSU (Table 3.5). By deducting the natural increase for the year 1958 from the population on 1 January 1959, we found an excess over the estimated population on 1 January 1958, which represents apparent net migration. The latter differs fairly significantly from recorded migration. Not only are there 549,000 movements in total for the period 1950–1958 (as against 989,000 according to the registers), but the annual differences vary considerably. From 1952 onwards, the difference was large and

<sup>6</sup>In reality, since this table is so large, we obtained only a copy of the line giving total migration inside Ukraine, which allowed us, by deduction from the above, to find outward migration.

**Table 3.5** Comparison between recorded and apparent net external migration after comparing annual population estimates to natural increase

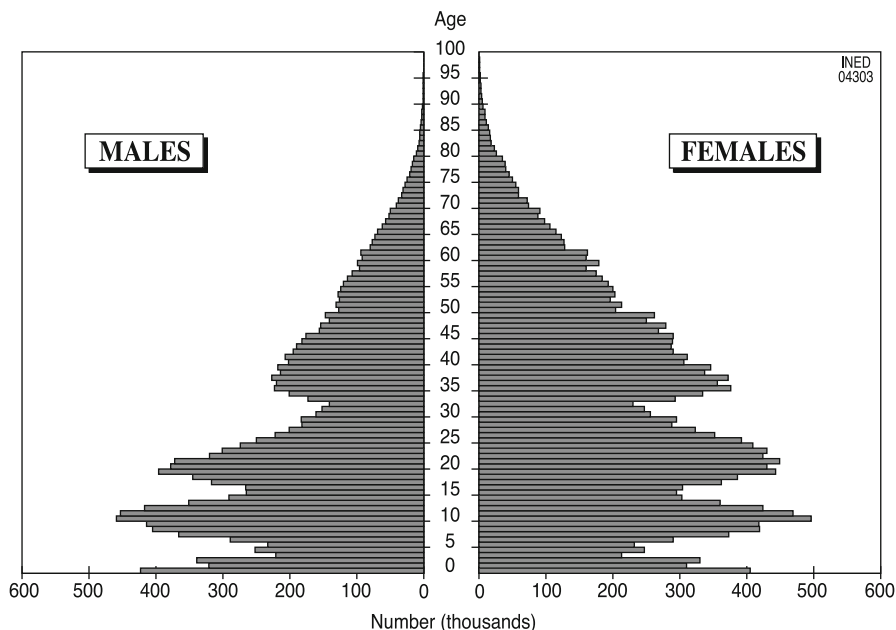
Year	Population estimated by TsSU	Births	Deaths	Apparent net migration	Recorded net migration	Difference
1950	36,588	845	315	106	111	-5
1951	37,223	858	328	161	104	58
1952	37,915	846	326	-70	50	-120
1953	38,366	796	327	156	214	-57
1954	38,991	845	319	-247	-43	-203
1955	39,271	793	296	-26	41	-67
1956	39,742	823	293	150	213	-62
1957	40,422	848	305	214	160	54
1958	41,179	873	287	103	141	-38
1959	41,869					
Total		7,526	2,794	549	989	-440

most often negative; but in 1950 and 1951, it was small and positive. Since most of the problem here arises from the fact that registers did not take into account migration between rural areas of Ukraine and outside (whether urban or rural areas), in our backward projection from 1959 to 1949, we chose to use the net migration figures obtained from population estimates up to 1950. For 1949, in the absence of a 1 January population estimate and given the small differences observed in 1950–1951 (Table 3.5), we used recorded net migration as it stood. At the same time, we used statistics drawn from the registers in order to distribute our estimated net external migration by sex and age group, hypothesizing that the age structure of external migration was not radically different from that of total migration.

However, for backward projection, we needed net migration by single year of age. Unfortunately, departure statistics related only to age groups, which themselves varied from one period to another.<sup>7</sup> In breaking down age groups into years of age, given the major disruptive effects of history on the age pyramid, our only choice was to work with migration rates. In order to do this, therefore, we made an initial rough backward projection without migration, adding the age-specific deaths estimated in the section above to the total 1959 Census numbers. We thus obtained an initial estimate of populations by age on 1 January of each year, allowing us to calculate annual net migration rates by age group. These rates by age group were then broken down into age-specific rates, using a polynomial model.<sup>8</sup> Applying these

<sup>7</sup>In 1949 and 1950, movements were grouped in an unusual way under the age of 18 (0, 1–3, 4–7, 8–13, 14–15 and 16–17), by year of age from 18 to 24 and by 5-year age group from 25 to 60, with a final group aged 60 and over. From 1951, they were given by year of age up to 20 and in 5-year age groups from 20 to 60, with a final age group of 60 and over.

<sup>8</sup>If we let the rate at age  $x$  be  $y$ , it is implied that, within a small age interval, it varies as a function of  $x$  according to an equation of the type:  $y = ax^2 + bx + c$ .



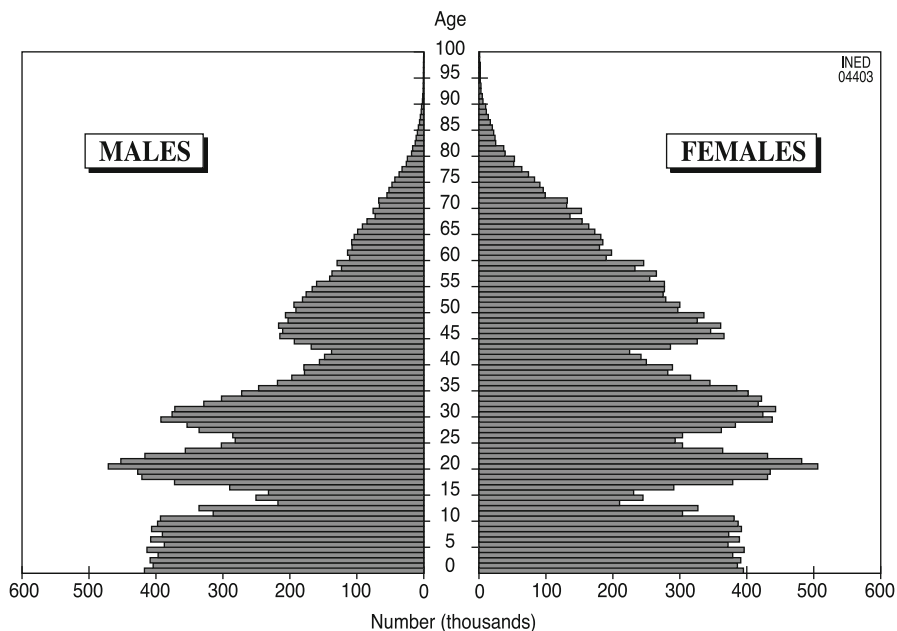
**Fig. 3.1** Age pyramid of population of Ukraine on 1 January 1949, by backward projection from 1959 Census

age-specific rates to the previous populations estimated by age, we were able to find a distribution by year of age for each year's net migration, which was then finally adjusted to give totals by age group to match initial amounts of net migration.

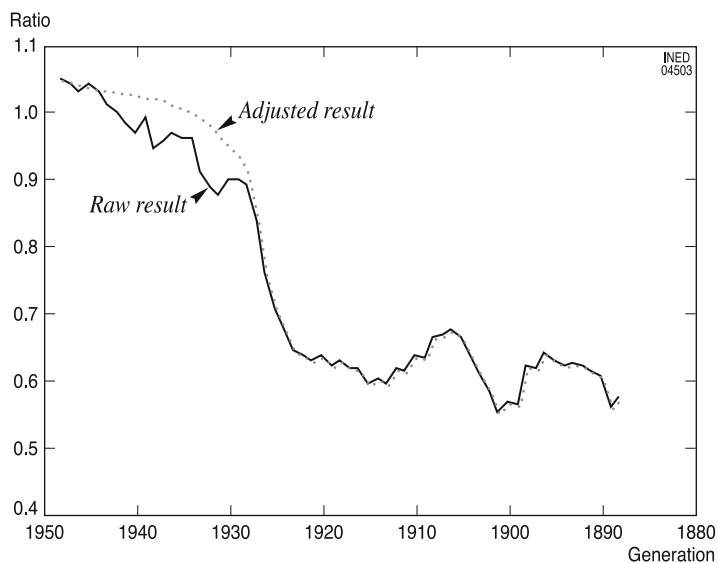
### 3.4.3 Backward Projection of the Population in 1949

Starting from the 15 January 1959 Census population (here assimilated to a 1 January population), it was then very simple to add deaths and subtract net migration, age by age within each cohort, in order to re-estimate the population on each 1 January and in particular on 1 January 1949. At this date, the Ukrainian age pyramid was clearly marked by the consequences of two wars and of the 1933 famine (Fig. 3.1), and these are still evident 10 years later in the pyramid drawn from the 1959 Census (Fig. 3.2).

However, the age distribution obtained in this way suffers from slight anomalies in the sex ratio for younger cohorts, which cannot in any way be explained by these historical events (Fig. 3.3). In all probability, this relates to an under-estimate of post-1949 female migration in our backward projection. We therefore adjusted the sex ratios initially obtained as indicated in Fig. 3.3 and corrected the age-specific female population.



**Fig. 3.2** Age pyramid of population of Ukraine, 15 January 1959 Census



**Fig. 3.3** Sex ratio by cohort, resulting from estimated population at 1 January 1949, with adjustment for 1930–1945 cohorts

### 3.5 Estimating 1939–1949 Losses

As we had done for the 1930s, we first estimated overall losses due to the 1941–1945 war and to the 1947 famine, whether they originated from excess mortality, birth deficit or net outward migration; then we attempted to isolate the losses attributable specifically to excess mortality.

#### 3.5.1 *Total Losses*

In order to estimate overall losses, all we had to do was compare the population that, with normal fertility and mortality and without migration, Ukraine might have had on 1 January 1949 to the population that we had just backward-projected to the same date.

On the mortality side, we interpolated age-specific and sex-specific probabilities of dying for 1939 and for 1949, hypothesizing that the health situation had returned to normal by 1949. These assessments obviously take into account the corrections for under-registration of deaths mentioned above.

For fertility, results are available from two retrospective surveys carried out in Ukraine in 1960 and in 1967, which enabled us to estimate fertility rates by mother's age group for the preceding 20 years. Then, by simple interpolation between the estimates obtained for 1939 and 1949, an assessment could be made of the fertility that might have been observed from 1940 to 1948 if there had been neither war nor famine and Stalinist repression.

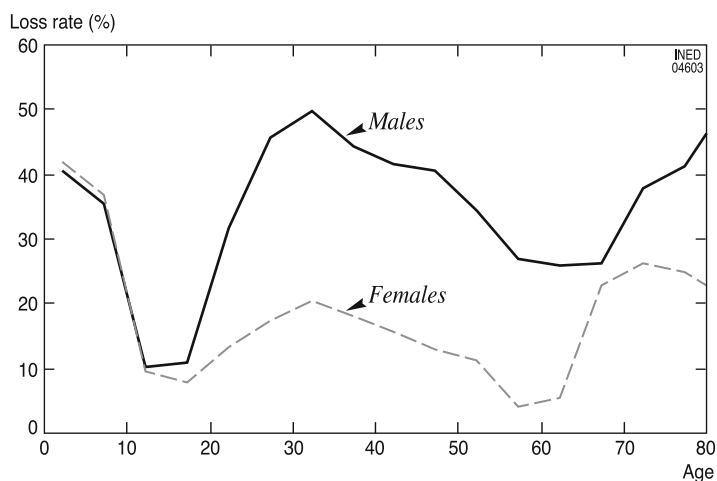
Starting from the population by sex and age on 1 January 1939 (present-day borders), we applied the age-specific and sex-specific probabilities of dying and the age-specific fertility rates for 1939, which enabled us to estimate the expected population by sex and age on 1 January 1940, and thus, by successive iterations, each following year's expected population up to 1 January 1949.

Table 3.6 compares the expected 1949 population by age groups, obtained in this way, to the actual estimated population for the same year. While estimating by backward projection from the 1959 Census gave a total of 35.7 million inhabitants, this initial projection from the 1939 Census gives 48.3 million inhabitants. The difference, 12.6 million, represents an estimate of overall losses due to the crisis.

These 12.6 million people consist of 7.86 million males and 4.73 million females. The deficit is very high for both sexes among the very young (roughly 40%) because of the fall in fertility during the war and the 1947 famine. It is also very high for men of working age because of war losses and deportations (Fig. 3.4). This estimate of overall losses thus combines the effects of excess mortality due to the crisis – which

**Table 3.6** One January 1949 population (in thousands) by sex and age groups, expected in the absence of crisis and estimated by backward projection

Age groups	Expected population			Estimated population			Losses		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
0–4	2,556	2,519	5,074	1,528	1,470	2,998	1,028	1,048	2,076
5–9	2,630	2,626	5,256	1,708	1,668	3,376	921	959	1,880
10–14	2,146	2,113	4,259	1,937	1,920	3,857	209	193	402
15–19	1,788	1,806	3,594	1,596	1,669	3,265	192	137	329
20–24	2,426	2,463	4,889	1,661	2,142	3,803	765	321	1,086
25–29	1,911	1,993	3,904	1,043	1,650	2,693	868	343	1,211
30–34	1,644	1,707	3,351	829	1,362	2,192	815	344	1,159
35–39	1,961	2,169	4,130	1,101	1,786	2,886	861	383	1,244
40–44	1,662	1,751	3,412	977	1,484	2,461	685	266	951
45–49	1,299	1,549	2,847	775	1,352	2,127	523	197	720
50–54	965	1,144	2,109	637	1,020	1,657	328	124	452
55–59	733	927	1,660	538	893	1,430	196	34	230
60–64	559	739	1,298	416	701	1,117	143	39	182
65–69	392	644	1,035	290	498	788	102	145	247
70–74	274	430	704	171	318	489	103	112	215
75–79	162	277	440	96	209	305	66	68	134
80–84	78	125	203	39	99	138	39	26	65
85+	38	61	99	22	70	92	16	–9	7
Total	23,224	25,041	48,265	15,365	20,310	35,675	7,859	4,731	12,590

**Fig. 3.4** Differences between total numbers expected and total numbers observed in 1949 related to total numbers expected, by age and sex

we are interested in here – with those of the exceptional fall in fertility and of net outward migration, which we must now try to separate out.

### ***3.5.2 Estimating Population Deficit Due to Fall in Fertility***

In order to isolate the effect attributable specifically to the fall in fertility, we must do our best to repeat the same exercise, comparing the expected population and the actual population by substituting each year's actual births for theoretical births calculated using non-crisis fertility rates. It should then be possible to obtain a new estimate of losses, combining only excess mortality and net outward migration. For 1939–1940 and 1945–1948, we have already estimated (above) real births within present-day borders, from births registered within contemporary borders, using a few simple hypotheses. However, we have expressed reservations about the results for 1940; now we must also form a judgement on under-registration for the years 1945–1948 and, above all, fill in estimates for 1941–1944 – years for which no statistics are available.

#### **3.5.2.1 Assessing Under-Registration of Births from 1945 to 1948**

Our backward projection from 1959, continued to the years before 1949,<sup>9</sup> allowed us to estimate the probable trend in this under-registration. Table 3.7 gives, for each year since 1945, the number of births registered by ZAGS (extrapolated to present-day territory) and the births resulting from backward projection. The apparent coverage rate (the ratio of the first group of births to the second) fluctuates fairly strongly at the beginning of the period and rises to an abnormal level – in excess of 1 – at the end of the period (Fig. 3.5).

The rates of more than 1 in 1957 and 1958 can be explained by under-counting of young children in the Census. As for the fluctuations at the start of the period, they are especially marked around 1948 and therefore relate essentially to age heaping (rounding to age 10) in the 1959 Census. We therefore assumed that there was almost complete<sup>10</sup> registration of births in 1958 and that it had improved gradually from about 96% in 1946. On the other hand, for 1945, when registration

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<sup>9</sup>In order to do this, we used actual observed mortality (after correction for under-registration) for the years where observations were available (1938–1940 and 1945–1948) and theoretical mortality (i.e. assuming no crisis) for the years where no death statistics were available. In order to take account of under-registration, the process was as explained above. Specifically, the following correction coefficients were used for infant mortality: 1.081 in 1945, 1.084 in 1946, 1.066 in 1947 and 1.090 in 1948.

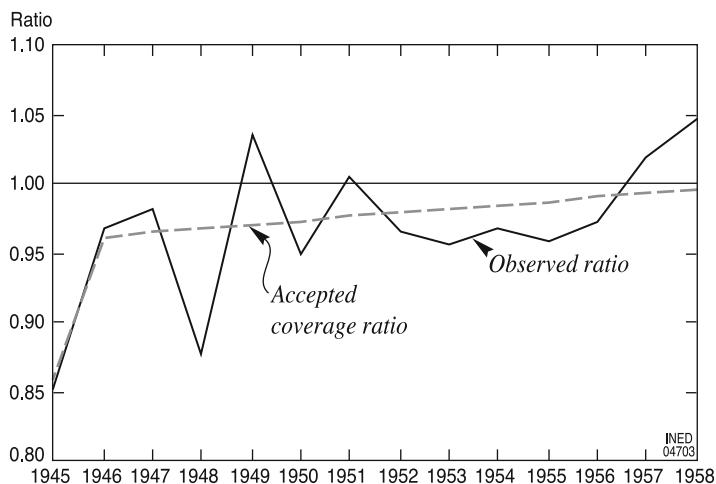
<sup>10</sup>With the exception, however, of missing births corresponding to the under-registration of infant deaths that will be discussed in Chap. 4. Thus, instead of tending towards 1 in 1958, our estimated coverage rate tended towards 0.996.



**Table 3.7** Births registered by ZAGS, backward-projected births from 1959 and accepted births for the period 1946–1958

Year	Births		Coverage rates		
	Registered by ZAGS <sup>a</sup>	Backward- projected from 1959	Apparent (a/b)	Estimated	Accepted births
1945	435,230	502,104	0.87	0.86	506,726
1946	753,493	775,610	0.97	0.96	783,633
1947	712,994	727,406	0.98	0.96	739,346
1948	757,783	862,865	0.88	0.97	783,494
1949	911,641	880,445	1.04	0.97	939,818
1950	844,585	890,939	0.95	0.97	868,144
1951	858,052	854,442	1.00	0.98	879,409
1952	846,434	875,964	0.97	0.98	864,966
1953	795,652	831,550	0.96	0.98	810,696
1954	845,128	873,200	0.97	0.98	858,591
1955	792,696	827,540	0.96	0.99	802,970
1956	822,569	845,507	0.97	0.99	830,795
1957	847,781	832,048	1.02	0.993	853,757
1958	873,483	834,144	1.05	0.996	876,991

<sup>a</sup>For the years 1946–1953, births registered in Crimea have also been added

**Fig. 3.5** Ratio of backward-projected births to registered births, 1945–1958

was still significantly disrupted by the aftermath of the War, we accepted the apparent coverage rate as real. The last column of Table 3.5 gives the births we finally accepted.

At the same time, this exercise enabled us, as we went along, to correct the irregularities in declared ages at the 1959 Census for the 1946–1951 birth cohorts,

**Table 3.8** Correction of 1959 Census numbers for 1946–1951 birth cohorts (total for both sexes)

Birth cohort	Population counted in census	Corrected births	Backward-projected births	Re-estimated population	Adjusted population accepted
1951	763,632	879,409	854,442	785,946	785,842
1950	798,609	868,144	890,939	778,176	778,073
1949	784,347	939,818	880,445	837,239	837,115
1948	773,902	783,494	862,865	702,714	702,627
1947	618,672	739,346	727,406	628,827	628,737
1946	662,282	783,633	775,610	669,132	669,050
Total	4,401,444			4,402,035	4,401,444

which had caused the fluctuations in the ratio of backward-projected births to registered births (Fig. 3.5). At each age, the populations were first re-estimated as follows:

$$P_e(i) = P_r(i) + (N_c(i) + N_r(i)) * P_r(i) / N_r(i)$$

Where, for each birth cohort  $i$ :

$P_r$  is the population recorded in the 1959 Census

$P_e$  is the re-estimated 1959 Census population

$N_r$  is the number of births estimated by backward projection

$N_c$  is the number of births corrected for under-registration

These results were then readjusted to bring their total into line with the Census total (Table 3.8).

### 3.5.2.2 Re-assessing Births for 1940 and Estimating Births for 1941–1944

For 1940, the number of backward-projected births was lower than the number of observed births (Table 3.9). This is normal, since, between birth and being counted in the 1959 Census, this birth cohort experienced the excess mortality of war, which was not taken into account in our backward projection. However, everything leads us to believe that this difference is lower than it should have been, since the gap was much greater in 1939. Conversely, the latter may actually have been over-estimated, since people born in 1939 were 19 years old at the January 1959 Census and their total number counted in the Census may have been reduced by age heaping (rounding to age 20). In fact, the ratio of observed births to backward-projected births was lower in 1938 than in 1939. However, it remained higher than that for 1940. In order to avoid this age heaping problem, we applied the mean of the ratios obtained for the 3 years 1938–1940 to the year 1939. With the War years over, the ratio between observed births and backward-projected births was under 1.01 in 1945, rather than the 1.08 estimated for 1939. It can be broadly accepted that it would have reduced in a more or less linear way from one birth cohort to the next between 1939 and 1945, and this enabled us to interpolate its values for the years 1940–1944 (Column d, Table 3.9). Finally, accepted births for the missing years

**Table 3.9** Non-crisis births, births backward-projected from 1959 and actual births estimated for 1939–1949

Year	Observed births	Backward- projected births	Ratio of observed/ backward-projected births		Accepted births
	(a)	(b)	(c) = (a)/(b)	Estimate (d)	(e) = (b)*(d)
1938	1,468,480 <sup>a</sup>	1,338,474	1.097		1,468,480
1939	1,419,038 <sup>a</sup>	1,247,109	1.138		1,419,038
1940	1,177,772	1,159,231	1.016	1.067	1,243,165
1941		930,163		1.056	985,325
1942		672,117		1.044	703,141
1943		530,602		1.033	548,323
1944		559,064		1.021	570,957
1945	506,429 <sup>a</sup>	502,104	1.009		506,726

<sup>a</sup>Corrected for under-registration (as explained in Chap. 2 for 1938–1939 and produce in the last column of Table 3.7, above, for 1945)

were obtained by applying these coefficients to the backward-projected births (Column e, Table 3.9).

In doing this, we are admitting the hypothesis that the deterioration in registration of births began from 1940 with an under-registration rate of 5% (rather than in 1939 with 1%).

Table 3.10 and Fig. 3.6 compare expected annual trends in births in the absence of crisis with observed births (for present-day territory) and estimated actual births.

The difference between total estimated births and total theoretical births for the period 1939–1948 gives an estimate of the crude birth deficit for Ukraine, resulting from the fall in fertility during this crisis period. However, as it stands, the crude figure of 4.2 million missing births cannot be subtracted from the estimate of overall losses obtained above (12.6 million) in order to deduce losses from mortality and migration, since these births are themselves naturally subject to the risks of death and migration.

If the projection is re-done with the estimated actual births from Table 3.9 for the whole of the period 1939–1948, a new estimate of the expected population in 1949 is obtained – without crisis mortality and without migration. It amounts to 44.7 million instead of the 48.3 million previously estimated, which brings the net effect of the exceptional fall in fertility during the crisis to 3.6 million. It remains to be determined which part of the remaining deficit of 8.8 million people relates to net outward migration and which to the excess mortality of the crisis.

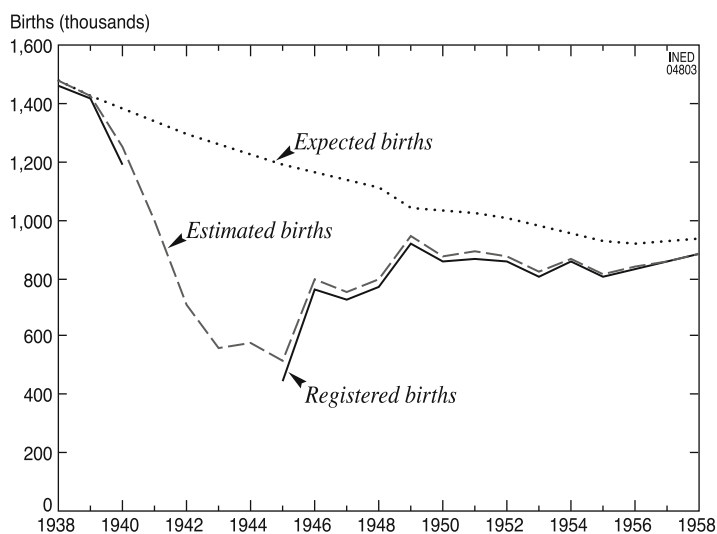
### 3.5.3 *Estimating Population Deficit Due to Migration*

For the 10 years from 1939 to 1948, ordinary migration statistics drawn from passport registers are available for only 3 years: 1946–1948. However, during the War years and the immediate post-War years, forced migration of various kinds had a

**Table 3.10** Annual trends in observed, estimated and expected non-crisis births, from 1938 to 1958

Year	Observed births <sup>a</sup>	Estimated births	Theoretical births
1938	1,453,796	1,468,480	1,468,480
1939	1,404,847	1,419,038	1,419,038
1940	1,177,772	1,243,165	1,371,052
1941		985,325	1,327,280
1942		703,141	1,285,867
1943		548,323	1,249,040
1944		570,957	1,214,222
1945	435,230	506,726	1,182,012
1946	753,493	783,633	1,155,934
1947	712,994	739,346	1,130,581
1948	757,783	783,494	1,103,688
1949	911,641	939,818	1,030,335
1950	844,585	868,144	1,021,300
1951	858,052	879,409	1,010,021
1952	846,434	864,966	996,086
1953	795,652	810,696	973,896
1954	845,128	858,591	947,875
1955	792,696	802,970	918,786
1956	822,569	830,795	912,899
1957	847,781	853,757	917,453
1958	873,483	876,991	929,415
Total 1939–1948		8,283,148	12,438,714
Theoretical births - Estimated births 1939-1948			4,155,566

<sup>a</sup>In present-day territory; not corrected for under-registration

**Fig. 3.6** Annual trends in observed, estimated and expected non-crisis births, from 1938 to 1958

strong impact. It can be classified into five categories: (a) exodus, evacuation and voluntary or organized returns, (b) migration flows of Poles and *Volksdeutsch* Germans, (c) forced labour in territories occupied by Germany, followed by repatriation, (d) forced migration (administrative deportation, or *spetsposelenie*) and the return of such deportees, (e) deportation by the Gulag. Let us start with the years 1939–1945, where estimates are the most difficult.

### 3.5.3.1 Exodus, Evacuation and Voluntary or Organized Returns

The first movements of refugees affected the present-day territory of Ukraine in 1939, with the discriminatory Hungarian policy enforced even before the outbreak of war. The number of Czech and Slovak refugees living in Subcarpathian Ruthenia who were driven out to Bohemia and Slovakia by the Hungarian authorities in 1939 is estimated at 25,000. With the partition of Poland, about 20,000 Jews from Subcarpathian Ruthenia fled to Galicia, which was annexed by Ukraine (Kulischer 1943, pp. 48, 114). Later, in 1942–1943, Eastern Galicia was to receive another 60,000 Jewish refugees from Slovakia (Kulischer 1943, p. 114).

There was also a flow from Romania to Ukraine of Jewish populations who feared Romanian and German persecution. Before June 1941, about 72,000 Romanian Jews headed for the territories newly annexed by Ukraine. This first movement was followed in 1941–1942 by the organized transfer of 185,000 Jews to Ukrainian Transnistria, bordering Bessarabia, under Romanian protectorate from 1941 to 1944.

But the biggest influx of refugees came from the Polish regions annexed by Germany in September 1939. Between September 1939 and June 1941, 300,000 Poles fled to the Polish regions annexed by the USSR (Kulischer 1943). Pro rata to the population of the annexed territories that became part of Ukraine, 180,000 of them can be viewed as coming to Ukraine, with the others settling in Belarus and the Baltic States. In fact, it turned out that these Poles stayed in Ukraine only temporarily, since the Soviet authorities soon carried out deportations to Siberia that impacted just as much on these new refugees as on the Polish settlements established in border territories after the First World War. In total, it is estimated that 225,000 Polish refugees and settlers were deported to Siberia between February 1940 and June 1941.

Exodus and evacuation affecting the Ukrainian population as a whole began with the invasion of the USSR by Germany in June 1941. In total, it is estimated that about 3.5 million people were involved in evacuation or voluntary exodus in that year (IIP 1975, pp. 263–276).

The first refugees began to return on the liberation of Ukraine by the Red Army in 1943–1944. No overall estimate of returns is available – and even less any annual distribution of them. We assumed that 80% of those who were evacuees and refugees at the start of the War (three million people) returned to Ukraine between 1944 and 1946. Taking into account unfolding events, we then assumed that these returns were distributed as roughly 15% for 1944, 50% for 1945 and 35% for 1946.

### 3.5.3.2 Agreed Exchanges of German or Polish Populations and Volksdeutsch Germans

Under the German-Soviet Pact, Germans in the territories annexed by the Soviet Union were authorized to go and settle in Germany, while Ukrainians, Russians and Belarussians living in the Polish territories annexed by Germany were to go to the USSR.

In fact, very few Poles opted for Soviet citizenship within the framework of the Pact. Only 35,000 were registered in 1940, across the whole USSR (mainly Ukraine and Belarus). On the basis of the proportions of Ukrainian-speaking Poles counted in the 1931 Polish Census, we estimated that about 26,000 of these 35,000 Poles were of Ukrainian origin and therefore settled in Ukraine.

Movement in the opposite direction, of Germans from the USSR, was greater. About 250,000 Germans left Volhynia, Galicia, Bessarabia and Northern Bukovina for Germany from August 1939 to June 1941. Subsequently, with the German occupation of Ukraine, this movement continued, voluntarily or under duress (the *Volksdeutsch* round-up). It grew even more in 1943–1944, as German troops retreated. It is estimated that 325,000 Germans left Ukraine for Germany in 1943 and 1944, of whom about 225,000 were later to be repatriated by the Soviets in 1945–1946. However, the majority of these repatriated Germans were resettled in Siberia or in Central Asia. We do not know in what proportion they returned to Ukraine and, lacking any more precise information, we estimated such returns at a third.

After the war, under the 1944–1945 agreements between the new Poland and the USSR, a large number of Poles were compelled to leave the former Polish territories annexed by Ukraine. Between 1944 and 1946, 787,000 Poles left Ukraine for Poland, of whom 43% were male and 57% female (GUS 1947, p. 80). In exchange, Ukrainians from Poland once more had the possibility of opting for Soviet citizenship, and this time, transfers – probably under compulsion from the Soviet authorities – were on a very much larger scale than in 1940. In total, 518,000 Poles moved to the USSR (GUS 1947), of whom about 480,000 went to Ukraine.

These were not the only transfers arising from intergovernmental agreements. Movements also took place in the context of the 25 June 1945 agreement between the USSR and Czechoslovakia on Subcarpathian Ruthenia. Since no statistics concerning these transfers are available, we have taken into account the total population numbers subject to the agreement: 90,000 Ukrainians living in Czechoslovakia and 33,000 Czechoslovakians living in Subcarpathian Ruthenia.

### 3.5.3.3 Forced or Voluntary Labour in Territories Occupied by Germany (*Ostarbeiter*)

Several fairly divergent estimates are available of the number of civilian workers who went to Germany – willingly or otherwise – between 1941 and 1944.

On the one hand, German sources indicate that 2.8 million *Ostarbeiter* were transferred from the Soviet Union to Germany between the start of operations and

mid-June 1944 (Polian 1996, p. 117). Pavel Polian includes an additional 100,000 people transferred in the second half of 1944 and thus obtains a total of 2.9 million Soviet workers who left for Germany between 1941 and 1945. He has estimated that 2.3 million of these workers (79%) came from Ukraine. It is probable that this total relates only to pre-war Ukrainian territories. At the very least, it excludes transfers from Galicia, annexed in 1939. This is because, during the War, Galicia was administered by the Government of Lemberg, independent from that of Ukraine. Workers coming from Galicia therefore counted as Polish or of Lemberg origin, not as *Ostarbeiter* – a designation generally reserved for nationals of the USSR within its old borders. German sources enable assessment of the number of Galician workers recruited for labour in Germany at 600,000 (Polian 1996, p. 68). Thus, relying on the data gathered by Polian, the number of workers from the USSR (1945 borders) who moved to the Reich can be calculated at 3.5 million, of whom 2.9 million were Ukrainians.

However, this estimate seems to us excessive. The estimate of the State War Crimes Commission, which assessed the number of Ukrainian workers deported to Germany and Romania at two million (Polian 1996, p. 369) is probably closer to reality.

The final report of the Repatriation Commissions estimated the proportion of Ukrainians among Soviet civilians transferred to Germany at 44%. Moreover, according to Polian (1996, pp. 298 and 307), 1.1 million of the 2.9 million Soviet civilians repatriated from abroad on 1 March 1946 were Ukrainians – slightly under 40%. If we add to these the 1946 and 1947 repatriations, we arrive at a little over 1.2 million people repatriated after the War. However, we must also add *Ostarbeiter* who returned to Ukraine during the German occupation, either because they were judged to be handicapped or incapable of work and so were forced to return by the German authorities, or because they succeeded in escaping in various ways. Polian (1996, p. 68) estimates forced returns between 1942 and 1944 at 150,000 for the whole USSR, but gives no indication of the number of voluntary returns. Relying on German statistics on transfers, deaths and the actual jobs undertaken by *Ostarbeiter* in the German economy, the number of Ukrainian workers who returned to occupied Ukraine can be estimated at 450,000. This would therefore make a total of 1.7 million Ukrainian civilians who returned to Ukraine after the War. Obviously others could have died in Germany or elsewhere, or evaded repatriation. The latter possibility was open, in particular, to those who possessed certain documents – for example, proof of residence in Poland before 1939. Moreover, it is known to be the case that, for the whole USSR, 1.2 million Soviet workers and refugees were never found by the Soviet repatriation services, and the majority of these were considered to be deceased (Polian 1996, p. 72); if we accept the above proportion of 40%, this would mean 480,000 Ukrainians. Finally, 415,000 Ukrainian workers who had moved to Germany were mobilized from there and thus fell outside the repatriation statistics. In total, by adding these 900,000 unrepatriated civilians to the 1.7 million repatriates, we obtain an overall estimate of 2.6 million Ukrainian civilians transferred to Germany. However, this total includes the population transferred under the *Volksdeutsch* scheme (600,000). It therefore seems reasonable to believe that,

excluding this category (already mentioned in the previous section), the number of Ukrainian civilians transferred to Germany must have been close to two million. Therefore we think that the State War Crimes Commission's estimate (two million) is closer to reality than the combined total from the sources cited by Polian (2.9 million).

We divided these *Ostarbeiter* by year of departure according to information provided by the German service for recruiting foreign labour: 3% in 1941, 48% in 1942, 30% in 1943 and 19% in 1944.

### 3.5.3.4 Forced Migration of Ukrainian Populations

Administrative deportations (notably of kulaks), having increased in scale during the 1930s, continued in 1939 and 1940: 133,000 new arrivals were recorded in the camps in 1939, 79,000 in 1940 and 47,000 in 1941 (Zemskov 1990). These statistics relate to the population of the whole USSR, but the proportion that represents Ukrainians can be estimated pro rata to the Ukrainian population in the 1939 Census, i.e. 19%.

Forced population transfers linked to the Second World War must then be added to these pre-War movements. They first affected the Polish population of the annexed territories, involving, according to Viktor Zemskov, about 380,000 people between 1940 and 1941. If we accept that the number of these deportees who were Ukrainians was proportional to the section of the population annexed to Ukraine within the whole taken by the USSR from Poland (60%), deportations of Poles who had become Ukrainians from Volhynia and Eastern Galicia can be estimated at 228,500. In Summer 1941, administrative deportations also involved German communities settled in southern Ukraine and Crimea for two centuries. From 1943, the hunt for collaborators began. It targeted various categories of suspects: repatriated Germans, Crimean ethnic minorities, members of the Organization of Ukrainian Nationalists (OUN), etc. These last three categories are easily identifiable in the deportation statistics kept by the NKVD,<sup>11</sup> which give reason for and year of deportation. To these must finally be added, from 1946, members of the militias (police auxiliaries) and soldiers of the Vlasov army.<sup>12</sup>

Thus, in total, almost a million Ukrainians can be counted as having been forcibly exiled from Ukraine between 1939 and 1947. Table 3.11 summarizes the various forced population movements and their timings.

We distributed the 100,000 Ukrainian nationalists deported between 1944 and 1947 equally across the 4 years. The 83,000 members of the militias and soldiers of the Vlasov army deported in 1945–1947 were distributed as 40,000 in 1945, 21,500 in 1946 and 21,500 in 1947.

<sup>11</sup>The *Народный комиссариат внутренних дел* [People's Commissariat for Internal Affairs].

<sup>12</sup>The latter category was the object of 283,000 deportations. We have assumed that the proportion of Ukrainians was the same as that observed among prisoners of war (Polian 1996, p. 298), i.e. 29%.



**Table 3.11** Forced movements of Ukrainian populations out of Ukraine by the Soviet authorities between 1939 and 1947

Population category	Years of deportation	Number
Poles from annexed Volhynia and Eastern Galicia	1940–1941	228,571
Crimean Germans	1941–1942	52,293
Germans from other regions of Ukraine	1941–1942	83,804
Tatars and other Crimean peoples	1944	228,392
<i>Volksdeutsch</i>	1944–1946	126,106
Ukrainian Nationalists	1944–1947	100,310
Members of the militias and soldiers of the Vlasov army	1945–1947	83,009
Other deportations	1939–1941	48,686
Total	1941–1947	951,171

Sources: IEA 1992 (Institute of Ethnology and Anthropology, Russian Academy of Sciences); Zemskov 1990; Polian 1996

An overwhelming proportion of the kulaks deported before the War were liberated from 1942 onwards: of the 962,000 deported and remaining at 1 April 1942, 810,600 were freed during the War. Thus, on 1 October 1948, there were only 137,881 kulaks still detained outside the gulags (IEA 1992). Since we know that, at the outset, about 16% of deported kulaks came originally from Ukraine (Zemskov 1990), we can estimate the number of kulaks who returned to Ukraine from 1942 onwards at 133,000.

As for most of the wartime deportees – they were freed after Nikita Khrushchev<sup>13</sup> came to power, from the mid-1950s onwards. Their returns are therefore incorporated into standard migration statistics for that period.

### 3.5.3.5 Deportations to Gulag Camps, Settlements and Prisons

Thanks to the work of Viktor Zemskov (1991a, b, c), which relates to the whole of the USSR, movements into and out of the gulags during the period 1939–1947 can be reconstructed<sup>14</sup> (Table 3.12).

Thus, between 1939 and 1947, about 1.1 million Ukrainians were deported by the Gulag; 620,000 of them were freed, 170,000 died in captivity and 40,000 of them left the system for other reasons (including by escaping).

<sup>13</sup>It was actually Khrushchev who had, on Stalin's orders, conducted the deportation of Ukrainian nationalists!

<sup>14</sup>We know the distribution of Gulag detainees by ethnic origin, at the start of each year from 1940 to 1947. We estimated the proportion of Ukrainians among the detainees by applying the proportion of Ukrainians observed in the 1939 Census to each ethnic group, although we were aware of the risk of under-estimating deportees originating from the territories newly acquired by Ukraine.

**Table 3.12** Movements of Ukrainians into and out of Gulag camps, settlements and prisons

Year	Population at start of year	New detainees	Deaths	Freed	Other departures
1939	277,705	44,016	8,958	44,947	1,129
1940	266,687	131,939	9,061	56,385	10,169
1941	323,011	75,315	18,048	107,272	9,475
1942	263,530	78,465	45,448	84,563	554
1943	211,431	53,391	33,691	62,346	3,211
1944	165,574	110,108	15,767	33,545	1,670
1945	224,700	217,504	13,474	88,745	4,802
1946	335,183	169,053	8,968	55,258	4,888
1947	435,123	218,940	18,025	89,011	7,795
1948	539,232				
1939–1947		1,098,731	171,440	622,072	43,692

Source: Zemskov 1991a, p. 11; Zemskov 1991b, p. 12

However, during the German occupation, the new Ukrainian internees were essentially people who had previously been refugees or evacuees, and therefore they are already counted in the estimates made above for these categories of departures from Ukraine. In order to avoid double-counting, we reduced the entries in Table 3.12 for the years 1942–1944 to zero. This reduces the total number of deportations of Ukrainians to the gulags between 1939 and 1947 to 857,000.

On the other hand, once freed, prisoners did not all return to Ukraine immediately. Those who were freed in the early years of the War were first mobilized by the army or redeployed to Siberia with the military industry, and in a lot of cases it was only at the end of the War that their return to Ukraine actually became possible. An estimated 20% never returned: either they died at the front, or they tried to settle in other regions, far from the places where they were known and had been arrested. So we estimated that, of the 254,000 freed in 1941–1943, 203,000 returned to Ukraine – 15% in 1944, 50% in 1945 and 35% in 1946.

### 3.5.3.6 Summary of Arrivals and Departures for Ukraine in the Period 1939–1947

Table 3.13 summarizes the spread of these different categories of forced or voluntary emigration and return across the period 1939–1947.

In total, 9.4 million people left Ukraine from 1939 to 1947 and 6.5 million returned during the same period, which gives total net outward migration of 2.9 million.

The next step must be to distribute these population movements by sex and age.

### 3.5.3.7 Distributing 1939–1947 Migration by Sex

The sex ratio of Germans from Bessarabia and Northern Bukovina who moved to Germany before 1941 is known: 46,000 males and 47,000 females arrived from Bessarabia, along with 20,000 males and 22,000 females who had left Northern

**Table 3.13** Estimated exceptional migration flows into and out of Ukraine 1939–1947 (today territory, thousands)

Year	Exodus and evacuations	Poles	Germans	Forced labourers or voluntary workers to German territories	Deportations	Gulag	Repatriations	Total
Departures from Ukraine								
1939	25		40		25	44		134
1940			215		103	132		450
1941	3,500			48	278	75		3,901
1942				1,128	7			1,135
1943	267		95	518				880
1944	178	117	230	333	259			1,117
1945		525			155	218		898
1946	33	294			65	169		561
1947					59	219		278
Total	4,003	936	580	2,027	951	857		9,354
Returns								
1939	36	90			2	45		173
1940	36	116			14	56		222
1941	93	27			4			124
1942	123	82		236				441
1943				130				130
1944	431		25	70	18	63	178	785
1945	1,435	319	47		54	191	997	3,043
1946	1,095	165	3		35	126	72	1,496
1947			0		22	89	11	122
Total	3,249	799	75	436	149	570	1,258	6,536

Bukovina (Schechtman 1946, pp. 199–200). We applied the same distribution (49% male, 51% female) to the 120,000 Germans of Polish origin who left territories annexed by Ukraine to go to Germany in 1939–1940.

For the two million Ukrainian workers who left for Germany between 1941 and 1945, we used the same sex distribution as that given by German statistical services for the whole foreign workforce on 15 November 1943. At this date, out of 1.8 million *Ostarbeiter*, 47% were male and 53% female (Polian 1996, p. 111). The sex ratio of repatriates is also known: the 1.1 million Ukrainians repatriated in 1944–1946 consisted of 34% male and 66% female (Polian 1996). The proportion of females among those transferred to Germany was therefore larger on return than on departure. This is primarily due to the filtering that operated in the evacuation camps for repatriates: of the 120,000 people handed over to the NKVD for subsequent deportation, 90% were male and only 10% female. Allowance must also be made for excess male mortality in Germany (including the massacres carried out by the Nazis and then by the NKVD and the Red Army at the end of the War), and for the fact that men were more successful in evading repatriation; women who had families feared repatriation less than being sent to the camps and losing their right to return to Ukraine.

The sex distribution of those deported after the liberation of Ukraine, although not known at departure, was described fairly accurately by the administrations of the places where they were detained. Women formed less than 1% of members of militias, soldiers in the Vlasov army and deported collaborators (Zemskov 1990). Other sex distributions are also known: of deportees from Crimea on 1 January 1949 – 44% male and 56% female (IEA 1992); of Ukrainian nationalists on 15 July 1949 – 36% male and 64% female (Zemskov 1990); of repatriated Germans on 1 January 1953 – 39% male and 61% female (IEA 1992). We assumed that the same proportions pertained at the time of deportation, even though this probably under-estimates the proportion of males.

In 1938, 49% of deported kulaks were male; by 1948, the figure was 45% (Zemskov 1990; IEA 1992). We estimated that this reduction was essentially due to male excess mortality and took the view that the sex distribution of the 150,000 kulaks freed between 1939 and 1948 was the same as that of kulaks detained in 1938: 49% male and 51% female.

The sex distribution of Gulag detainees was assumed to have remained constant with that of detainees on 1 January of the year under consideration. Thus, in total, of the 850,000 newly-detained Ukrainians and the 622,000 freed, 86% were estimated to be male and 14% female.

No sex-specific statistics are available relating to refugees and evacuees from the beginning of the War. We divided the 3.5 million refugees and evacuees by sex according to the proportions of the civilian population on the eve of the War – meaning the projected population at the start of 1941 less the male population mobilized by the army.<sup>15</sup> Thus, the 3.5 million 1941 refugees can be divided into two million females and 1.5 million males. We then estimated that 80% of them (1.7 million females and 1.3 million males) were able to return home between 1944 and 1946.

In the absence of any other source, we estimated that refugees and deportees from the Polish territories annexed by Ukraine were divided by sex in the same way as the 1939 population of the annexed territories (49% male and 51% female). We did the same for the 136,000 Ukrainian Germans deported by the Soviet authorities at the beginning of the War and for the 325,000 Germans evacuated by the Nazis in 1943–1944, relying on the results of the 1939 Census relating to this population.

Table 3.14 gives the annual sex-specific distribution of all these arrivals and departures for the present-day territory of Ukraine. Thus we finally arrive, for the whole period 1939–1947, at a net loss of 1.4 million males and 1.5 million females.

However, as we have already said, we have standard migration statistics from 1946 onwards. Therefore, our estimates for the years 1946 and 1947 can be compared with these results (Table 3.15). In 1946, standard statistics had not long been re-established and their quality was still poor; they significantly under-estimated

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<sup>15</sup>In order to estimate the number of men mobilized, we assumed that rates of mobilization varied with age from 60% at 18 years old through 40% at 30–15% at 40, making a total of four million men.

**Table 3.14** Estimated exceptional migration flows into and out of Ukraine 1939–1947 (today territory, thousands)

Year	Departures from Ukraine		Returns		Net flow	
	Males	Females	Males	Females	Males	Females
1939	84	50	103	71	19	21
1940	272	179	132	91	-140	-88
1941	1,715	2,187	61	63	-1,654	-2,124
1942	537	597	213	228	-324	-369
1943	399	481	62	69	-337	-413
1944	498	619	375	409	-123	-210
1945	497	401	1,425	1,618	928	1,217
1946	320	241	707	788	387	547
1947	209	69	91	31	-118	-38
Total	4,531	4,823	3,169	3,367	-1,361	-1,456

**Table 3.15** Estimated migration for the years 1946–1948 according to standard statistics (in thousands)

Year	Departures from Ukraine		Returns		Net flow	
	Males	Females	Males	Females	Males	Females
1946	152	198	570	545	417	347
1947	192	216	320	274	128	58
1948	174	182	300	248	126	66

migration linked to the War. Our estimate is therefore probably closer to reality. On the other hand, the breakdown by categories on which we relied becomes less and less effective as migration resumes a normal course and as voluntary migration flows – for which standard statistics are better able to account – increase in scale again. That is why, in our general assessment of 1939–1948 migration flows, we used both our estimates for the years 1939–1946 and the results of standard statistics for 1947 and 1948 (Table 3.16).

In total, for the period that interests us here (1939–1948), the crude figures for net outward migration were 1.0 million for males and 1.3 for females, 2.3 million in total, which must now be distributed by age.

### 3.5.3.8 Age Distribution of Migration Flows

When distributing population movements by sex, we were able to rely on certain specific reference points; however, there is only a very small amount of information on the age of migrants in the period 1939–1945. We had to try to choose different models of distribution, corresponding as far as possible to the characteristics of each category of migrants (Table 3.17).

**Table 3.16** Estimated migration finally used for the years 1939–1948 (in thousands)

Year	Departures from Ukraine		Returns		Net flow	
	Males	Females	Males	Females	Males	Females
1939	84	50	103	71	19	21
1940	272	179	132	91	-140	-88
1941	1,715	2,187	61	63	-1,654	-2,124
1942	537	597	213	228	-324	-369
1943	399	481	62	69	-337	-413
1944	498	619	375	409	-123	-210
1945	497	401	1,425	1,618	928	1 217
1946	320	241	707	788	387	547
1947	192	216	320	274	128	58
1948	174	182	300	248	126	66
Total	4,688	5,153	3,698	3,859	-990	-1,295

**Table 3.17** Distribution of migration flows by year of age, 1939–1946: models used

Categories	Reference age structure
Refugees	Projected population at start of year (1941: for males, civilian population only)
Poles	Population of new territories annexed in 1939–1940
Germans	Projected population at start of year
<i>Ostarbeiter</i>	Arrivals in 1946 (0 for ages 0–17)
Administrative deportees	Projected population at start of year
Gulag	Arrivals in 1946 (0 for ages 0–17)
Repatriations	Arrivals in 1946 (0 for ages 0–17)

Thus, transfers of German populations and administrative deportations of Ukrainians were distributed by age in proportion to the total projected Ukrainian population at the start of the year concerned. The same type of distribution was applied to refugees, with the exception of departures of males during the year 1941, to which we applied the age structure of just the male civilian population (in order to take mobilization into account). Migration of Poles was distributed pro rata to the population of the territories annexed in 1939. *Ostarbeiter*, repatriates and Gulag detainees were distributed pro rata to 1946 migration flows.

However, we qualified these reference models to some extent. Thus we assumed that there were no children under 18 years of age among *Ostarbeiter*, repatriates or Gulag detainees.

These estimates of migration flows and of their sex and age distributions enabled us to calculate sex-specific net migration for each of the birth cohorts present in 1939 or born between 1939 and 1949. Most of the cohorts born before 1920 (adults in 1939), both male and female, manifested net outward migration during the period 1939–1948. Most of the female adult cohorts lost 7–8% of their total number from 1939 just because of migration, and this rate reached as much as 10% for the cohorts

**Table 3.18** Components of overall losses during the crisis years 1939–1948: proportions due to crisis mortality, birth deficit and migration, by sex

Population and losses	Total numbers (in thousands)		
	Males	Females	All
<i>Population</i>			
– backward-projected to 1949 (1)	15,365	20,310	35,675
– expected without any crises (2)	23,224	25,041	48,265
– expected, using non-crisis mortality and reconstructed births (3)	21,471	23,277	44,748
– expected, using non-crisis mortality, reconstructed births and migration out of Ukraine (4)	20,632	22,123	42,755
<i>Losses</i>			
– totals (2)–(1)	7,859	4,731	12,590
– due to birth deficit (2)–(3)	1,753	1,764	3,517
– due to outward migration (3)–(4)	839	1,154	1,993
– due to excess mortality (4)–(1)	5,267	1,813	7,080
Of which, for mortality:			
(a) during the War, 1941–1945	5,041	1,663	6,704
(b) pre- and post-War, 1939–1940 and 1946–1948	226	150	376

born between 1914 and 1918. Net migration for males looks slightly different, since the cohorts mobilized by the army had little involvement in the departures of the early War years. Thus, the 1905–1926 birth cohorts lost less than 5% of their total number to migration. In contrast, the cohorts less affected by mobilization lost far more to migration: the most affected was the 1890 cohort, which lost 15% of its total number to migration.

### 3.5.4 *Losses Due to Excess Mortality Resulting from the Crisis*

As we have already noted in regard to births, the crude total of losses to migration (2.3 million) cannot be subtracted directly from the overall losses resulting from migration and from crisis mortality, since migrants are themselves subject to mortality and fertility. Therefore the projection must be repeated again, using the estimated data for migration flows by birth cohort. We finally arrive at Table 3.18, which summarizes the different components of total losses for the period 1939–1948. Given the process we used, these results were obviously obtained by sex and by cohort.

Using this approach, therefore, the net effect of the excess mortality of the crisis can finally be estimated at 7.1 million dead between 1939 and 1949, of whom 5.3 million were male and 1.8 million female. However, as with migration and births,

**Table 3.19** Annual distribution of deaths due to the excess mortality of the crisis, 1941–1948

Year	Males		Females	
	Thousands	Distribution 1941–1945 (%)	Thousands	Distribution 1941–1945 (%)
1941	1,591	30	242	14
1942	1,596	30	491	29
1943	1,057	20	622	38
1944	755	14	191	11
1945	341	06	135	8
1946	33		16	
1947	174		122	
1948	20		12	
Sub-total 1941–1945	5,339	100	1,682	100
Total	5,567		1,831	

this net effect is lower than the crude effect of mortality operating alone: when an expected population and an observed population are compared, the absolute difference diminishes as we move further away from the disruptive event. In order to come closer to reality, we had to attempt to work on shorter periods. To start with, we can distinguish between the pre- and post-War years (1939–1940 and 1946–1948), for which a reliable record of deaths is available (once corrections for infant mortality and old-age mortality, already mentioned, are taken into account), and the War years (1941–1945), for which mortality has to be reconstructed. If the 376,000 excess deaths – estimated by comparing ZAGS-registered deaths (after correction) with theoretical deaths (i.e. assuming no crisis) for the pre- and post-War years – are deducted from the 7.1 million deaths for the period 1939–1948, estimated net losses due to the excess mortality of the years 1941–1945 amounts to 6.7 million deaths. This number must first, for each cohort, be distributed across the 5 years under consideration, and then readjusted in order to find the crude number of deaths attributable to excess mortality.

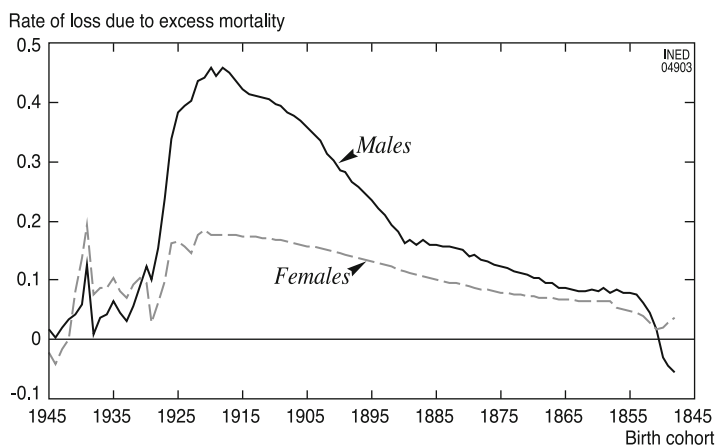
Distribution between calendar years for males was made pro rata to recorded military losses (including deaths of prisoners of war) and for females according to the intensity of disruption caused by hostilities and political repression.

In order to readjust the estimated numbers of deaths, we weighted the deaths for each birth cohort and for each calendar year by the inverse of the theoretical probability of survival between the year under consideration and 1949. Reconstructed in this way, deaths for the period 1941–1945 then amounted to 7 million instead of the 6.7 million initially estimated. Table 3.19 shows their annual distribution.

Finally, total losses in Ukraine for the period 1939–1948 were as follows:

- birth deficit: 4.1 million;
- net outward migration: 2.3 million;
- excess mortality due to the crisis: 7.4 million.





**Fig. 3.7** Rate of loss due to excess mortality between 1939 and 1949, by cohort

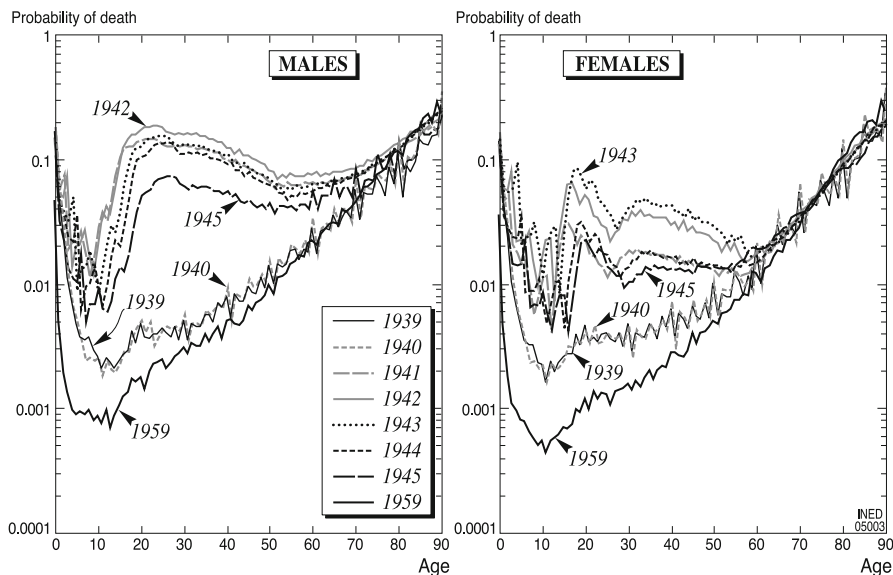
This gives a total of 13.8 million losses, instead of the 12.6 million estimated at the outset by comparing expected and observed 1949 populations.

But we should now return to the topic of mortality. Figure 3.7 gives the sex-specific cohort distribution of rates of losses due solely to the excess mortality of the crisis, observed during the period 1939–1948.

The excess mortality that struck males during this period was appalling. From this alone, some birth cohorts lost almost half their total number: each of the cohorts born between 1910 and 1920 (aged between 20 and 30 at the start of the War) lost over 40% of its total 1939 number. More generally, the excess mortality of the crisis took more than 20% of the total of all cohorts of males born between 1892 and 1928 and over 10% of all those born between 1869 and 1930. Females, markedly less affected by military operations and political repression, obviously experienced lower excess mortality. Even so, it was in the order of 10% or more of all females of working age.

### 3.6 Annual Trends in Life Expectancy Between 1939 and 1959

Finally, on the basis of these estimates, life tables for each of the years 1939–1948 can be reconstructed and linked to the series of life tables that can be computed directly from standard data (corrected for under-registration) for the years 1949–1959 and from backward projection of the population. Figure 3.8 illustrates age-specific trends in probabilities of dying over the War years, compared to the situations at the start and end of the period (1939 and 1959).



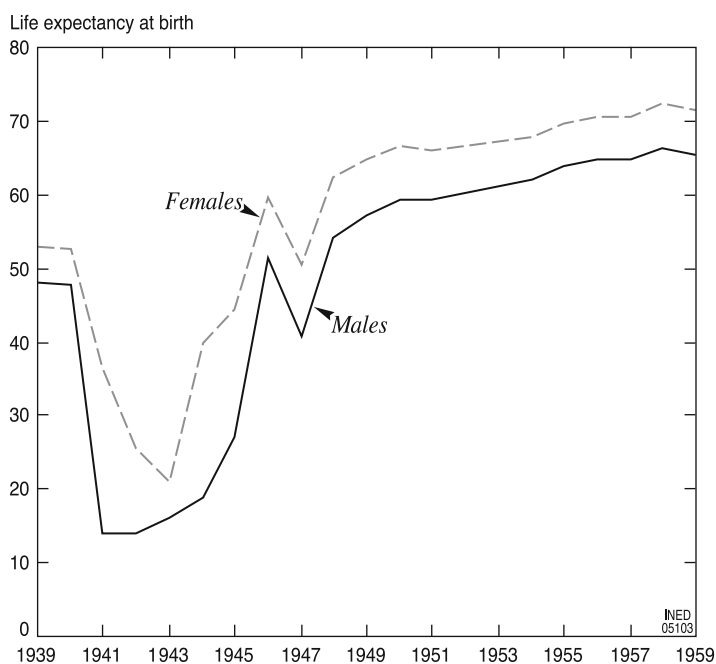
**Fig. 3.8** Age-specific probabilities of dying, estimated for the years 1941–1945 as compared to 1939–1940 and to 1959, by sex

Adult male mortality seems particularly high between the ages of 20 and 60. The most deadly year was 1942, but 1941, 1943 and 1944 were hardly any better. 1945 was also a year of very severe male mortality, although it was clearly falling by then. Women also suffered exceptionally at these ages, but in a slightly more diverse way both in terms of age and calendar year. Adult female mortality seems to have been particularly high around the age of 20 and reached a second peak at about 35. However, it might be questioned whether this corresponds to reality or results from the hypotheses we used in distributing migration and crisis deaths. Similarly, and somewhat differently from what we observed for men, the years 1942 and 1943 were significantly more devastating for females than 1941 and 1944, which came closer to the 1945 level. This difference is more plausible than the age peaks we observed: men experienced the full force of military operations, while women suffered more from the civilian consequences of occupation and repression.

These life tables show that life expectancy, which was close to 50 for males and 55 for females on the eve of the War, fell abruptly to less than 14 years for males and less than 21 for females in the bleakest years (Table 3.20 and Fig. 3.9). It rose again in 1945 and especially in 1946, when it was already markedly higher than the pre-War level (51 for males and 59 for females). However, with the 1947 famine, it fell again to 40 for males and 50 for females. From 1948 to 1959, the upward trend was re-established as regular, so that by 1959, male life expectancy had reached 65.2 and female, 71.1.

**Table 3.20** Life expectancy at birth, 1939–1959

Year	Males	Females	Year	Males	Females
1939	47.7	52.5	1950	59.0	66.3
1940	47.4	52.4	1951	59.0	65.5
1941	13.6	36.3	1952	59.9	66.2
1942	13.7	25.4	1953	60.7	66.8
1943	15.9	20.6	1954	61.7	67.4
1944	18.4	39.5	1955	63.5	69.3
1945	26.9	44.2	1956	64.4	70.2
1946	51.2	59.4	1957	64.4	70.3
1947	40.3	50.2	1958	66.2	72.2
1948	53.8	62.0	1959	65.2	71.1
1949	56.8	64.5			

**Fig. 3.9** Trends in life expectancy at birth, 1939–1959, by sex

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