

## Chapter 2

# The Crisis of the 1930s

Jacques Vallin, France Meslé, Sergei Adamets, and Serhii Pyrozhkov

From 1935, in a way that now seems almost surreal, Ukraine's UNKhU (Directorate for National Economy and Account) challenged the figures on births and deaths registered between 1930 and 1935. In a note addressed to the leadership of the Republic's Communist Party, presenting them with some figures on annual change in the Ukrainian population between 1926 and 1934 (Table 2.1), Aleksandr Asatkin, Director of the UNKhU of Ukraine, expressed his amazement at the peak in mortality observed in 1933, and attempted to explain it through errors in the registration system (ZAGS), without, of course, ever mentioning the famine that had reached its highest level in that year. However, checks made in 1934-1935<sup>1</sup> on the way ZAGS functioned showed that deaths in the regions most affected by the disaster had in fact been under-registered. Moreover, ZAGS' final results for 1933 were much higher than this 1935 document showed (see N.B. in Table 2.1; see also Annex I, Tables 1 and 2 on the website (<http://www.demogr.mpg.de/books/drm/009> or <http://extras.springer.com/>)). In reality, the presence of famine was clear, but everything was done to conceal it. Monitors from the TsUNKhU (Central Directorate for National Economy and Account), covering the whole USSR, systematically reclassified

---

<sup>1</sup>The ZAGS Monitoring Commission was created on 20 February 1934 by the Central Committee of the CPSU (Communist Party of the Soviet Union). It was made up of civil servants from the TsUNKhU, the CPSU Monitoring Committee and the Committee for Soviet Control. It probably functioned up to September 1935.

J. Vallin (✉) • F. Meslé  
Institut National d'Études Démographiques, Bd. Davout 133,  
75980 Paris Cedex 20, France  
e-mail: vallin@ined.fr; mesle@ined.fr

S. Adamets  
Institut National d'Études Démographiques, Bd. Davout 133, 75980 Paris Cedex 20, France  
e-mail: serguei.adamets@sfr.fr

S. Pyrozhkov  
Institute for Demography and Social Studies, Bd. Panasa Myrnogo 26, 01011 Kyiv, Ukraine  
e-mail: psi@starnet.md

**Table 2.1** Numbers of births and deaths registered in Ukraine in the early 1930s

Event	Year						
	Mean	1926–1929	1930	1931	1932	1933	1934
Births		1,153,125	1,022,952	975,320	782,042	470,685	571,567
Deaths		518,913	538,080	514,744	668,158	1,850,256	483,382
Natural increase		634,212	484,872	460,576	113,884	–1,379,571	88,185

*Source:* *О состоянии учета населения в УССР* [Population registration in the Ukrainian SSR], TsDAGO Ukraini, fonds 1, series 1, file 2581

N.B. For 1933 and 1934, these data do not correspond to the final results registered by ZAGS, which were much higher in 1933 (564,028 births and 2,103,999 deaths) and slightly lower in 1934 (551,520 births and 462,037 deaths)

deaths initially classified as “from starvation” under either “cause of death unknown” or “from exhaustion”.<sup>2</sup>

The fact remains that ZAGS statistics on population change<sup>3</sup> are only a starting point, and should be used cautiously.

Since the opening of the archives, some historians and statisticians have set about estimating population losses attributable to the famines and the waves of turmoil and repression that followed the collectivization of land, relying on statistics published before 1989. Robert Conquest (1988, p. 306) estimated the number of deaths caused by the famine in 1932–1933 at 5 million, whereas Stanislav Kulchytskyi (1995) estimated the losses of the period 1933–1936 at 3.5 million. However, these estimates must be treated with caution, since they rely on extrapolating the growth rate of the 1920s to the 1930s. It is questionable whether the high fertility of the 1920s, which was still reflecting the adjustment of births delayed by war, could have lasted into the 1930s, even without a crisis. In all probability, therefore, these early attempts overestimated the real losses.

A fuller reconstruction of population change for the whole USSR was later published by Goskomstat, the State Committee for Statistics of the USSR (Andreev et al. 1993). In order to reconstruct time series of births and deaths and to produce annual population estimates for the USSR between 1920 and 1959, its authors adjusted the census results for 1926, 1937, 1939 and 1959 and corrected the series of registered births and deaths with the help of population models. However, the hypotheses inherent in the models that enabled them to adjust the data seem to overestimate fertility and mortality (Adamets and Shkolnikov 1995). And in any case, this estimate at the level of the USSR does not give us precise information on losses in Ukraine.

Abandoning the idea of basing their work on registered births and deaths, several authors have attempted to assess Ukraine’s losses by relying only on the 1926 and 1939

<sup>2</sup> Document from the Russian State Archive of the Economy, fonds 1562, series 329, file 131.

<sup>3</sup> TsUNKhU compiled three forms of statistics on births and deaths: monthly provisional statistics, final annual statistics including late reports, and final statistics adjusted by estimating births and deaths for territories not covered by ZAGS.

census data. Thus, Sergei Maksudov (1989) gives an overall estimate of 4.5 million for the period 1927–1938, without distinguishing between the effect of excess mortality and that of sub-fertility. Serhii Pyrozshkov (1992, 1996), on the other hand, by comparing total cohort numbers from the 1939 census<sup>4</sup> with those that would have arisen from normal mortality<sup>5</sup> and fertility<sup>6</sup> trends, arrives at 5.8 million for the period 1926–1939.

In the context of this book on mortality in Ukraine, it seems to us interesting to attempt a new estimate, endeavouring to distinguish direct losses attributable to increased mortality from indirect losses linked to a fall in fertility. In order to do this, we need to go back to population change statistics, even if this means hypothesizing about under-registration.

## 2.1 Reconstructing Registered Births and Deaths Series

In point of fact, it is fairly complicated to reconstruct the statistics for registered births and deaths from fragments of information available here and there. Table 2.2 pieces together the jigsaw for the period 1924–1939. From 1924 to 1927, the total numbers of births and deaths by sex were published by the International Statistical Institute (ISI 1929). For the subsequent years, we have to juggle with the archives. Here, taking up the elements highlighted by Sergei Adamets (1995) in his thesis on demographic catastrophes in Soviet Russia, and supplementing them with other data found since then in Moscow or Kiev, we have:

- total numbers of births and deaths for both sexes together, from 1927 to 1932,
- births and deaths by sex and age from 1933 to 1939,
- natural increase by sex from 1928 to 1932,
- births for 1938 and 1939, by mother’s age.

In order to reconstruct a complete sex-specific series, we first of all calculated sex-specific births from 1928 to 1932 by applying the mean sex ratio at birth for the periods 1924–1927 and 1933–1936 to total births; we then worked out sex-specific deaths by subtracting the natural increase from births.

Figure 2.1 illustrates annual sex-specific trends in number of deaths. This seems to be a completely plausible picture of the history of Ukrainian mortality between

---

<sup>4</sup> In his 1996 publication (Pyrozshkov 1996), several typographical errors have crept into the table that gives the population observed in 1939 (Table, Annex 1, p. 1039). It should read: for the total, both sexes, all ages, 30,946,000 (instead of 30,046,000); it should also read, for 15–19 years, both sexes 2,962,000 (instead of 2,062,000); finally, for the female sex, it should read 1,526,000 for 15–19 years (instead of 1,626,000) and 909,000 for 40–44 years (instead of 809,000); there are no errors on the male side, however.

<sup>5</sup> Assessed by interpolating the available life expectancies for 1926–1927 and 1938–1939 and then deducing age-specific probabilities of death from these, using Coale-Demeny (1983) model life tables.

<sup>6</sup> Assessed on the basis of the Coale-Trussell model (1974).

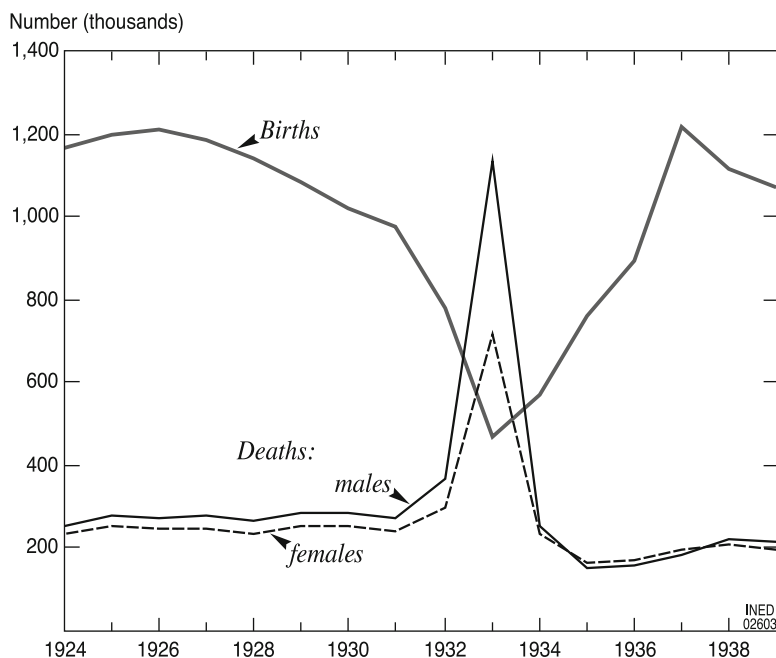
**Table 2.2** Annual sex-specific numbers of registered births and deaths, from 1924 to 1939

Year	Births			Deaths			Natural increase		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
1924	601.6	561.3	1,162.9	252.1	232.9	485.0	349.5	328.4	677.9
1925	618.3	578.5	1,196.8	277.9	253.9	531.8	340.4	324.6	665.0
1926	623.2	584.7	1,207.9	273.8	244.9	518.7	349.4	339.8	689.3
1927	611.2	573.2	1,184.4	276.0	246.6	522.6	335.2	326.6	661.7
1928	589.9	549.4	1,139.3	264.3	231.4	495.7	325.6	318.0	643.6
1929	559.8	521.2	1,081.0	286.0	252.7	538.7	273.8	268.5	542.3
1930	529.7	493.3	1,023.0	287.5	250.6	578.1	242.2	242.7	484.9
1931	505.0	470.3	975.3	274.1	240.6	514.7	230.9	229.7	460.6
1932	404.9	377.1	782.0	368.2	300.0	668.2	36.7	77.1	113.8
1933	294.9	269.1	564.0	1,284.1	819.9	2104.0	-989.2	-550.8	-1,540.0
1934	286.5	265.0	551.5	242.2	219.8	462.0	44.3	45.2	89.5
1935	393.1	366.0	759.1	179.3	162.5	341.9	213.8	203.4	417.2
1936	461.2	431.9	893.1	186.9	172.6	359.5	274.2	259.3	533.5
1937	624.8	589.2	1,214.0	225.9	202.5	428.4	398.9	386.7	785.6
1938	572.9	540.6	1,113.5	224.5	206.3	430.8	348.4	334.3	682.6
1939	552.2	521.4	1,073.5	215.0	197.6	412.6	337.2	323.7	660.9

*Sources:*

- 1924–1927: ISI 1929;
- 1928–1932: births and deaths, totals for both sexes together: Russian State Archive of the Economy (RGAE), fonds 1562, series 329, file 256, item 30–31;
- 1928–1932: sex-specific natural increase: RGAE, fonds 1562, series 329, file 256, item 45;
- 1933–1938: total sex-specific births and deaths from RGAE, fonds 1562, series 329, files 18, 53, 83, 109, 134, 190;
- 1938: births according to mother's age and deaths by sex and age from RGAE, fonds 1562, series 20, files 120 and 125;
- 1939: births according to mother's age and deaths by sex and age from RGAE, fonds 1562, series 329, files 264 and 267;
- From 1928 to 1932, sex-specific births were calculated by applying mean sex ratio at birth for the periods 1924–1927 and 1933–1936 to total births, then sex-specific deaths were calculated by subtracting natural increase from births (figures in *italics*)

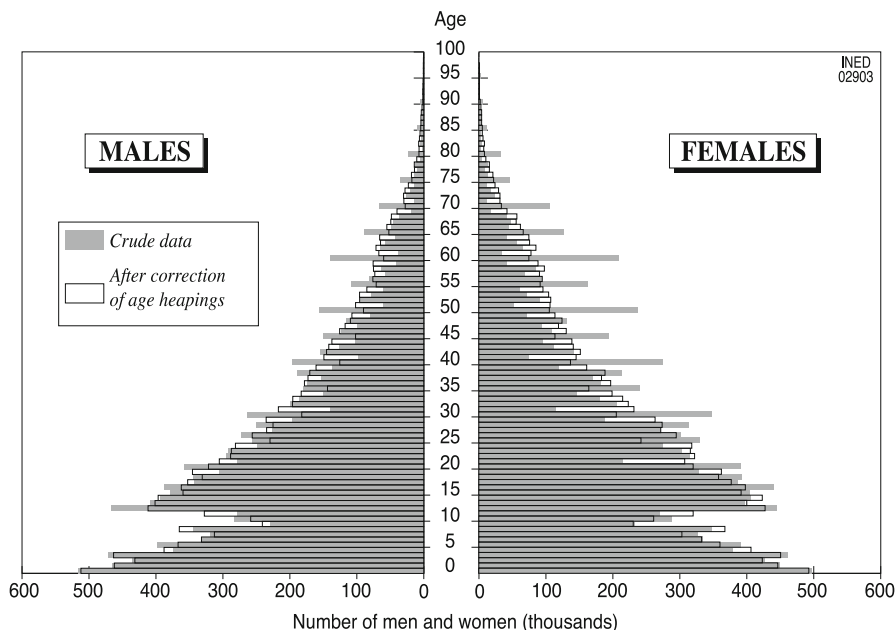
the two World Wars. Firstly, compared to the 28.9 million inhabitants recorded in the 1926 census, the 519,000 deaths for that year give a crude death rate of 18 per thousand that is fully compatible with what we know about the country's state of health at that time. The same applies to the fact that the crude male death rate exceeds the crude female death rate by 20%. In addition, until the major crisis of 1932–1933, sex-specific trends in the number of deaths do not indicate anything particularly abnormal. After the crisis, this number appears to fall slightly compared to 1930–1931 – predictably enough, since the total population was reduced by the impact of the crisis and since the crisis probably selected the most resistant individuals. Finally, on the eve of the Second World War, the total number of deaths, slightly lower than it had been during the 1920s, may reveal the beginnings of a downward trend in mortality. Although there was under-registration of deaths over the course of this period, in all likelihood it was not very significant, except perhaps



**Fig. 2.1** Annual sex-specific trends in numbers of births and deaths, from 1924 to 1939

during the two crisis years where the registration services really seem to have been snowed under – or perhaps manipulated to minimize the extent of the crisis. Therefore it is essentially the extent of this ‘crisis under-registration’ that we have to attempt to assess here. As for the rest, the small corrections already made in measures of mortality around the censuses may represent a satisfactory degree of correction to any under-registration of infant deaths and deaths in old age (see later).

The counterpoint to this is that the trend in numbers of births clearly follows the same logic. With a crude birth rate of 42 per thousand in 1926, it is hard to imagine large under-registration of births; although the number of births declined in the late 1920s, this probably resulted from the onset of a fall in fertility that was characteristic of Eastern Europe in that era. The crisis obviously led to a drastic fall – although one that was less severe than the rise in mortality – followed by a catch-up peak. Situated in 1937, this peak may appear to be a little late, but that can be explained precisely by the gravity of the crisis and the way it threw families into profound disarray. In short, we cannot talk about large structural under-registration of births, any more than of deaths – and probably even somewhat less. The crisis years are more open to debate, but the arguments put forward for deaths cannot work here, since the number of registrations fell markedly and the authorities had no interest in minimising them – in fact, the opposite. Therefore, we shall hypothesise that the number of births registered over the course of this period corresponds well to the reality (apart from under-registration of deaths of young children: see below), while



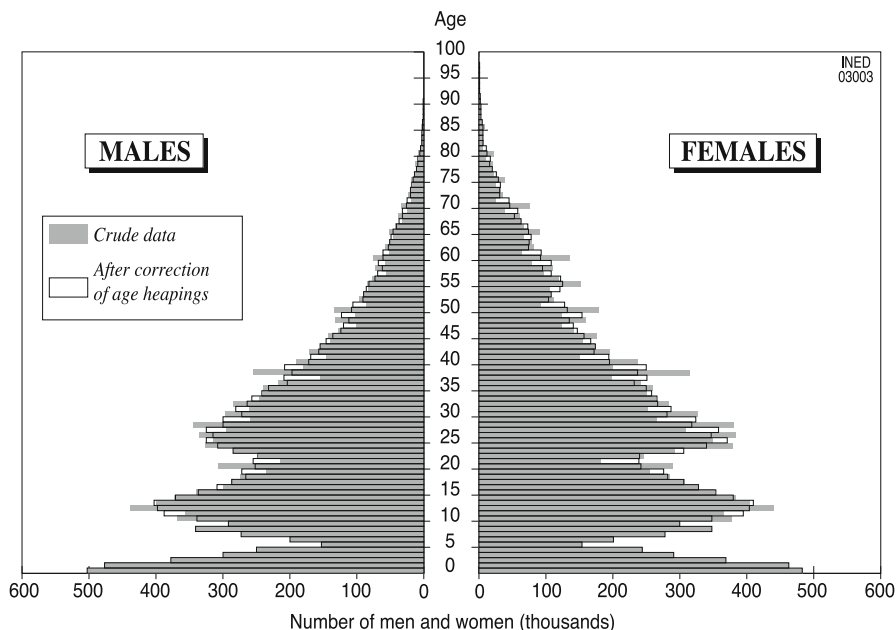
**Fig. 2.2** Age pyramid of the Ukrainian population at the census of 17 December 1926 (before and after correction for age heaping)

remembering that, if the number had been higher than this, it would subsequently have led us to under-estimate direct losses from the crisis through excess mortality and to proportionately over-estimate indirect losses through birth deficit.

## 2.2 Estimating Direct and Indirect Losses

In order to estimate the direct and indirect losses of the 1930s, an attempt can first be made, starting from the 1926 census, to calculate the population that would have been recorded in 1939 if there had been no crisis, and then to judge the extent of the latter by discussing the difference between the expected result and the result actually obtained in 1939 (Goskomstat 1992).

This approach obviously relies, in the first instance, on the accuracy of the results of the two censuses. In fact, this has hardly been challenged by specialists (Adamets et al. 1994; Blum 1994, Blum and Darskii 1999). Although the Kremlin authorities tried on many occasions to manipulate the published results of the censuses, everyone views the statistical literature preserved in the archives, now accessible, as reliable. However, early twentieth-century Soviet censuses, like many others at the time, suffered from some imprecision in declarations of age, which led to classic age heaping (Fig. 2.2). We tried out several ways of correcting the results of the 1926 census (TsSU 1928–1933): a 3-year or a 5-year moving average, and a more sophisticated method already used for Russia (Adamets et al. 1994). Although the results

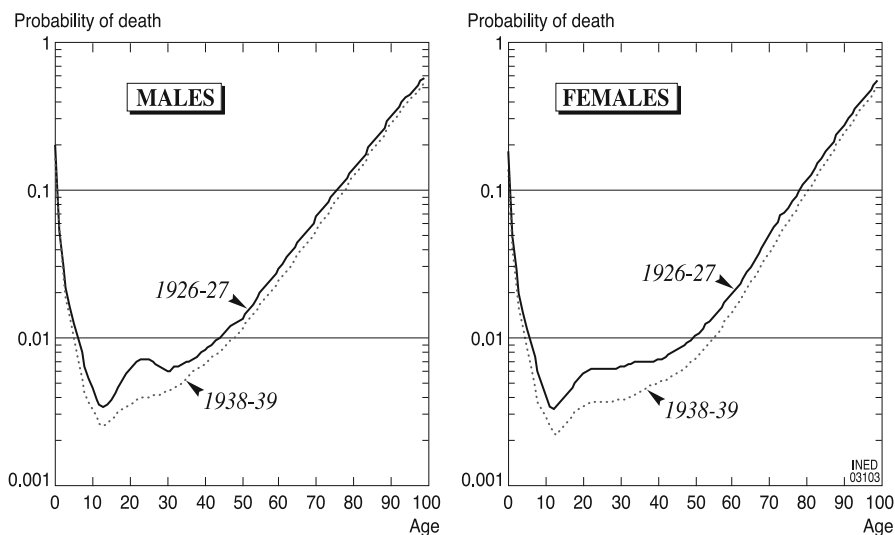


**Fig. 2.3** Age pyramid of the Ukrainian population at the census of 17 January 1939 (before and after correction for age heaping)

they gave differed very little, we settled on the method already used for Russia, where the results were slightly more satisfactory.

The population by sex and detailed age in the 1939 census, which could not be found in Ukraine itself, was kindly supplied to us by Evgenii Andreev of Goskomstat in Moscow. Age heaping is much less pronounced than for the 1926 census. We simply smoothed the crude data by using a 3-year moving average, starting from age 10 (Fig. 2.3).

The existing data enabled us to calculate two life tables, for the start and for the end of the period, relying firstly on the 1926 and 1939 censuses and secondly on the death statistics by sex and age available for 1926–1927 and 1938–1939. The calculations had already been done for 1926–1927 (Novosselskii and Paevskii 1930), giving a life expectancy of 45.3 years for males and 48.8 years for females. They were reworked by Sergei Adamets and Vladimir Shkolnikov (1995) in order to take into account under-estimated mortality of people under 1 year old or over 55, bringing life expectancy to 42.9 and 46.3 years respectively. As for the life table calculated for 1938–1939, an in-depth discussion of trends in the quality of registration of infant deaths will be found in Chap. 4; here, its effect is to increase the infant mortality rate observed in 1938–1939 by 5%. We applied the same type of correction to the older age groups as Adamets and Shkolnikov (1995) had done for the 1926–1927 table. We thus obtained a life expectancy at birth of 47.8 years for males and 52.6 years for females in 1938–1939. Figure 2.4 illustrates the comparative probabilities of death from both tables.



**Fig. 2.4** Age-specific probabilities of death in Ukraine, according to life tables for 1926–1927 and for 1938–1939

Using these two points, we interpolated age-specific probabilities of survival for the period 1928–1938.

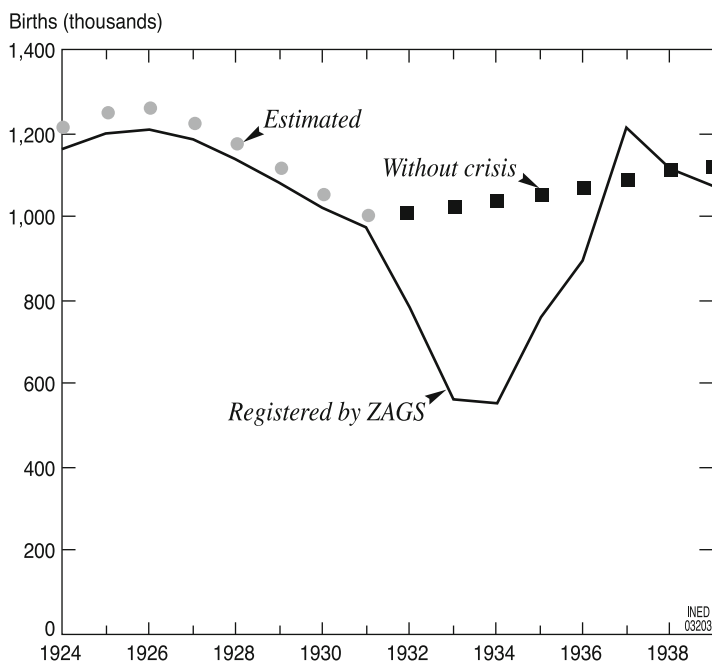
These probabilities were then applied, year by year from 1927 to 1939, to the birth cohorts involved in the 1926 census, in order to obtain an estimate of survivors of these cohorts, if there had been no crisis, on January 1 of each year from 1928 to 1939.

In order to finalize this projection, it was also necessary to apply these probabilities to births that took place after the 1926 census, and in order to do this, we first had to estimate the total numbers of births that would have occurred without the crisis (Table 2.3). It is not possible to interpolate between the fertility rates observed before and after the crisis. This is because, after correction for under-registration,<sup>7</sup> the pre-crisis general fertility rate (for women aged 15–49) was diminishing significantly, falling from 157 per 1,000 in 1927 to 117 per 1,000 in 1931, but after the crisis it climbed again, to a much higher level than in 1931 (in all probability, over 130 per 1,000 in 1936<sup>8</sup>). This fall in the late 1920s is completely consistent with what happened at that time in neighbouring non-USSR countries (Poland, Czechoslovakia, Romania, Bulgaria). It might therefore be imagined that we could prolong this downward trend in order to estimate the births to be expected if there had been no crisis. However, the rise that followed the crisis cannot be explained solely by a

<sup>7</sup> It is difficult to estimate the rate of coverage of births by ZAGS registration, but at the very least we must increase the registered births by a number equal to the excess infant deaths produced by the correction of infant mortality rates.

<sup>8</sup> If we take the ratio of observed births to the expected population, the general fertility rate rises to 130 per 1,000, but that under-estimates the true situation, since the actual population is obviously lower than the expected population.





**Fig. 2.5** Births registered by ZAGS (1924–1939), estimated pre-crisis births (1924–1931) and births estimated assuming no crisis (1932–1939)

recovery phenomenon. It also relates to the ban on abortion imposed in 1936, a measure which might very well have been taken even without the crisis. It is therefore almost impossible to reinvent non-crisis annual trends in the number of births over this period. Moreover, for us, the most important thing here is to estimate the excess mortality of the crisis and so – whatever our hypothesis about non-crisis fertility – we shall infer the birth deficit from the total losses due to the crisis. Error in the fertility hypothesis will affect only the estimate of the birth deficit and not the estimate of the excess mortality of the crisis. Therefore, here we have deliberately chosen the simplest possible hypothesis in order to estimate births that might have taken place without a crisis: that, throughout the whole period 1932–1939, the general fertility rate remained constant at its 1931 level.

Thus a births series is obtained that combines births registered by ZAGS from 1924 to 1931 (corrected for under-registration) and births estimated for 1932 to 1938 assuming no crisis (Fig. 2.5). The latter show a slight increase, as does the expected population of women aged 15–49.

Our projection was completed by applying non-crisis probabilities of survival to these births; we then finally obtained an *expected 1939 population*, and it just remained to compare this, by age groups, to the population actually observed in the census carried out in that year (Table 2.4). The losses that become apparent from this comparison vary a great deal according to age group. Figure 2.6 illustrates variations in rate of losses by age group and sex. Some of the fluctuations in this rate of losses

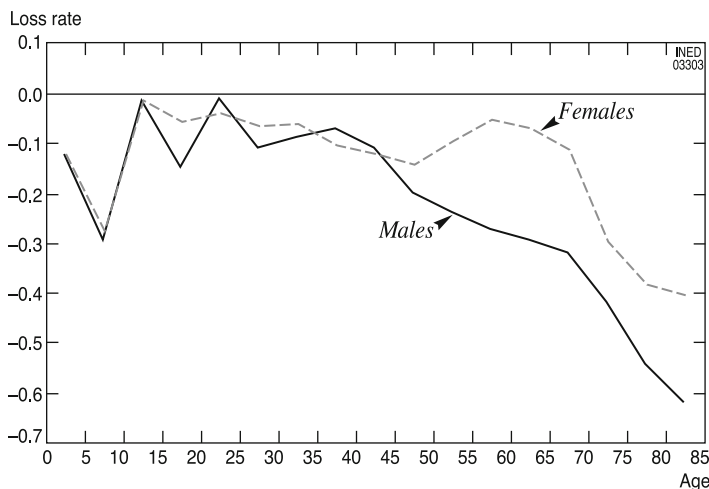
**Table 2.3** Estimate of births from 1932 to 1939 with no crisis

Year	Registered births	Births corrected for under-registration	Women aged 15–49 observed or estimated <sup>a</sup> at 1 Jan	Estimated actual rate	Rate with no crisis	Women aged 15–49 expected at 1 Jan	Births with no crisis
1924	1,163	1,211					
1925	1,197	1,246					
1926	1,208	1,258					
1927	1,184	1,228	7,692	0.157			
1928	1,139	1,178	7,940	0.146			
1929	1,081	1,115	8,154	0.135			
1930	1,023	1,053	8,399	0.124			
1931	975	1,001	8,532	0.117			
1932	782	801			0.117	8,625	1,009
1933	564	576			0.117	8,668	1,021
1934	552	562			0.117	8,836	1,037
1935	759	770			0.117	8,937	1,050
1936	893	905			0.117	9,070	1,068
1937	1,214	1,227			0.117	9,235	1,088
1938	1,113	1,123			0.117	9,418	1,110
1939	1,074	1,080	8,879		0.117	9,613	1,121
Total 1932–1938		5,964					7,383

<sup>a</sup>For 1927, this is in fact the population recorded in the 12 December 1926 census (corrected for age heaping). For 1939, it is the population recorded in the 17 January census. For 1928–1931, these are the 1 January populations estimated within our projection

**Table 2.4** Sex-specific population (in thousands) by age group, as expected without crisis and as actually observed in the 1939 census

Age group	Expected population			Population observed in census			Losses		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
	0-4	2,198.2	2,125.0	4,323.2	1,893.9	1,839.0	3,732.9	-304.3	-286.0
5-9	1,928.6	1,854.5	3,783.1	1,305.5	1,317.1	2,622.6	-623.1	-537.4	-1,160.5
10-14	2,012.0	1,961.3	3,973.3	1,907.5	1,913.3	3,820.9	-104.5	-47.9	-152.4
15-19	1,671.1	1,665.8	3,336.9	1,417.5	1,577.3	2,994.8	-253.6	-88.5	-342.1
20-24	1,459.1	1,460.6	2,919.7	1,439.0	1,399.0	2,838.0	-20.1	-61.7	-81.7
25-29	1,685.2	1,795.7	3,481.0	1,503.1	1,679.0	3,182.2	-182.1	-116.7	-298.8
30-34	1,419.1	1,495.7	2,914.8	1,293.4	1,410.8	2,704.2	-125.7	-84.9	-210.6
35-39	1,147.1	1,286.9	2,434.0	1,063.1	1,158.2	2,221.3	-83.9	-128.7	-212.6
40-44	930.1	1,063.1	1,993.2	829.1	931.7	1,760.8	-101.1	-131.4	-232.4
45-49	753.5	846.1	1,599.7	604.9	723.4	1,328.3	-148.6	-122.8	-271.4
50-54	630.9	682.1	1,313.0	481.1	619.7	1,100.8	-149.8	-62.3	-212.2
55-59	504.1	546.5	1,050.6	366.3	518.8	885.1	-137.8	-27.7	-165.5
60-64	380.0	450.3	830.3	267.0	418.0	685.0	-113.0	-32.2	-145.3
65-69	268.8	355.6	624.4	183.0	315.4	498.3	-85.9	-40.2	-126.1
70-74	194.5	276.9	471.4	114.0	195.3	309.3	-80.4	-81.7	-162.1
75-79	122.2	174.7	296.9	56.9	108.4	165.3	-65.3	-66.4	-131.7
80-84	50.0	72.3	122.3	19.3	42.9	62.3	-30.6	-29.4	-60.0
85+	18.6	28.9	47.5	8.9	25.2	34.1	-9.7	-3.7	-13.4
Total	17,373.2	18,142.1	35,515.3	14,753.6	16,192.7	30,946.2	-2,619.6	-1,949.4	-4,569.0



**Fig. 2.6** Variation in calculated rate of losses, by age groups and sex

are not very realistic. It is normal for the rate of losses to be lower at 0–4 years than at 5–9 years. The first age group born after the famine was affected only by the birth deficit that continued a little beyond 1932–1933, and perhaps also benefited from post-crisis infant mortality that was lower than the norm. On the other hand, the apparent absence of losses at 10–14 years and the fluctuations beyond 55 years are not very convincing. Estimating on the basis of the difference between total numbers expected and total numbers observed may in reality amplify the effect of age-specific errors (both at the level of total numbers observed in the census and at the level of probabilities of survival). Therefore these results should be viewed with caution, and our subsequent discussion relies only on sex-specific totals and not on age distributions.

Thus we might expect a total of 35.5 million Ukrainians in the 1939 census instead of the 30.9 million actually observed. Therefore, just after the crisis, 4.6 million Ukrainians were missing. So where exactly does this observed difference come from? For the most part, of course, it results from excess mortality combined with birth deficit, both due to the crisis. However, there must be some discussion of the possible role of migration and the robustness of the hypotheses accepted. Finally, an attempt may be made to deduce from all this an estimate of under-registration of crisis deaths by the authorities.

### ***2.2.1 Respective Roles of Lower Fertility and of Excess Mortality Resulting from the Crisis***

If we assume that the observed difference is a good measure of the combined effects of excess mortality and sub-fertility, then in order to isolate the effects of these two components, we merely need to re-do the same population projection for 1939,

**Table 2.5** Contributions of excess mortality and of birth deficit to overall losses in the 1930s crisis, by sex

Population (observed and expected) and losses	Total numbers (thousands)		
	Males	Females	All
<i>Population</i>			
Observed in the census (1)	14,753	16,193	30,946
Expected, given non-crisis mortality and fertility (2)	17,373	18,142	35,515
Expected, given non-crisis mortality and after correction of registered births (3)	16,833	17,625	34,458
<i>Losses</i>			
Total (2)–(1), of which	2,620	1,949	4,569
Due to forced outward migration (4)	563	367	930
Due to excess mortality (or to voluntary outward migration) resulting from the crisis (3)–(1)–(4)	1,517	1,065	2,582
Due to the birth deficit (2)–(3)	540	517	1,057

replacing the estimated non-crisis births with registered births (corrected for under-registration of infant deaths). This second projection leads to a total of 34.5 million inhabitants in 1939. The difference from the population actually observed in the census – 3.5 million – gives us a measure of the extent of losses attributable to the excess mortality of the crisis and to outward migration. The difference of 1.1 million from the result of the first projection represents the extent of losses due to the birth deficit. This measured effect of the birth deficit is significantly lower than the difference between estimated births and registered births from 1927 to 1938:  $12.6 - 11.2 = 1.4$  million. This is because, even with normal survival rates, the high infant and child mortality prevalent in that era would have taken a heavy toll on births that, in the event, were prevented by the crisis.

On the birth side, the losses are fairly similar for both sexes. The slightly higher deficit of males (525,000 as against 511,000) relates to the fact that normally more boys are born than girls (about 105 boys per 100 girls) and that at the age reached by the birth cohorts concerned in 1939, excess male mortality had – as yet – only slightly reduced the numerical advantage of boys at birth (Table 2.5).

On the other hand, taken together, losses due to migration and to the excess mortality resulting from the crisis are much greater for males than for females (2.1 million as against 1.4). This difference may relate either to the excess mortality factor or to migration.

### 2.2.2 *Role of Migration*

Here it is necessary to distinguish between two types of outward migration: forced outward migration, which has been particularly documented, and voluntary flight from the crisis, which is more difficult to assess.

On the one hand, in 1930–1931, according to Viktor Zemskov (1990, 1991a, b), 381,000 families, of whom almost 64,000 originated in Ukraine (i.e. about 300,000 people), were forcibly exiled, mainly to Siberia, the Urals region and the Arctic regions. From 1932 to 1938, a further 470,000 Soviet citizens were subjected to this process. The region of origin of the latter group is not known; but, assuming that the proportion of Ukrainians was the same as before, this would mean an additional 100,000 people being deported from Ukraine in this way during those years. So, in total, for the whole period 1930–1938, about 400,000 Ukrainians were forcibly exiled from their country. It could be estimated that, since this total number relates to whole families, it should be divided half and half between males and females. However, a number of these people must also have been affected by deportations to the gulag,<sup>9</sup> and this would have applied much more to males. Therefore, here we prefer to apply a distribution of 60% females and 40% males, i.e. 240,000 and 160,000 respectively.

To this must be added deportations to the gulag. In 1939, of 1.3 million people observed by the census in camps outside Ukraine, 182,000 were Ukrainians. To these we must add people detained in the Gulag's prisons and penal settlements, who do not figure in these statistics. It is known that, in total, in 1939, 705,000 people of all origins inhabited these prisons and settlements; so, if we use the same proportion of Ukrainians as for the general population of the gulags, this means increasing the earlier figure by 100,000. To this must also be added people who had been freed (275,000) or had escaped (22,000), of whom very few returned to Ukraine.<sup>10</sup> Finally, we must add those who died between their deportation to the gulags and 1939. Viktor Zemskov estimates the number of Ukrainians who died in the camps and settlements between 1934 and 1938 at 45,000. We must then add pre-1934 deaths and deaths that took place in Gulag prisons: these can be estimated at something over 50,000. In total, therefore, the Ukrainian population deported to the gulags can probably be established at around 680,000 people. From this must be subtracted Ukrainians deported to the gulags within Ukraine itself. In 1937, the Ukrainian NKVD recorded 114,000 people in Ukrainian gulags. Taking our bearings from the growth observed in the gulag population throughout the USSR, we can estimate the population of the Ukrainian gulags at 150,000 in 1939. Supposing that almost all these detainees came from Ukraine, the total 1939 population of Ukrainians deported to gulags outside Ukraine must have been in the order of 530,000. Applying the sex distribution observed in the NKVD's census of the gulags in 1937 (76% males and 24% females), we obtain figures of 403,000 males and 127,000 females.

---

<sup>9</sup>Gulag is an acronym of *Главное Управление ЛАГерей* (Chief Directorate for Camps). Therefore, we could refer to deportations 'by the Gulag'. However, the word 'Gulag' has passed into other languages to designate the camps themselves and so we can also refer to deportations 'to the gulag(s)'. Therefore, when referring to the Directorate, we shall write this word with an initial capital letter, while in the second instance we shall treat it as a common noun.

<sup>10</sup>These estimates start from the total numbers of people freed or escaped, given by Viktor Zemskov (1991a, b), and from the hypothesis that the proportion of Ukrainians among them is the same as in the population of the gulags observed in the 1939 census.

In total, the 1939 Ukrainian population deficit due to forced migration departures from Ukraine can thus be established at 400,000 who were forcibly exiled and 530,000 deported to the gulag, i.e. 930,000, of whom 563,000 were males and 367,000 females (Table 2.5).

It is much harder to assess voluntary moves. According to a TsUNKhU report of 1937,<sup>11</sup> net outward migration rose to 1.3 million people between 1926 and 1936. However, in the absence of reliable migration statistics, this estimate is highly questionable. The numbers obviously cover forced migration, even if this is not stated explicitly. Moreover, they have very probably been exaggerated in order to conceal the excess mortality of the crisis. In fact, true voluntary migration must have been small, since not only did the regime monitor the movements of the population closely (notably with the introduction of passports in towns in 1932), but there was hardly anywhere better to go in the USSR, while fleeing abroad was out of the question. Of course, the famine led some Ukrainians to flee the disaster zone, to Russia and Belorussia (now Belarus) but most of these refugees very quickly had to return to Ukraine, since their illegal migration status (linked to the passport requirement imposed in 1932) prevented them from living and working outside Ukraine. We also know that the policy of industrial development of the Soviet East began in this era, enabling some people to flee both repression and crisis in Ukraine; but the scale of this movement only really increased from the Second World War onwards. So here we have preferred to accept that net voluntary migration was almost nil and to confine ourselves to forced migration alone, while acknowledging that we may thus be under-estimating net outward migration.

In other words, the 3.5 million people mentioned above, who were missing from the 1939 census, must be reduced by the 0.9 million who were forcibly exiled or deported; the remaining 2.6 million are missing because of the excess mortality of the crisis.<sup>12</sup> Ideally, rather than subtracting this crude number from the total losses in order to estimate losses due to the excess mortality of the crisis, we should have re-run the population projection model (as we do in Chap. 3 for the subsequent period), introducing estimates of migrants by age and by calendar year. But here we came up against the total absence of any indication of distributions of migrants by age and by year, and therefore we had to give up on this; it should be borne in mind that, although this no doubt meant we were overestimating the migrants to be subtracted from the total losses, this was working in the opposite direction from our hypothesis that net voluntary migration was almost nil, which may have under-estimated actual net outward migration. In addition, the overall total of crisis deaths does not take into account the fact that the birth cohorts dwindled over time between the crisis and the end of the reference period, which again leads to a tendency to over-estimate the real extent of the excess mortality of the crisis.

---

<sup>11</sup> Document from the Russian State Archive of the Economy, fonds 1562, series 329, file 200, item 191.

<sup>12</sup> It should also be made clear that people who were deported, once outside Ukraine, also suffered from high excess mortality, which is not taken into account here.

However, given uncertainty about net migration and in view of the already absolutely overwhelming final result that we obtained (as we shall show below, in 1933 males had only 7 years of life expectancy), we abandoned this projection, preferring to remain confident that our estimate of excess mortality is an estimate that is as close as it can be without in any way exaggerating the scale of the crisis.

### 2.2.3 *Estimating Under-Registration of Crisis Deaths*

If we compare the 2.6 million deaths resulting from the excess mortality of the crisis with the 1.7 million difference observed between the 7.4 million registered deaths (Table 2.6, Column e) and the 5.7 million deaths to be expected without excess mortality arising from the crisis<sup>13</sup> (Table 2.6, column d), we obtain the total number of deaths that escaped registration (0.9 million). However, some of these are the result of the ordinary under-registration mentioned above, which was taken into account in correcting the 1926–1927 and 1938–1939 life tables that we used to estimate non-crisis mortality by interpolation. The results of this correction – 390,000 deaths – appear in Column f of Table 2.6. So there finally remain 530,000 deaths that escaped registration because of the crisis and the regime’s acts of concealment, and these must be distributed between the three crisis years (1932–1934). In order to do this, we applied the distribution observed for registered crisis deaths (Column e minus Column d of Table 2.6). The results are shown in Column g.

Among the 530,000 deaths that escaped registration because of the crisis, there are 331,000 females and 199,000 males. This assumes that crisis under-registration was very much greater for females (24%) than for males (10%). Although this result may appear astonishing, it does not seem to us implausible, especially if the under-registration relates essentially to young children.<sup>14</sup> The hypothesis might certainly also be made that we have previously under-estimated the impact of voluntary migration. However, it would then have to be accepted that the latter had a very different effect depending on sex. There are two possible solutions. We may take the view that it is the rate of under-registration of females that is correct and that the rate for males has been under-estimated. It is then necessary to imagine, for net female migration of nil, very large net inward migration of males (in the order of 300,000 in order to equalize the rates of under-registration of deaths). Or else, in contrast, the view can be taken that it is the rate of under-registration of male deaths

---

<sup>13</sup> For the specific needs of this comparison, our estimate of ‘non-crisis deaths’ had to be adapted. In effect, we had to base our reasoning on the deaths that normal mortality would have produced in the actual population resulting from the crisis. In order to do this, we used our forward projection, as if there had been no crisis, from the population observed in the 1926 census – but, in this case, we took the results only as far as 1932. For the years 1934–1938, we made a backward projection from the population observed in the 1939 census. Finally, for the year 1933, the hardest hit by the crisis, we took the mean of these two types of estimate.

<sup>14</sup> It can well be imagined that, for various reasons of an administrative or cultural nature, under-registration of girls’ deaths was higher than boys’.



**Table 2.6** Registered deaths and expected deaths, from 1927 to 1938

Year	Forward projection from 1926	Backward projection from 1939	Estimate used	Deaths registered in ZAGS	Unregistered deaths without crisis	Unregistered crisis deaths	Corrected deaths	Difference
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(d)-(h)
All								
1927	573		573	523	57		579	-6
1928	575		575	496	52		547	27
1929	563		563	539	47		585	-22
1930	549		549	538	42		580	-31
1931	534		534	515	38		553	-19
1932	503		503	668	32	45	746	-243
1933	457	367	412	2,104	22	457	2,583	-2,172
1934	428	365	365	462	19	26	508	-142
1935	435	381	381	342	20		362	18
1936	455	403	403	360	21		380	23
1937	497	436	436	428	22		450	-14
1938	513	450	450	431	20		451	-0.4
Total			5,743	7,406	392	529	8,325	-2,582
Males								
1927	302		302	276	31		307	-4
1928	304		304	264	28		293	11
1929	298		298	286	26		311	-14
1930	290		290	287	23		311	-20
1931	282		282	274	21		295	-13
1932	265		265	368	18	16	402	-137
1933	241	179	210	1,284	11	171	1,467	-1,257
1934	225	181	181	242	10	10	262	-81
1935	230	191	191	179	10		189	2

(continued)

Table 2.6 (continued)

Year	Forward projection from 1926	Backward projection from 1939	Estimate used	Deaths registered in ZAGS	Unregistered deaths without crisis	Unregistered crisis deaths	Corrected deaths	Difference
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(d)-(h)
1936	241	205	205	187	10		197	8
1937	264	224	224	226	10		236	-12
1938	273	233	233	225	9		234	-1
Total			2,987	4,098	207	198	4,503	-1,516
Females								
1927	270		270	247	26		272	-2
1928	271		271	231	23		255	16
1929	265		265	253	21		274	-8
1930	259		259	251	19		270	-11
1931	252		252	241	17		258	-6
1932	237		237	300	15	29	344	-106
1933	216	188	202	820	11	286	1,117	-915
1934	202	185	185	220	10	16	246	-61
1935	205	189	189	163	10		173	16
1936	214	198	198	173	11		183	14
1937	232	211	211	203	11		214	-3
1938	240	217	217	206	11		217	0.1
Total			2,756	3,308	185	331	3,822	-1,066

that is correct, and it is then necessary to imagine a net outward migration of females in the order of 200,000 to equalize the rates of under-registration of deaths. However, neither of these two hypotheses seems to us to be compelling. This is because both assume a large increase in observed excess male mortality resulting from the crisis; yet excess male mortality was already very high. It can certainly be accepted that men suffered more than women from acts of political violence linked to dekulakization.<sup>15</sup> On the other hand, it is hard to imagine that the famine – the main cause of excess mortality in the crisis – would have carried off more males than females. Therefore, there seemed to us to be no justification for increasing the excess male mortality observed, and we preferred simply to assume nil net voluntary migration for both sexes and an under-registration of crisis deaths greater for females than for males.

### 2.2.4 *Estimating Annual Trends in Life Expectancy from 1926 to 1939*

Given these hypotheses on the under-registration of deaths, an attempt may be made to estimate annual trends in life expectancy during the 1920s and 1930s, distinguishing the crisis years from other years.

For the years 1927–1931 and 1935–1938, one could, without great risk of error, ascribe the age distribution of expected deaths to registered deaths (increased for under-registration) and recalculate annual life tables taking into account the annual fluctuations in the number of registered deaths.

On the other hand, doing the same for the three crisis years would carry a risk of serious error, since crisis deaths have a different age structure from ordinary deaths. Fortunately, an age distribution of ZAGS-registered deaths is available for the years 1933 and 1934. Nevertheless, for these 2 years, we have to decide the age distribution of unregistered deaths. Then we should consider what to do with the 1932 deaths, for which no age distribution is available. Let us therefore treat each of these three crisis years separately, starting with 1933 – the year most affected.

**1933.** An age structure appropriate to crisis deaths can be obtained by subtracting, for each age, expected non-crisis deaths from total ZAGS-registered deaths. Therefore it might be imagined that we could just distribute the unregistered deaths by age, pro rata to the registered crisis deaths. However, the hypothesis underlying such an approach (under-registration independent of age) leads to an absurdity: the absence of excess mortality resulting from the crisis among those under 1 year old. Even if we accept that very young infants still being breast-fed suffered less than other people, it cannot be imagined that infant mortality was unaffected by famine on such a scale. The last case of large-scale famine observed in Europe is that of Finland in 1868. The crude mortality rate in Finland for that year went up to 78 per

---

<sup>15</sup> Word coined from *kulak* (wealthy peasant), to designate Stalin's policy of destroying this socio-economic group.

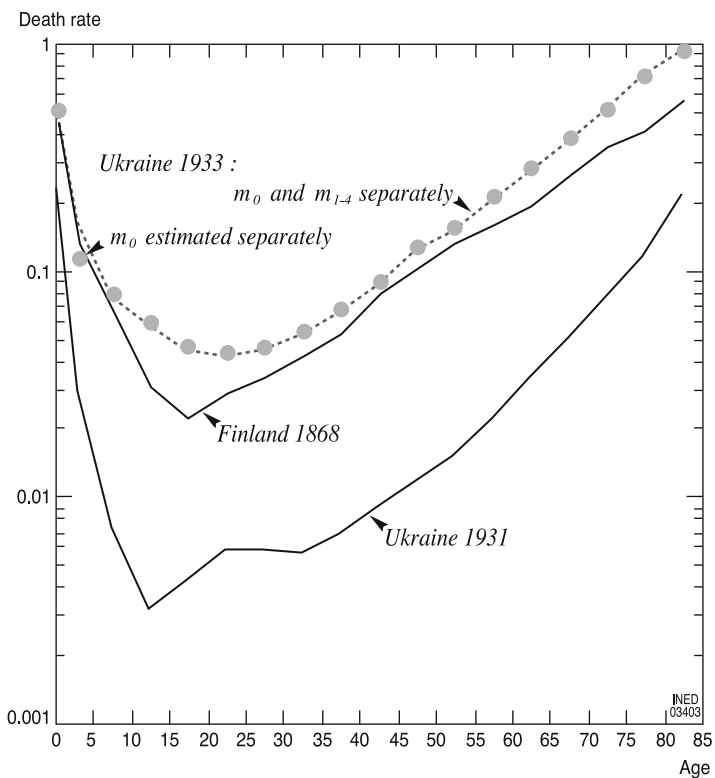
thousand, as against 26 per thousand in the early 1860s (SGF 1907). This situation is, relatively speaking, comparable to the one that interests us, since the crude mortality rate in Ukraine rose to 85.5 per thousand in 1933, whereas without the crisis it would have been only 16.9 per thousand. With a multiple of 3 applying to the crude rate in the Finnish crisis, the corresponding increase in mortality at age under 1 was from 211 per thousand to 336 per thousand – i.e. a rise of 50% (Pitkänen 1993). Since the crude crisis mortality rate in Ukraine was 5 times higher than the rate to be expected without a crisis, it seems to us that mortality among those under 1 year old must have been approximately double non-crisis mortality. Therefore we multiplied the infant mortality rate for 1931 by 2 in order to estimate the 1933 infant mortality rate. By applying this rate to weighted births for 1932 and 1933, we obtained the estimated infant deaths for 1933; then, by subtracting registered deaths from that figure, we arrived at an estimate of unregistered infant deaths. Having subtracted the latter from the total number of unregistered deaths, we were able to distribute the remainder by age pro rata to registered crisis deaths at 1 year and over. However, the reader will perceive that, by doing so, we are very probably under-estimating mortality at 1–4 years. The estimated curve for Ukraine is consistently higher than the Finnish age-specific mortality curve, except for mortality at 1–4 years (Fig. 2.7). Therefore, as with infant mortality, we decided on an a priori increase in mortality at 1–4 years and distributed the remaining deaths proportionately above 5 years of age.<sup>16</sup>

Figure 2.8 illustrates the age-specific impact of the Ukrainian crisis compared to that of the Finnish famine, using, for Ukraine, the ratio of age-specific mortality rates in 1933 to those for 1931 and, for Finland, the ratio of 1868 rates to those for 1861–1865 (Pitkänen 1993). The excess mortality of the crisis seems very much greater in Ukraine than in Finland, but this principally reflects the fact that Finnish non-crisis mortality in the 1860s was very much higher than Ukrainian non-crisis mortality in the 1930s; and this was all the more true for the adolescent age groups that are the first to benefit from health transition. The excess mortality of the crisis observed in Ukraine is thus particularly high around 14 years of age, where the 1933 rate is almost 18 times higher than the 1931 rate.<sup>17</sup> At all ages between 5 and 70 inclusive, the 1933 rates are at least 7 times higher than those for 1931. Finally we should note that, just as in Finland, excess mortality resulting from the crisis reached its maximum in the adult age groups at around 50 years of age.

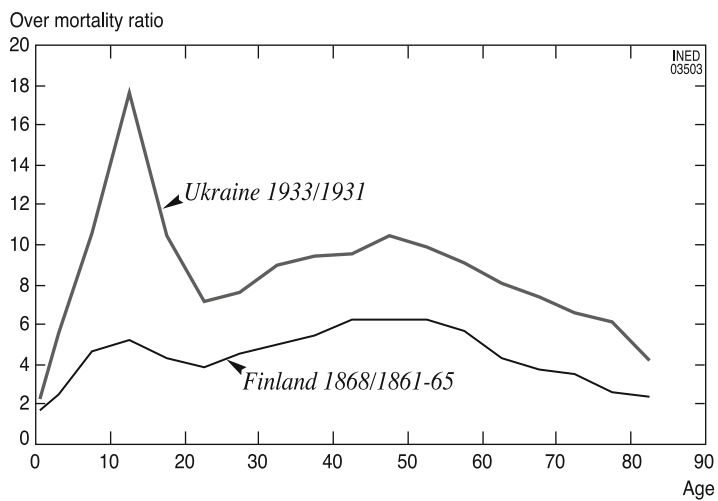
**1934.** Since the number of undeclared deaths for 1934 was relatively small (about 10,000), we have restricted ourselves to a very simple hypothesis and have distrib-

<sup>16</sup> The correction made to the infant mortality rate led to an estimated proportion of 44% of deaths at under 1 year of age being ZAGS-registered. We hypothesised that this rate of coverage increased rapidly with age between 1 and 5 years, rising from 55% at age 1 to 84% at age 4. Once the remaining deaths were distributed between the older ages, the rate of coverage at age 5 went up to 98%. It then remained more or less at this level until it reached the oldest old, falling to below 90% again after age 90.

<sup>17</sup> We should clarify that this in no way relates to our correction of under-registration of deaths, since we estimated that there was almost total coverage (98%) at this age.



**Fig. 2.7** Estimated age-specific male mortality rates in 1933 in Ukraine compared to 1931 rates and to Finland's 1868 rates



**Fig. 2.8** Crisis mortality: excess male mortality, comparing ratio of Ukrainian age-specific 1933 rates to 1931 rates with ratio of Finnish age-specific 1868 rates to 1861–1865 rates

uted them by age pro rata to the distribution obtained for the undeclared 1933 deaths in the previous section.

**1932.** For 1932, the situation is trickier, since we have no age distribution for registered deaths. Of course, we do have the age distribution of the 503,000 expected non-crisis deaths resulting from our projection calculation. But all the 243,000 crisis deaths, registered or not, have to be distributed by age. We could decide to distribute them like the 1933 crisis deaths, but here we come up against a new difficulty with infant mortality: from 1932 to 1933, the number of births fell by almost half, and so the proportion of crisis deaths at under 1 year old observed in 1933 cannot be applied to 1932. We therefore chose to estimate 1932 infant deaths by maintaining a constant ratio between total excess mortality due to the crisis and excess mortality due to the crisis at under age 1, and this led us to increase non-crisis infant mortality by 33% for boys and 32% for girls. The remaining crisis deaths were distributed by age over 1 year old, on the same basis as 1933 crisis deaths.

Once distributed by age in this way, the unregistered deaths were added to the registered deaths, and age-specific mortality rates were obtained, allowing us to calculate life tables for each of the 3 years by using the ratio of all deaths to the theoretical populations calculated previously (with non-crisis mortality and registered births) minus crisis deaths.<sup>18</sup>

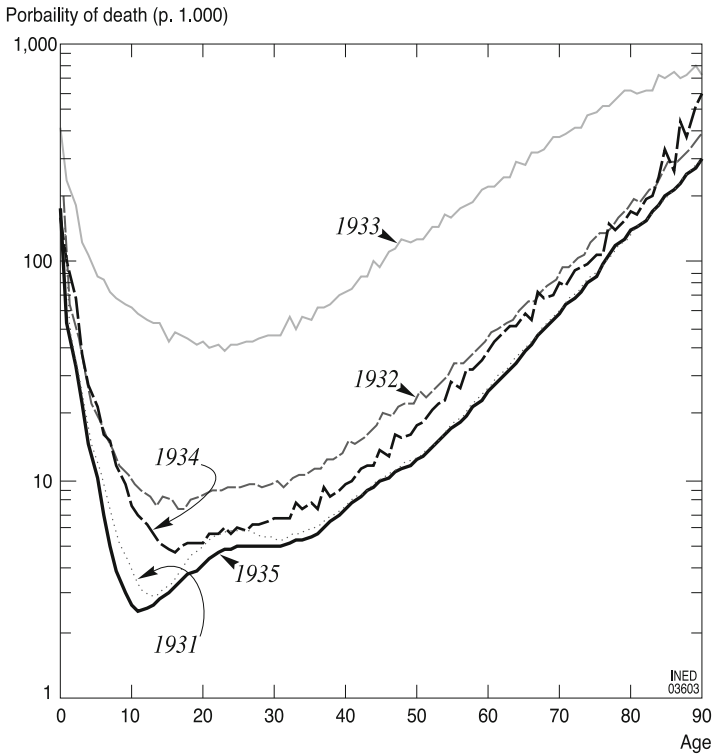
The age-specific probabilities of death that we obtained in this way for the crisis years follow a regular course up to the oldest old age groups (Fig. 2.9). Our estimates are obviously much more uncertain beyond age 90, but that has no influence on the level of life expectancy. The gap between the 1933 curve – and to a lesser extent those of 1932 and 1934 – and the curves for the surrounding years (1931 and 1935) reflects the scale of the crisis.

From 1927 to 1931, life expectancy was almost stable, with a few oscillations, going from 43.3 years to 43.5 for males and from 46.8 to 47.9 for females (Table 2.7 and Fig. 2.10). Then, with the crisis, it fell dramatically, losing almost 9 years in 1932 then another 28 years in 1933. In that year, it was a little over 10.8 years for females – and just 7.3 for males!

This result may appear exaggerated, but we do not think that is the case. Firstly, with rates calculated on the basis of the ratio of age-specific ZAGS-registered deaths alone to our population estimates, we would have obtained 12.2 years' life expectancy for males and 19.5 for females. By correcting the deaths for under-registration, but without differentiating under-registration according to age, we would have obtained

---

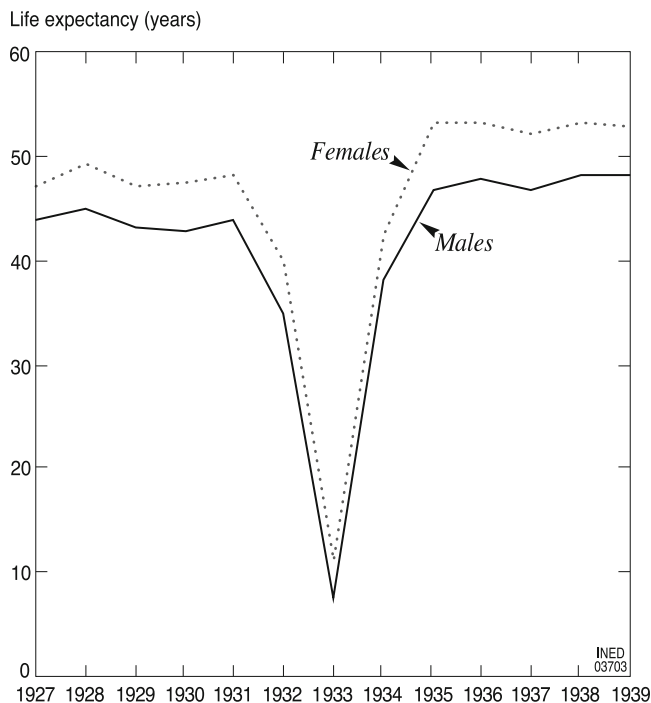
<sup>18</sup> Firstly, we needed population estimates to match to the denominators of the rates; we used the results of the forward projection up to 1 January 1933 and those of the backward projection from 1 January 1934. However, the result for the year 1934 proved implausible at ages over 80, since the total population numbers were much too high in comparison to the estimated deaths. This relates to the fact that the 1939 census greatly overestimated the total number of very aged people, claiming to have observed over 1,000 centenarians – in an era when there were only 200 in France. With backward projection, this over-estimate of the total numbers of the oldest old affects the younger age groups and hinders the calculation of rates. We therefore made a new forward projection up to 1 January 1934, on the basis of estimated mortality for 1932 and 1933, and took a mean between the forward- and backward-projected populations as our denominator for the 1934 rates.



**Fig. 2.9** Age-specific male probabilities of death for the crisis years (1932–1934), compared to 1931 and 1935

**Table 2.7** Estimate of annual trends in life expectancy from 1927 to 1939

Year	Males	Females
1927	43.3	46.8
1928	44.6	48.7
1929	42.8	46.7
1930	42.5	46.9
1931	43.5	47.9
1932	34.5	39.4
1933	7.3	10.9
1934	37.6	42.1
1935	46.3	52.7
1936	47.6	53.0
1937	46.2	51.9
1938	47.9	52.7
1939	47.7	52.5



**Fig. 2.10** Annual trends in life expectancy at birth between the Wars

10.3 and 14.0 years respectively. By introducing particular corrections to infant and child mortality, as we have, the figures reached are 7.3 and 10.8 years. We have made it clear that these two successive corrections were necessary in order to ensure consistency of data. Secondly, reliance on the estimates given by Evgenii Andreev et al. (1998) for Russia (15.2 years for males and 19.5 years for females) and by the same authors (Andreev et al. 1992; repeated by Alain Blum 1994) for the whole USSR (10.3 years for males and 13.0 for females) might suggest even in advance that life expectancy in Ukraine – which, of all the Republics of the USSR, suffered most from the famine – would be significantly below 10 for males and around 10 for females.

This period life expectancy measures the extent of the immediate circumstances of the crisis. The impact of these circumstances on the survival of each birth cohort is obviously much less, since each one experiences it only at a particular age. If, on the other hand, a crisis like this continued over several decades, it would soon lead to the population disappearing.

Ukrainian life expectancy was still abnormally low in 1934, but on the other hand it reached a high point just after the crisis, in 1935–1936. This is a fairly classic immediate post-crisis situation where, precisely because of the severe reductions of earlier years, mortality is temporarily less than normal. After reaching a significantly lower point in 1937, life expectancy rose again in 1938–1939.



## References

- Adamets, S. (1995). *Les catastrophes démographiques en Russie soviétique en 1918–1923: Crises alimentaires, épidémiques et de mortalité*. Doctoral thesis in historical demography (457 p.). Moscow/Paris: CDEH/EHESS.
- Adamets, S., & Shkolnikov, V. M. (1995). *О довоенных таблицах смертности СССР* [About pre-war life tables for the USSR] (27 p.). Moscow: Institute of Economic Forecasting, Centre for Demography and Human Ecology (Paper presented to the Conference “Population of the USSR in the 1920s and 1930s in Light of Newly-Declassified Documentary Evidence”, Toronto, January 1995).
- Adamets, S., Blum, A., & Zakharov, S. (1994). *Disparités et variabilité des catastrophes démographiques en URSS* (Dossiers et Recherches No. 42) (100 p.). Paris: INED.
- Andreev, E. M., Darskii, L. E., & Kharkova, T. L. (1992). L'histoire de la population de l'URSS 1920–1959. *Annales de démographie historique*, 61–150.
- Andreev, E. M., Darskii, L. E., & Kharkova, T. L. (1993). *Население Советского Союза: 1922–1991* [Population of the Soviet Union: 1922–1991] (143 p.). Moscow: Nauka.
- Andreev, E. M., Darskii, L. E., & Kharkova, T. L. (1998). *Демографическая история России: 1927–1959* [Demographic history of Russia: 1927–1959] (187 p.). Moscow: Informatika.
- Blum, A. (1994). *Naître, vivre et mourir en URSS: 1917–1991* (274 p.). Paris: Plon.
- Blum, A., & Darskii, L. (1999). Le ‘modèle’ soviétique (1917–1991) et ses devenirs. In J.-P. Bardet & J. Dupaquier (Eds.), *Histoire de la population européenne* (pp. 659–695, 792 p.). Paris: Arthème Fayard.
- Coale, A., & Demeny, P. (1983). *Regional model life tables and stable populations* (2nd ed., 496 p.). New York/London: Academic.
- Coale, A., & Trussell, J. (1974). Model fertility schedules: variations in the age structure of childbearing in human populations. *Population Index*, 40(2), 185–201.
- Conquest, R. (1988). *The harvest of sorrow. Soviet collectivisation and the terror-famine* (412 p.). London: Arrow Books.
- Goskomstat. (1992). *Всесоюзная перепись населения 1939 г. Основные итоги* [General population census for 1939. Main results]. Moscow: Nauka.
- ISI (International Statistical Institute). (1929). *Aperçu de la démographie des divers pays du monde* (447 p.). The Hague: van Stockum and Son.
- Kulchytskyi, S. (1995). *Ukraine's demographical losses from famine in 1932–1933 according to the general census of the population in 1937* (7 p.). Kiev: Institute of the History of Ukraine (Paper presented to the Conference “Population of the USSR in the 1920s and 1930s in Light of Newly-Declassified Documentary Evidence”, Toronto, January 1995).
- Maksudov, S. (1989). *Потери населения СССР* [Population losses in the USSR] (298 p.). Benson: Chalidze.
- Novosselskii, S. A., & Paevskii, V. V. (1930). *Смертность и продолжительность жизни населения СССР 1926–1927. Таблицы смертности* [Mortality and life expectancy of the population of the USSR 1926–1927. Life tables] (LII + 139 p.). Moscow/Leningrad: Plankhozguiz.
- Pitkänen, K. J. (1993). *Deprivation and disease. Mortality during the great Finnish famine of the 1860s* (176 p.). Helsinki: Hakapaino.
- Pyrozhev, S. I. (1992). Демографическая структура трудового потенциала [Demographic structure of the working-age population]. In *Трудовой потенциал в демографическом измерении* [Potential labour force: Population report] (pp. 47–92, 174 p.). Kiev: Naukova Dumka.
- Pyrozhev, S. I. (1996). Les pertes démographiques en Ukraine dans les années 1930 et 1940. *Population*, 51(4–5), 1032–1040.
- SGF (Statistique générale de la France). (1907). *Statistique internationale du mouvement de la population d'après les registres d'état civil. Résumé rétrospectif depuis l'origine des statistiques de l'état civil jusqu'en 1905* (880 p.). Paris: Imprimerie nationale.

- TSSU SSSR (Tsentral'noe Statisticheskoe Upravlenie SSSR). (1928–1933). *Всесоюзная перепись населения 1926 г. Окончательные итоги* [1926 General Population Census. Final results] (56 Vols.). Moscow: TsSU SSSR.
- Zemskov, V. N. (1990). Спецпоселенцы (по документации НКВД-МВД СССР) ['Special settlers' (based on NKVD-MVD USSR documentation)]. *Социологические исследования* [Sociological Studies], 11, 3–17
- Zemskov, V. N. (1991a). Гулаг [Gulag]. *Социологические исследования* [Sociological Studies], 6, 10–27.
- Zemskov, V. N. (1991b). Гулаг [Gulag]. *Социологические исследования* [Sociological Studies], 7, 3–16.