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The first 35 years of Soviet living standards: Secular growth and conjunctural crises in a time of famines [☆]

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ABSTRACT

This article investigates welfare and living standards in the Soviet Union during the great crises of the first 35 years of Soviet power, during which the USSR experienced 5 major famines. It reviews the classic literature on traditional measures of Soviet consumption and recent critiques of them. It discusses the nature of welfare and welfare indicators, the reliability of Soviet statistical indicators on welfare, and it charts the dimensions of the groups in Soviet society that were most vulnerable to these welfare crises. A range of welfare indicators covering nutrition, mortality and stature are critically examined both regarding their immediate and long-term consequences and the groups affected.

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1. Introduction

This article investigates welfare and living standards in the Soviet Union during the great crises of the first 35 years of Soviet power. This was an extraordinary period in which critical welfare crises covered more than half of these years,¹ and where there were at least 5 major famines. Because these crises and famines were associated with major political events, (revolutions, wars, collectivization) there has been a tendency to view them as separate individual events, and to ignore their common aspects. At the time attempts were made to distort the record and to conceal the scale and nature of these famines. Very little information was publicly available about these famines until the archives were opened. However, considerable materials were gathered at the time and preserved in the archives together with reports and other documents indicating the nature of the internal struggles over statistical evaluations. These materials are now available. This article makes a critical analysis of the whole range of data on welfare over this period, including those from previously closed Soviet archives.

The first part of the article begins with a review of the classic literature on traditional measures of Soviet welfare, and recent critiques of them. These works estimated the growth of real wages and household consumption for the whole of the Soviet population between a selected number of relatively favorable years. While this approach did produce results that corrected some of the excessive claims of the Soviet government at the time, it under-estimated the complexity of the situation which the USSR faced, the many crises through which Soviet society was passing, and the fractured nature of society as regards the welfare entitlements of different groups.

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¹ i.e. the 18 years of 1918–1922, 1928–1933, 1941–1947.

Table 1
Chapman's calculation of Soviet real wages, 1928–1952 made in 1954 and 1963

Real Wages	Before taxes & bond purchases		After taxes & bond purchase		
	1928 price weights	1937 weights	1928 weights	1937 weights	
				1954	1963
1928	100	100	100	100	100
1937	58	82	57	81	57
1940					54
1948	45	62	40	56	40
1952	72	103	63	90	66

Source: Chapman (1954, 1963). Chapman's figures in 1963 were given in proportion to a 1937 base of 100. For comparative purposes I have changed the base back to 1928. Note: Chapman noted that Jasny and Prokopovich had given slightly lower figures. Chapman, *ibid.* 1954, p. 147.

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The second part of the article discusses the nature of welfare, the overall reliability of Soviet statistical indicators and provides a survey of the most vulnerable groups in society, who were most likely to face the most severe entitlements crises.

The third and major part of the article surveys a range of welfare related indicators that capture crisis developments for society as a whole, and wherever possible for separate groups within society. All of these indicators are treated critically with an exposition of the politics around them, the extent of political distortions and a general assessment of their reliability.

2. A brief review of the classical studies of growth in per capita consumption in the USSR

2.1. Early classics: Bergson, Chapman and Gregory

In the 1950s, Abraham Bergson and his team (including Janet Chapman) carried out a major US research effort to analyse the 'real' nature of Soviet economic growth as distinct from the 'unreal' claims that were being made by Soviet officials at the time.² Janet Chapman's early (1954) estimates of Soviet real wages argued that contrary to the Soviet claims of growth, that between 1928 and 1948 there had been a quite distinct decline in real wages, which were only partly recovered in the final years of Stalin's reign. The calculation of real wages is complex, and is dependent upon several things including what price weights are used. But in all the concepts and price weights provided by Chapman both in her original article in 1954, and in her 1963 book she finds that Soviet performance was poor (Table 1).

When Bergson (1961) produced his calculation of Soviet Real National Income for these years in 1961, he used a somewhat broader indicator of household consumption per employed person, as well as the much broader concept of total household consumption, which included the peasantry. Both of these indicators, and especially those for total household consumption provided a much more favorable picture, although still not a particularly good one. The fall in consumption in the early 1930s had still not been totally recovered in the late 1930s, and only began exceeding the 1928 level in the late 1940s (Table 2).

In these early studies, the Bergson team did not include indicators for the pre-revolutionary period, but Paul Gregory later provided a 1913 benchmark to link the Bergson national income series with his own pre-revolutionary series for 1880–1913 (Gregory, 1982, pp. 102–121). According to Gregory's calculations per capita national income fell significantly between 1913 and 1928; by 17% instead of the 9% growth claimed in official Soviet statistics. This would make the subsequent decline in the 1930s claimed by Bergson and Chapman even more significant, and would imply that 1950 consumption levels were still lower than 1913 levels.

2.2. Challenges to these early pessimistic views: Davies, Wheatcroft and Allen

This pessimistic scenario has been challenged. The Birmingham research team under R.W. Davies, (with which I am associated) was generally impressed with the reliability of most of the Bergson calculations, but we were critical of Chapman's estimates of real wages, the selection of benchmark years and especially of Gregory's 1913 benchmark link. We argued that Chapman had somewhat under-estimated the level of growth of living standards in the late 1930s, by concentrating on the decline in real wages earned in industry, instead of considering the effects of structural change, as formerly low paid peasants moved to the higher paid urban sector. We also argued that because of the exceptional harvest of 1913, a 1913 benchmark would provide a quite uncharacteristic indicator of pre-revolutionary consumption. Furthermore we thought that Gregory's 1913 figures further exaggerated the growth in rural consumption by not adequately capturing urban supplies

² Khrushchev in 1958 would eventually claim that the USSR was catching up on American growth and would exceed them in 10 years.

Table 2

Bergson's calculations of household consumption in the USSR, 1928–1950

	1928	1937	1940	1944	1950
<i>Household consumption per capita</i>					
In adjusted market prices of 1937	100	97	93	64	113
In adjusted market prices of 1950	100	101	93	65	111
In adjusted market prices of 1928	100	122			
<i>Household consumption per employed worker</i>					
In adjusted market prices of 1937	100	76	73		79
In adjusted market prices of 1950	100	79	72		77
In adjusted market prices of 1928	100	95			

Source: Bergson (1961).

by road (Wheatcroft et al. 1986, pp. 267–268; Harrison, 1994, pp.41–42)³. The Birmingham team argued by contrast that per capita national income in 1928 was at roughly the same level as the prewar norm³ and that there consequently had been some growth in consumption between 1913 and 1938.

Bob Allen has also recently criticized the pessimistic evaluations of Bergson and Chapman and he is much more extreme in his optimism. His criticisms are based on several grounds, some of which seem more valid than others. He points out that the low growth rate of real per capita consumption was a result of it being calculated by using the Paasche Price Index. If the Laspeyres Price index had been used the growth rate over the 1928–1937 period in 1937 prices would be raised from 3% to 32%. The grounds for preferring the Paasche index are questionable and if the index, which Allen prefers—the Fisher Ideal Price Index were used then the growth rate would have been 17% over these 10 years (Allen, 1998, pp. 1066–1068, 2003, pp. 139–140). Allen also notes that Chapman's assumption that 1928 prices in rural areas were lower than in urban areas had led her to over-estimate 1928 consumption and therefore to further reduce the apparent growth from 1928 to 1937. When this unwarranted reduction in 1928 rural prices is removed the Fisher Ideal Price Index would indicate a growth in real consumption per capita of 25% from 1928 to 1937 (Allen, 1998, pp. 1068–1069, and Allen (2003, pp. 140–141). Both of these criticisms and significant adjustments recommended by Professor Allen seem appropriate.

But Professor Allen's optimism was further fuelled by a couple of factors that are more questionable. He accepted the Gregory linkage to the pre-revolutionary national income series, which as I have noted above, would lead to an excessively optimistic growth rate for the longer period 1913–1938 or 1948. And his calculation of food consumption availability (Allen, 2003, pp. 132–137) appears to use heavily corrected post-revolutionary series of grain production figures and an uncorrected pre-revolutionary one. This leads him to under-estimate the pre war data by about 15%, and to greatly over-estimation the level of early Soviet improvements in food consumption. This will be discussed in more detail later.

2.3. A recent extension to the pessimistic view: Hessler

Another scholar who has recently written on issues related to Soviet living standards and consumption in this period is Julie Hessler in her volume on the history of Soviet trade. But Hessler's work is more of a social history than an economic history and she accepts uncritically the Gregory–Bergson pessimistic view of consumption dynamics. In her work, she posits two modes of Soviet socialism as regards the supply and distribution of food and consumer goods. One of these was a 'crisis mode', which characterized Soviet society in 1917–1922, 1928–1933 and 1939–1947. And the other was a 'recovery or normalization mode' which was in place the rest of the time, i.e. 1923–1927, 1934–1938, and after 1948. She argues that 'Until the 1950s normalization never actually led to normalcy; instead, internal and external factors conspired to swing the pendulum back to another crisis phase (Hessler, 2004, p. 5).'

In her conclusion she asks: 'Was Stalinist policy responsible for the country's emergence from the famine era?' (Hessler, 2004, p. 326) But she doesn't answer this dangerously provocative and complex question. Instead she sidesteps it and states:

'Without a doubt, many of the food crises and famines in the period from 1917 to 1948 had resulted directly from Soviet policies; it is equally clear that Soviet policies in the post-Stalin period prevented starvation from recurring then.'

Later in her conclusions, when she directly attributes the improvements in welfare and longevity to developments in the Khrushchev period, she makes it clear that she subscribes to a temporal compartmentalization theory. She lists the 'milestones from 1954 to 1964' which she claims produced these improvements. According to her, they included 'the radical increase in the state's purchasing price for agricultural products, which spurred peasants to intensify their efforts in collective fields; the end of obligatory deliveries; and perhaps above all, the decision to import essential foods.⁴ She admits that technological progress also played a part: 'the mass production of penicillin from 1949 on made it possible to control

³ Gregory has subsequently responded to these criticisms and has suggested that it might be appropriate to adjust these figures (Gregory, 1994, pp. 161–163).

⁴ Actually this really came later after the Soviets received foreign currency to make such purchases following the OPEC Oil bonanza in the 1970s. SGW.

infectious diseases, which in turn would render hunger less lethal. Also, modern fertilizers and agricultural equipment led to a dramatic increase in harvest yields.' She thinks that in the early 1950s policy factors in combination with climate were the most important factors and argues that 'If a drought had occurred in 1951 or 1952, the era of starvation may well have persisted until the innovations in agricultural policy of the Khrushchev years (Hessler, 2004, p. 326).

We will return to the question of whether the escape from under-development and welfare crises was the result exclusively of developments in the later stage after this period, and to what extent it could be related to some of the developments of this time, but let us first look in more detail at the nature of welfare, the reliability of the indicators used in the Soviet Union and the groups of the population which were most vulnerable to crisis conditions.

3. The nature of welfare, its indicators and the most vulnerable groups

3.1. The nature of welfare

Welfare can be considered in two ways. One approach is based on the presumption that *increases in the supply* of consumer goods and services, *automatically increases* welfare. The other approach is to presume that greater longevity and in stature are *consequences* of improved welfare. The first of these approaches sees welfare as a more or less immediate consequence of economic activity directed towards increasing the supply of consumer goods, while the latter sees welfare as the consequences of a whole series of developments over a period of time. Indicators of the flow of material goods and of food consumption are concerned with immediate welfare. Measures of mortality are more complex and generally provide a reflection of welfare conditions throughout life. Measures of stature are also complex measures, which reflect welfare conditions over time, but the time in this case is the period in which growth was occurring i.e. during the first 20 or so years of life. A famine is an extreme case when the lack of welfare and supply of food reaches the level of causing or threatening to cause death in the short-term. The progression from high to low welfare and into famine is not marginally incremental. There is a certain level beyond which there will suddenly be catastrophic consequences. Consequently attempts to sum levels of welfare and calculate an average welfare level may well conceal the reality of famine conditions in certain groups. It is for this reason that Amartya Sen has recommended that particular attention be paid to vulnerable groups and to assessing their entitlement situation when considering the risk of famine (Sen, 1981). Below in Section 3.3, I will attempt to draw out the changing contours of the particularly vulnerable parts of the Soviet population. Because of the dramatic structural changes that were taking place during this period and the 'liquidation' of certain groups and classes these changes are of particular importance. But before attempting a survey of the most vulnerable groups of the population I will briefly review the situation regarding the reliability of statistical indicators at this time.

3.2. The reliability of Russian and Soviet statistical data

The new revolutionary regime came to power with the promise of giving the people bread and generally improving popular welfare as society progressed towards Communism, a time of abundance. The Bolshevik leadership was consequently sensitive to indications that welfare was not increasing, and applied considerable pressure to remove such dangerous indicators from view. The publication of statistics was halted as soon as unwanted indicators were recorded. Considerable pressure was placed on the statisticians and registrars to cover-up failures to progress as rapidly as planned, and eventually many statisticians were purged and in the late 1930s executed. We know that the grain harvests and the population figures that were officially accepted in the 1930s were grossly exaggerated, because this was subsequently admitted by the regime itself. We know that both Stalin and Khrushchev had very low opinions of the work of statisticians, and that they often ignored the advice of the statisticians and imposed different and politically more convenient figures on the regime. This has led many commentators to doubt that it is possible to get any meaningful and reliable statistical data for the Stalin period.

This article argues that such pessimism is unwarranted. Now that the Soviet archives are open, it is possible to see how the different statistics were put together, and what pressures were placed on the statisticians to produce distorted results. In most cases the data themselves were not distorted, it was only the political conclusions from these data that were distorted, and that is precisely why the detailed data was declared secret and not allowed to be published. The internal story of the struggle for statistical reliability from within the Soviet statistical agencies is a quite remarkable story. Here I will just give the main outlines of the story regarding grain statistics, in Section 4 when we consider separate statistical indicators I will give more details about the particular story of other sets of indicators.

The Central Statistical Administration (TsSU) was a quite remarkable revolutionary organization that emerged with great strength and confidence from the turmoil of the Revolution. The Revolution did indeed lead to the collapse of the old pre-revolutionary Central Statistical Committee (TsSK) that had been part of the Ministry of the Interior. But it was replaced by a new revolutionary Central Statistical Administration that was largely based on the extremely talented and dedicated statisticians of the local government (*Zemstvo*) system and of the towns. This new Soviet Central Statistical Administration (TsSU), under its pioneering leader P.I. Popov, was greatly appreciated by Lenin. In its early years, it was allowed to develop some extraordinarily ambitious work including mass surveys of food consumption and of peasant and worker budgets. After the experience of War Communism Lenin was extremely suspicious of attempts to rush ahead prematurely into planning, and he supported Popov in introducing a degree of stability and realism into the early agricultural plans.

Popov, right from the creation of TsSU, had always seen planning and the construction of a statistical balance of the national economy as one of the main objectives of the new Central Statistical Administration, but he was insistent that this required a sound statistical base, as well as a detailed understanding of the complex interactions of the different branches of the economy. With Lenin's support, and that of a number of senior Bolsheviks who understood the importance of objective statistics for economic planning,⁵ much was achieved in the early 1920s, including in 1925 the construction of a 'Balance of the National Economy for 1923/24' (Wheatcroft and Davies, 1985, pp. 34–45).⁶ Throughout the early 1920s Popov withstood the pressures for Gosplan to increase his evaluation of grain production to allow them to make larger and more ambitious plans. With Lenin's death in 1924 and Tsyurupa's illness Popov was unable to withstand the political pressures and was eventually sacked in December 1925. He was replaced by N. Osinskii, an unusually independent old Bolshevik with some statistical experience, who had more weight politically than his predecessor. Although Osinskii acquiesced with a major inflation of grain statistics in 1926,⁷ he continued to defend the independent work of the statisticians, until he, in his turn quarreled with Stalin over the 1927 harvest evaluation and was forced to resign in early 1928 (Wheatcroft, 1974, p. 27).

The Soviet political and economic system of the first five year plan generated pressures that led to a distortion in many plan fulfillment indicators. When fulfillment was the basis for reward there were great pressures to report fulfillment even when it did not occur. Osinskii was later to describe this as 'a plan-constructivist distortion'. Under the compliant Milyutin, the third director of TsSU the statisticians were not always able to withstand these pressures.⁸ The absorption of the Central Statistical Department (TsSU) into the state planning commission (Gosplan) in late 1929 and the abolition of censuses weakened the independence of the statisticians and further aggravated the distortions of the first five year plan.⁹ In late 1931, there was a reaction against this process that led to the re-establishment of a powerful and more independent central statistical department (TsUNKhU) and the return to its leadership of none other than Osinskii.¹⁰ For a number of years Osinskii led a valiant attempt to retain statistical credibility, and a degree of openness. Many statistical materials were published.¹¹ Censuses and sample surveys, which had been abolished in favor of accounting data were gradually restored, although it would be a number of years before a full population census was carried out in 1937 and as we shall see below, was to have tragic consequences. In general, there was a move to make politically embarrassing figures secret rather than to distort them. The conclusions that were made on the basis of the restricted published figures were often misleading and distorted, but the primary data were not normally corrupted.

Attempts were soon made to limit Osinskii's independence, and a proven Stalinist Kraval' was moved into TsUNKhU as Osinskii's deputy, and effective minder. By 1934 Kraval' had taken charge of TsUNKhU, although Osinskii retained control of the sensitive task of harvest evaluations. The task of harvest evaluations had been hived off from TsUNKhU and transferred to a new independent organization TsGK with its own inter-regional network, over which Osinskii continued to preside until 1936. By this time the pressures to report agricultural improvement were so intense that it became impossible not to provide indicators that could be used to claim that grain production and grain yields had risen significantly. In reality, there was no increase in grain yields, despite the great claims that Collectivization would produce such a growth.

The politicians rationalized this situation by claiming that the problem was in the great level of harvesting losses that were taking place. It was claimed, with some justice that the collective peasants did not have an incentive to harvest grain efficiently, as they no longer felt that they owned the harvest. Furthermore, if they owned livestock, they would have an interest in allowing grain to be wasted in the fields, so that it could be later eaten by their livestock or simply gleaned. Harsh legislation was introduced threatening the death penalty for people stealing grain from the fields, which effectively banned gleaning. But in addition the politicians argued that the peasants should be made responsible for all the grain standing in the field, and not just for the grain harvested and recorded in the barns. The state therefore had an operational interest in calculating the so called 'biological' yield, or 'yield on the stalk' rather than the barn yield after harvest and transport losses. There was also at this time a move to attempt to objectify the harvest evaluations by using the so called 'metrovka' (metre square) which allowed trial harvesting to be carried out at the best agro-meteorological time, in the most careful way, which

⁵ The most important of whom was A.D. Tsyurupa, a former Zemstvo statistician who was a leading Bolshevik, Lenin's deputy chair of the Council of People's Commissars, and for a while also head of Gosplan. Unfortunately his health was bad and he would be somewhat incapacitated in 1925 and died in 1927.

⁶ The young economist Leontief who had worked on these early balances would later in emigration develop input-output analysis along the same lines.

⁷ The 20+% correction to grain statistics that was introduced in 1926 on the orders of an interdepartmental expert Soviet that was given control of harvest evaluations could be justified, if it was agreed that a 19% correction was required to pre-revolutionary grain statistics. Initially the pre-revolutionary data were adjusted upwards by this amount, but later on when the politicians were looking to claim growth from the pre-revolutionary period they conveniently dropped this correction to pre-revolutionary data. This manipulation is explained in some detail in Wheatcroft (1974), and will be discussed further below.

⁸ This was the time when the economist Strumilin stated ironically that the statisticians now preferred to stand for high figures, rather than to sit for low figures. Colloquially in Russian to sit means to sit in prison.

⁹ In line with the ideological view of the time that planning would dominate all aspects of the economy, all censuses were abolished and it was assumed that accountancy procedures would suffice. Even the word 'statistics' was removed from the title of the new agency, which became the department of national economic accounting within Gosplan. The word statistics would only reappear in the title in 1948.

¹⁰ Osinskii was not only a former Director of TsSU, who had been sacked because he had stood up to Stalin, he was also one of the most distinguished independent oppositionists. At various times Osinsky had been a member of rightist and leftist oppositional groups and had been the founder of the Democratic Centralists.

¹¹ The Statistical handbook *Narodnoe Khoziaistvo SSSR* was published in 1932, followed by *Sotsialisticheskoe Stroitel'stvo SSSR* in 1934, 1935 and 1936. A new statistical journal *Plan* was published monthly starting from 1932. But apart from these published materials a much larger amount of confidential printed material began to be produced and circulated in secret amongst the leadership groups which contained monthly plan fulfillment materials. Even more detailed materials were produced in secret on plan fulfillment by month for separate sectors of the economy. There was a series on kolkhoz peasant budget statistics, and on prices.

would result in a true biological yield calculation. Osinskii was perfectly clear about the distinction between biological and barn yield, and introduced another concept of 'normal losses', which were the level of losses that normally needed to be deducted from biological yield to produce barn yield. But the politicians failed to allow any discussion of the detail of what the figures actually meant, and in published work they began to compare current biological yields with past barn yields (and often for pre-revolutionary times this was without the necessary correction to prewar data). This had the effect of grossly distorting and exaggerating production figures.

Within TsUNKhU everyone knew what was happening, but by law they were forced only to use those figures approved by the government in their published work. The government only approved the exaggerated biological yield figures. The department within TsUNKhU responsible for constructing the balances of the national economy was faced with the problem of how to construct a grain-forage balance that was meaningful. They did this by the simple expedient of using an item, which they called 'nevyazka' [disconnect], which effectively removed the distortion and then allowed them to make meaningful balances from the data. Of course all these operations had to be carried out in secret without their results being published, or at least published in a form that would indicate that they were not accepting the official figures.

Fortunately all these data are now available in the archives and allow us to make more meaningful comparisons of the data (Wheatcroft, 2001b, pp. 842–865).

Osinskii fought his last battle over the evaluation of the harvest for the drought year of 1936. The biological yield seemed to be unacceptably low, even though it was admitted that there had been a serious drought. No harvest figures for 1936 were published at the time for the 1936 harvest. Osinskii's work was investigated by a commission headed by Voznesenskii, and Voznesenskii accused Osinskii of wrecking harvest evaluations with his concept of normal losses, which Voznesenskii claimed was a form of sabotage. Osinskii was arrested and shot, while Voznesenskii was promoted to become head of Gosplan and a member of the Politburo, before coming to an untimely end himself after the war.

The 1930s were a difficult time for all Soviet politicians, government employees and statisticians. Those who tried to work honestly like Osinskii were shot, and as we will see below, those who provided the distortions like Kraval' were also shot.

3.2.1. Penal data

As will be explained in the next section, apart from the welfare of the civil population we are also interested in the welfare of the large group of penal population. TsSU initially received data from the penal and judicial authorities which were published in the early statistical handbooks up to the late 1920s. We have data on the activities of the courts in these years and the scale of imprisonment in the regular prisons and the labour colonies controlled by the Peoples Commissariat of Justice. Data from the state security organizations were however always restricted.

The security organizations had their own statistical departments, which were used for providing internal accounting and operational data. There was no central statistical committee that dealt with all aspects of the work of the security organizations. There were several separate statistical or accounting agencies for the separate divisions within the organs and they performed their separate tasks adequately. Their data was secret at the time, but there is no reason to doubt the ability, honesty and reliability of their calculations.¹² The Labour Camp, Labour Colony, Prisons and Exile systems all had their own separate accounting agencies, which provided regular accounts of the populations entrusted to them. Their accounts, like most prison accounts were kept in the form of balances in which they had to account for the presence and ultimately discharge of the convicts entrusted to them. It is possible that the guards might cover-up the killing of convicts by reporting them as having escaped, but if they did this they would still be held responsible for having let them escape. They would be more likely to report them as having died in the process of escaping. It has also been suggested that OGPU/NKVD would artificially deflate the prison and camp death rates by ordering prisoners who were ill and likely to die to be released (Ellman, 2002, pp. 1151–1172). This may be correct to some extent, but it is a problem implicit in all penal records, where the consequences of imprisonment show up in post-penal health decline.

One of the largest and most important of OGPU statistical departments was the statistical department of OGPU-SOU the Secret Operational Department which held records on all cases being investigated by the various investigative departments within OGPU. In 1953, Khrushchev and Malenkov ordered General Kruglov of the MVD to provide data on the scale of repressions and Kruglov ordered Colonel Pavlov, acting Head of the 1st Special Department of MVD (the successor to the Statistical Department of SOU) to provide the data. The resulting Pavlov figures have often been cited as if they were some overall summary of all repressive activities of the Security forces, rather than as the operational accounting data of the investigative organs. The claims that these data are clearly false because they fail to include all dekulakised kulaks, or the Katyn killings are invalid. Category 2 and 3 kulaks in 1930 and 1931 were ordered to be exiled without referring their cases to the investigative organs. And the Polish officers and intellectuals in 1940 were similarly processed and shot on the basis of the documents used for their arrest, without further investigations. So in both cases, and in the cases of most exiles, it was totally understandable that they would not be included in the Pavlov data. Generally the data in these penal archives is extremely full and detailed and has been found to be mutually consistent across central and thousands of local archives across the country.

¹² Prof. Keep once suggested that since OGPU was engaged in illegal acts, trusting their data was like accepting the tax returns of the Mafiosi. See Keep, 1999, pp. 1089–1092. This is incorrect. Just because an organization engages in illegal acts, does not mean that the internal records that it needs for its own operations are likely to be incorrect. If popular analogies are to be made I would have thought that the Mafiosi accountants were likely to have been scrupulously accurate in providing for the needs of their clients. The consequences of acting otherwise would have been most severe.

Let us now move to consider the general characteristics and scale of the most vulnerable parts of Soviet society, who would be the major victims of famine low welfare levels and issues concerning the accuracy of indicators concerning them.

3.3. *The most vulnerable groups*

Amartya Sen has emphasized the importance of identifying the most vulnerable groups in any welfare crisis so that we can then analyse how they reacted to the crisis. These are the groups that will experience the largest fatalities and severest shock of famines, and they are the groups that often get excluded from statistical investigations.

The most vulnerable groups in the first crisis of 1918–22 were urban unemployed and refugees. In the second crisis the most vulnerable groups were the so called 'kulaks', refugees and those people in urban areas without passports. Many of these groups would eventually be exiled and imprisoned, where they would be recorded in the penal records. As the penal population swelled all of this population would find itself vulnerable to shortages. In the third crisis again the homeless and refugees would be particularly vulnerable, as well as those groups entrapped by enemy action, as in Leningrad.

Population displacement in 1918–1922 came in the wake of a massive amount of earlier population displacement during the first world war, when over 6 million refugees were reported to have been uprooted by the Tsarist Army in its retreat from Poland (Gatrell, 1999). The demobilization of the Tsarist Army, the formation and subsequent demobilization of the Red Army and various other Civil War formations led to millions of former soldiers being displaced. The dramatic decline in the population of the Northern cities forced millions of destitute former city dwellers to begin roaming the country. After the 1921 drought, there were also millions of rural refugees, all of whom were in a particularly vulnerable situation. It is very difficult to estimate the size of the movement of these enormous populations. We know that at its height relief agencies were feeding over 12 million people daily. These were the populations that would suffer the major fatalities in the famine, and who would be the main generators of the massive pandemics that swept the country at this time. They are largely excluded from the civil statistics of the time.

We have much better records of the displacements of the kulaks and other groups that ended up in the extended penal system in the second crisis. The main outlines of the movement and fate of these groups is listed in Appendix. There was no major decline in the core urban population at this time in contrast to what had happened in the first crisis. Industrial unemployment ceased to exist and industrialization continued to develop at a rapid pace. There were, however, large flows of rural population out of the drought affected areas looking for work and cheaper food in 1931 and early 1932. The introduction of a strictly enforced passport system in July 1932 did restrict these movements, and also led to the removal from the cities of unregistered alien elements. Many of these ended up in the camps. As a result of these travel restrictions the disastrous harvest of 1932 was not accompanied by as much refugee movement as earlier, which probably contributed to the relatively low level of epidemic illness. The data for this crisis are remarkably good.

During the third crisis, 1941–1947 there were massive population movements as large parts of the population were evacuated from war zones to the rear. Large numbers were mobilized into the army, and the camps system was greatly reduced in the early stages of the war, although it grew to unprecedented levels after the war.

4. Indicators of crisis in welfare levels

Below we will consider a range of different types of welfare indicators. Nutritional data provide a direct indicator of immediate welfare levels. Data on mortality and stature are generally more complex and provide indirect indicators, which give an indication of welfare over a length of time. However, in extreme cases (famines) mortality data can also provide a more direct and immediate indicator of these crises.

4.1. *Nutritional indicators*

Three different types of nutrition data are available and all have been used as indicators of welfare crises and welfare trends. One of these refers to food availability calculations, which are based upon gross food production indicators and the construction of rudimentary food consumption balances. Another relates to rations or norms that were set by the central authorities and which were supposed to be the basis for institutional food supplies. Finally there are direct nutritional surveys of food actually consumed at certain times by specific groups of the population.

The food availability balances are relatively easy to construct, and can provide some overall indicators of the general food supply in the country, and even in different regions. But in essence they are highly dependent upon the reliability of the production data and the balancing that has been done to estimate the level of food available for human consumption, as opposed to other uses, which normally include seed, livestock use, industrial use, exports, stock accumulation and most controversially waste. Moreover the indicators provided by these data are largely undifferentiated as regards their impact on different groups of the population.

As, we have already noted, Amartya Sen has pointed out, it is not just food availability, which is important in a famine, but the way that food is distributed and the relative entitlements of different groups to scarce food supplies (Sen, 1981).¹³ The overall balance data need to be supplemented by other data, in order to provide a more detailed record of the split in food allocation between different groups: between the urban and rural population, between those on central supplies and rations, and those without such ration entitlements. Even within those groups, which were receiving centrally supplied rations there was a significant hierarchy.¹⁴ The party/state elite came on top, followed by: privileged sets of workers (Engineers -*ITR*, and shock workers *udarniki*); employees; normal workers; dependents; and the least privileged group, prisoners. Within the prisoner category there were also significant differences in rations.

Rations and consumption norms were established for these different sets of the population and may help to establish the different consumption patterns and trends in these separate divisions, but attention needs to be paid as to whether entitlements to rations were in fact honored. The crisis periods were marked not only by the imposition of rations, but also by supply disturbances that often resulted in food not being available to fulfill these rations.

Finally there are direct nutritional surveys, which are based on individual investigations of what exactly was eaten by certain households. These require a special network of investigators and well organized procedures of investigation and sampling. The USSR has a remarkable set of food consumption surveys for this period, but they naturally tend to fail to cover the most vulnerable groups. They can provide some general indications of crisis and trends in food consumption, but they are unlikely to capture all aspects of these crises.

The Soviet nutritional surveys were pioneered by *zemstva* statisticians, working on peasant budgets in their separate provinces before the revolution. Before WW1 the leading Russian agrarian statisticians used these budget studies to check on the reliability of the production series and recommended the application of a 19% correction.¹⁵ During the First World War A.V. Chayanov carried out much work in synthesizing these disparate regional series to produce a comprehensive picture of regional food consumption (Chayanov, 1916). These were further developed by Lositsky, 1918¹⁶ working within the early TsSU. Here, a vast network of consumption surveys was constructed with regular surveys carried out in the years of civil war, famine and the 1920s. These networks and surveys covered peasant, worker and employee households (Wheatcroft, 1993, 1997). In 1926, the Soviet statistician E. Kabo published his attempt to draw together data on the pre-revolutionary investigation of workers food consumption to compare with the post revolutionary data of TsSU (Kabo, 1926).

In addition to nutritional data collected through these specialized nutritional surveys, nutritional data were also collected as part of the regular cycle of data on peasant budget studies. At its peak in the mid 1920s, 3600 specialist nutritional surveys were collected twice a year, and 18,725 budget surveys were collected on a monthly basis. The survey data on nutrition collected by TsSU in the 1920s was unrivaled in terms of scale and comprehensivity.

The abolition of TsSU in 1929 had appeared to put an end to these surveys, especially in the countryside where many of the rural correspondents who had previously supplied information to the statisticians were attacked and repressed as kulaks. However, by 1932 and the resurrection of TsUNKhU, it became clear that part of the system concerning the full budget studies had simply undergone transformation and was continuing to produce secret detailed reports on food consumption both in the towns and amongst the *kolkhoz* peasants. By the mid 1930s 6–9000 *kolkhoz* budget surveys were regularly processed and presented in a secret in-house monthly publication called *Budzhety Kolkhoznikov* (*Budgets of Kolkhoz peasants*) and by the late 1930s these again covered over 16,000 peasant households. Similar Secret Budgets of Workers were produced which covered surveys of 8902 workers families in 1932, 12,691 in 1936 and 11,963 in 1940. The onset of the Second World War led to some disturbances in the collection of these data in occupied areas, or near the front, but it was resumed as soon as Soviet power was restored to these areas.

The table below presents the results of available synthetic food consumption surveys for the immediate pre-revolutionary period and for the period from 1918 to 1952. These series are far from complete, which reflects many of these disturbances in the system (Fig. 1).

These data show the disruptions and divergences from the prewar levels indicated by Chayanov and Kabo. The effects of the famines of 1918–1922, 1931–1933 and 1942–1947 are clearly visible, together with the recovery that took place following them and before the onset of the next crisis. They show that pre-revolutionary food consumption levels were relatively high at roughly 2900 kcal per person per year for both peasants and workers, with the peasants slightly better fed. Given the relatively small number and unsystematic nature of these early investigations we should not place too much faith in them providing exact levels. The post-revolutionary surveys were much more systematically carried out but. Of course we cannot expect them to fully capture the dynamic of the famine, because the worse affected households are unlikely to have been surveyed. However, amongst those households that were surveyed the picture that emerged was striking. The urban famine was most severe in 1918/19 and was more serious for employee (i.e. managerial) families than for workers. The following year saw some improvement in consumption for workers, but a further deterioration for employees. The level of peasant consumption fell sharply in 1921/22, especially in the Southern and Central Producer Regions. From 1922/23 the consump-

¹³ Because of the polemical way of Sen's writing, Sen is often interpreted as if food availability calculations could serve no useful purpose. This is clearly incorrect, these calculations can be very useful, when more detailed data are unavailable.

¹⁴ This has been studied at some length by Osokina (1993).

¹⁵ For an account of the Ivantsov correction see Wheatcroft (1974), vol. xxvi.

¹⁶ Lositsky had earlier produced the operational grain balances used by the Provisional Government's Ministry of Food.

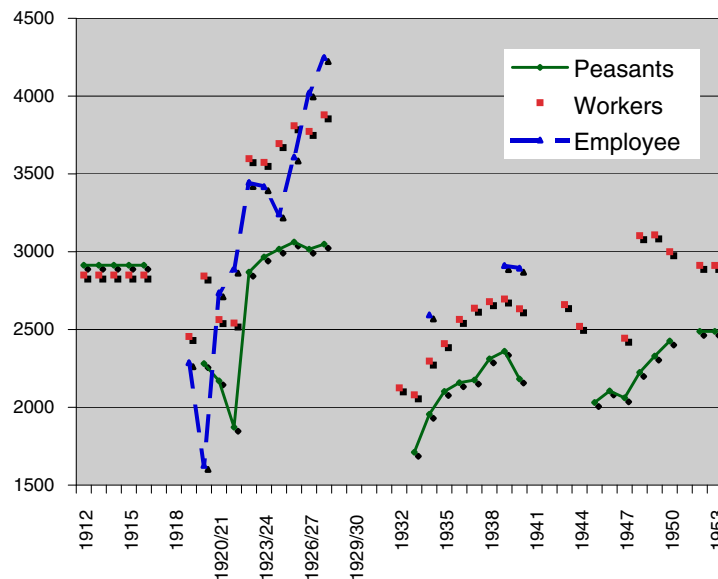


Fig. 1. The Results of food consumption surveys from 1900 to 1952 in kcal per person per day. Sources: see Appendix table 2a.

tion of all groups rose sharply, but especially for workers and employees, which greatly exceeded their pre-revolutionary levels by 1927/28, the last year that comprehensive data were published.

The data from the resumed surveys in 1932 and especially 1933 provide further indications of the extent of the famine in these years. Consumption levels for both peasants and workers were reported to be significantly below the figures reported in the famines of 1918–1920 and 1921/22. Worker consumption in 1933 was reported to have fallen to 2080 kcal per person per year, which was significantly lower than the 2455 kcal average level reported for 1918/19. The food consumption for kolkhoz peasants was reported to be as low as 1711 kcal per person in 1933 which was significantly lower than the national average of 1872 reported in 1921/22.

These were extraordinarily low figures, especially when we note that the peasant population that was surveyed in the 1930s were kolkhoz peasants and excluded the large number of uncollectivised peasants, including the unfortunate exiled kulaks, who undoubtedly suffered most heavily in the famine (I will return to this below.). It is also likely that amongst the kolkhoz peasants the worse affected households are unlikely to have been surveyed. These figures are certainly indicative of the heavy strain of the time, and it is understandable why they were declared secret and not published at the time.

In the late 1930s, levels of consumption were reported to have grown but were still significantly lower than in the mid 1920s. This growth ended in 1939 and especially in 1940, on the eve of war, when war preparations led to a sharp fall in consumption levels.

The post WW2 data show the very low levels of peasant consumption at the end of the war and through the 1946/7 famine, following which a moderate recovery took place. Meanwhile worker consumption levels had remained much higher than peasant levels and in 1948 rose to exceed pre-Revolutionary levels.

These direct food investigations give grounds to think that overall levels of food consumption fell after a peak in the mid 1920s for all the main sectors of society, and that peasant consumption was still below the low 1930s levels in the 1940s and early 1950s, although food consumption for workers had grown somewhat.

These results from the direct nutritional surveys differ sharply from the more optimistic food consumption calculations made by Gosplan from their balances of the utilization of food production. These calculations included the highly inflated grain production data which had been forced on TsSU in the mid and late 1920s, and which had later becoming institutionalized in the biological yield distortion of the 1930s.

At the time Gosplan produced a series of food consumption balances for 1928–1932 which were based on these inflated series. They claimed that urban consumption levels were rising over this period although rural levels were falling. These norms were later discovered in the Soviet archives by the Soviet historian Yuri Moshkov, who made them available to other scholars by publishing them in 1966 (Moshkov, 1966, p. 136).¹⁷

A comprehensive set of food consumption norms were drawn up for the Birmingham SIPS project in 1976, at a time before the direct nutritional survey data became available (Wheatcroft, 1976, pp. 21–22, 93–96). They were based on a careful analysis of the earlier published consumption figures, on Soviet data on production and balances, but also upon an understanding

¹⁷ They were quickly cited by Alec Nove in his very influential economic history (Nove, 1969, p. 177), and have subsequently been cited by most scholars working in the area. I am arguing that we need to be most cautious about using such data. As mentioned above, at the same time that Gosplan was producing these distorted balances, the statisticians in the balance section of the statistical office were applying 'disjuncture' correction coefficients to remove these distortions from their balances.

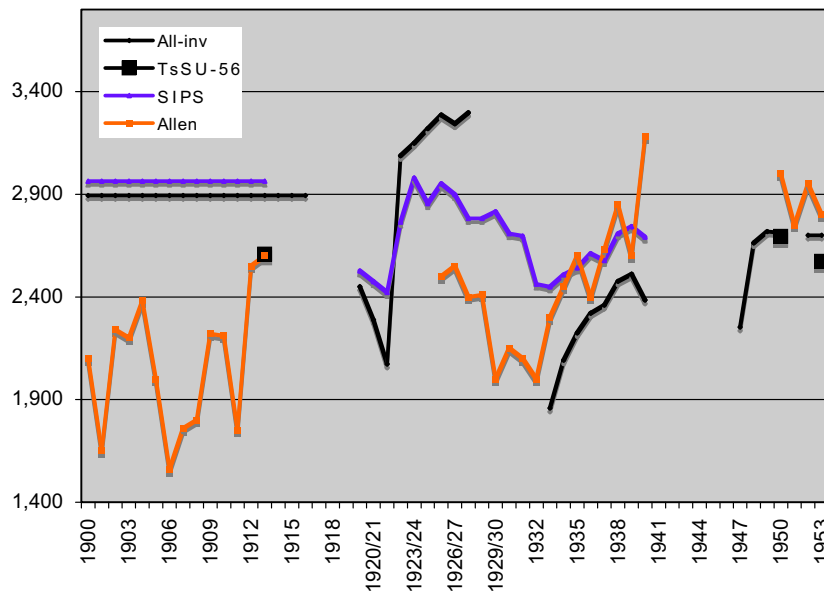


Fig. 2. Food consumption data in kcal per person per day estimates calculated from balance data compared with direct investigations. *Source:* see Appendix table 2b. *Note:* All-inv refers to an aggregate of the direct investigations of workers and peasants food consumption see Fig. 4a above. The pre-WW2 data has been aggregated on the basis that peasants were 70% of the total in the 1920s, 60% in the early 1930s, 55% in the late 1930s and 50% in the late 1940s and early 1950s. TsSU-56, are the official figures published in Soviet statistical handbooks from the 1950s SIPS data refers to data initially published in SIPS no. 1 and 2, Birmingham. These data include a prerevolutionary indicator for the average period 1900–1913.

of the politics behind the use of different correction coefficients. The results based upon this analysis, have been published in a number of publications (Wheatcroft et al., 1986; Davies et al., 1994).

Recently Professor Allen has also carried out this same operation, but he comes out with results very different to those produced earlier by SIPS, and also from those that we can now calculate from the available nutritional surveys. The table below compares the balance data of SIPS and Allen with the results of the direct nutritional surveys (Fig. 2).

4.1.1. Differences in the data

The major differences between these series relates to the prewar data. The SIPS series was based on the survey work of Chayanov and Kabo. If it had been based on balancing utilization from the production data, then the pre-revolutionary grain production series would have needed an upward adjustment of about 19%. This would also have been required to make this figure more compatible with the inflated post 1926 expert Soviet evaluations of Soviet grain harvests. The history of the justification for this specific correction (the Ivantsov correction) has been referred to above and is explained in some detail in an earlier article (Wheatcroft, 1974). These conclusions are generally accepted by Gregory, Hunter and most specialists working in this area. Allen, however, appears to have used the inflated post 1926 data with the uncorrected prewar data. This would explain why his 1913 food consumption figure coincides with the official Soviet figure. If Allen's figures had been correct it would have meant that food consumption levels in 1901, 1905, 1906, 1907, 1908, 1911 and all years before 1897 would have been lower, and often significantly lower than in the famine year of 1933! This is difficult to accept. If the appropriate corrected pre war data had been used the apparent growth in consumption across the whole period would turn into a decline, as is shown by all other sets of data.

There are some other strange features in the Allen series. They show consumption levels to have fallen much more sharply in 1929 than the SIPS series, and their low point is in 1929 and 1932 rather than 1933. This is contrary to all other evidence. Finally the Allen series shows a remarkable growth in consumption levels between 1939 and 1940 by over 20%, while the direct nutritional series shows a fall by over 20%. Again this is difficult to reconcile with other data and the general picture of increased pressure on the population as the country mobilized for war.¹⁸

These differences are significant, because they make the difference between a sharply rising trend and a falling trend as can be seen from Fig. 3 and Table 3 below.

Finally, while discussing nutrition data we should consider the food situation for the deprived penal population. Food consumption investigations failed to cover the desperate situation in the exile zones, prisons and labour camps. For these areas, we have data on rations and on general supplies.

The data now available on prison rations show that while average rations for hard labourers were as large as 4000 kcal per person per day, the rates for those prisoners who did not fulfill their production norms, were much less. In addition the 1939

¹⁸ The only indicator that would show a large increase in production at this time would be indicators that had not been adjusted for the change in boundaries that occurred after September 1939.

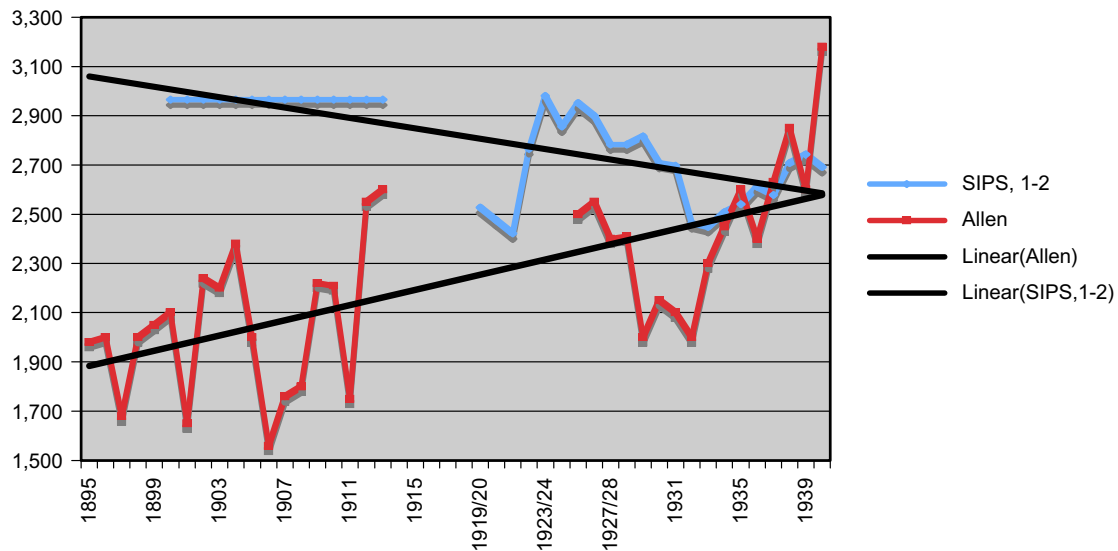


Fig. 3. Trends in Food consumption estimated by SIPS and Allen in kcal per year. Source: see Appendix table 2b.

Table 3
Food Consumption estimates in kcal per year (SIPS and Allen)

	SIPS 1	Allen	SIPS 1 (%)	Allen (%)
1900–113	2964	2232	100.0	100.0
1927/28	2783	2400	93.9	107.5
1933	2449	2300	82.6	103.0
1937	2578	2630	87.0	117.8
1938	2708	2850	91.4	127.7
1940	2691	3180	90.8	142.5

Source: see Appendix table 3b.

ration lists describe a punishment ration that was as low as 1670 kcal per person per day, and even this virtual starvation ration was reduced to 1238 kcal per person per day in April 1942.¹⁹ But this is not the whole story. These low norms do not take into account the poor quality of penal food, or the fact that rations were not always fulfilled. This was particularly the case when the country as a whole faced famine and severe food shortages, as it did in the early 1930s and during the war. Information is only now emerging about the truly horrendous situation in some of these areas caused by famine in June 1933.²⁰

As an instance of how this played out for particular groups, in December 1933 just after the famine, Yagoda complained to Stalin that prisoners in the camps in 1933 had only received two thirds of their 1932 level of food rations, i.e. 2064 kcal per person per day instead of the 3101 kcal per person per day received in 1932. Yagoda asked Stalin to ensure that the norm was increased to 2695 kcal per year, so as not to interfere with OGPU production tasks.²¹ What he was cautiously referring to was the growth in mortality from the very high rate of 49 per thousand prisoners in the camps in 1932 to the extraordinary level of 201 per thousand in 1933.²² As we shall see below these extraordinarily high levels of famine mortality reappeared in the penal system in the difficult years of 1942 and 1943, but subsequently after 1945 penal mortality levels remained well below 50 per thousand. In fact, they began falling very sharply to reach about 5 per thousand in 1953, with the trend only slightly reversed in the famine year of 1947 when mortality in the camps reached a crude rate of 44.1 per thousand, which had been a fairly normal level in the 1930s.

4.2. Mortality trends and disturbances

As explained above mortality indicators are normally a reflection of the impact of welfare over time, but in extreme cases like famines they can also provide an indicator of immediate direct welfare deprivation. The latter indicators tend to be of

¹⁹ The rations in physical quantities are listed in Vert and Mironenko (2004, pp. 346 and 367). I have used the standard conversion coefficients of the time to calculate their calorific value. This does not take into account the poor quality of food in the camps.

²⁰ See Werth (2007) for a harrowing account of the resort to cannibalism on Nazino Island in the Ob River in Western Siberia, when a consignment of special labour exiles were simply dumped on the Island with no preparation or food supplies in 1933.

²¹ See GARF (State Archives of the Russian Federation) 9414/1/1913, ll. 4–6 cited in Vert and Mironenko (2004), pp.328–330.

²² See appendix 1c.

fairly poor quality, because normally the statistical recording system is itself a victim of the social disorder and collapse associated with the famine. The Soviet Union was fairly unusual in that it managed to preserve a functioning statistical system in most areas throughout serious famine conditions. The strain of the times did however lead to a number of serious distortions in the record.

Two different types of data are available to provide indicators of mortality: direct indicators from mortality registration, and more indirect indicators that used the population censuses and other data to correct the basic registration data.²³ Below we will briefly describe the complex history of both mortality registration and population censuses in this period.

4.2.1. Mortality registration

The pre-revolutionary system of registration of births and deaths was largely based on registration by the church authorities in so called 'metric books'. The new Revolutionary government introduced a civil registration system through newly established Departments of Acts of Civil Registration (ZAGS). But this system had barely been established before it was overwhelmed with mass mortality and population movement, that it was unable to register. Although the new national system broke down during the first period of crisis, in many cities a local system remained in operation and recorded extremely high levels of mortality. The new national system with registration through the civil authorities eventually began producing meaningful figures in 1923 and began working well for most of European USSR by the mid 1920s. At this time mortality was falling sharply and TsSU received permission to publish detailed registration data in 1926 and 1927 (TsSu, 1928). Then in 1928 following the grain procurement crisis and a sharp reduction in welfare, the registration system began receiving less favorable indicators, which even showed an increase in mortality in some regions. The central authorities responded by immediately stopping the publication of these data (TsSu, 1929). In these years, there was a similar plan constructivist distortion for population data, as has been described above for grain statistics. Great pressure was placed on the statisticians and registrars to show that the large growth in population was continuing, that mortality was falling according to plan, and that natality was stable or rising.²⁴ The reality was unfortunately very different.

The re-establishment of an independent statistical service in early 1932 improved the ability of the statisticians and registrars to withstand political pressures. It is often claimed that the statistical registration system broke down in the famine, but for most parts of the European USSR this appears not to be the case.²⁵

By 1934 when Osinsky had been replaced in TsUNKhU by Kraval' there was another deterioration in the political situation. The security forces began taking an active interest in population registration, which now fell within their area²⁶ and they accused the agencies of double recording deaths and under-reporting births to produce inaccurate under-reports of the population size. An unpublished party/state decree was issued in 1934 under the signatures of Stalin and Molotov warning the statisticians and registrars of ZAGS to stop their wrecking work.²⁷ It is not inconceivable that these threats could have had the effect that was intended. For more detail see Wheatcroft, 2001a.

During the Great War of the Fatherland the statistical system was destroyed in the occupied areas.²⁸ Within the rear the system continued to operate, although struggling in some areas to cope with the growth in numbers of refugees and evacuated population. By the time of the drought of 1946 and famine of 1947 the system was fully operational again, although suffering from the lack of a recent census.

5. Censuses

After the Revolution a census was carried out in 1920 and it was proposed that others would be carried out at regular ten year periods. However, 1920 was in the middle of the civil war, and by the mid 1920s it was clear that a mid term census was required. Popov, the first Director of TsSU gained more unpopularity with the political leadership by arguing that serious planning required a firm statistical basis, but he was eventually allowed to plan a mid-term census. This was initially scheduled for 1925, but then delayed further to December 1926. The census allowed some minor adjustments to be made to the registration data.

²³ If the age by sex structure of the population are available for two consecutive censuses, and if it can be assumed that migration was negligible then the age specific survival rates can be calculated and from these an estimate can be made of total mortality.

²⁴ There were some attempts by some brave statisticians to draw this situation to the attention of the government. A.S. Novoselskii in Leningrad wrote an article in his local statistical journal which had a very direct title- 'Abortion is a demographically significant factor'. But the regime at this time was impervious to data that contradicted their expectations.

²⁵ The localities were ordered to send statistical reports to the centre in two different ways. There was a so called 'Conjunctural system' which was designed to provide early warning information from preliminary and incomplete records. Monthly reports for the conjunctural system had to be forwarded to the centre within 5 days from the end of the month. If reports were incomplete at this time the local agencies were told to ignore the conjunctural reports and to concentrate on the data for the full annual reports which would be sent to the centre within two months from the end of the year. These reports needed to be complete. There are many reports of the monthly conjunctural system breaking down, but no accounts in the European part of the USSR, at least, of the overall end of year system collapsing. Unfortunately many of the people warning about the collapse of the statistical system, are unaware of how the system actually worked. (Conquest, 1986)

²⁶ With the formation of a Union level People's Commissariat of Internal Affairs in 1934 ZAGS the department of civil registration, that collected birth death marriage and divorce data was brought into the same organization that was dominated by the Security forces.

²⁷ RGASPI (Russian State Archives of Social and political History). (The former party Archive). f. 17, op. 3, d.970, l.396. See also Sirka and Kurman (1935).

²⁸ There is an interesting case of a collaborationist network of statisticians working under German occupation in Kiev to produce a 1942 census of Kiev. But this was most unusual.

When TsSU was merged into Gosplan late in 1929, one of the first casualties was the proposed census for 1930, which was cancelled. The prevailing feeling was that there was no need for censuses and mass surveys since most of the population was recorded under various state accounting systems.²⁹ Few figures were being published, and despite the change in policy towards more independence for statistics, Kraval', Osinsky's deputy was cajoled into reporting a population estimate for 1932 that was in line with these plans, rather than with objective assessments.³⁰ The important thing to note is that this highly exaggerated population estimate, took place before the main thrust of the famine. The reluctance of the political leadership to publicly admit the scale of population loss in the famine, did not necessarily lead to an increase of political pressures to not report these losses internally. Arguably the situation was the opposite. Once it was accepted that the data would not be published there was a pressure to report the truth. The consequences of not doing so could be dire. There was however little immediate incentive to correct the serious disjuncture that had already developed. This problem would only emerge when the next census was carried out, and largely explains the great delay in carrying out the census. It had been planned for late 1932 after the establishment of TsUNKhU, but was continuously postponed until 1937, which turned out to be a rather unpropitious time for dealing with sensitive problems.

When the census was eventually carried out in early 1937 it produced a result showing that there were about 8 million less people than had been expected. An investigation was carried out into this discrepancy. The census was eventually declared wrecked. Kraval', the Director of TsUNKhU, Kvitkin, the head of the sector of Censuses and several of the leading demographers involved in the census were shot as wreckers. Kurman, the most senior demographer in charge of the registration system argued that his registration data were largely correct, and that the error lay in unrecorded mortality in the famine, unrecorded mortality in the penal system, a degree of over-estimation of the population in the 1937 census, and under-estimation in the 1926 census.³¹ Kurman was lucky to escape with his life, but he was sentenced to the camps for 10 years for maligning the security forces in claiming that they had under-reported deaths (Vishnevskii, 1993). However, generally his arguments were accepted. A re-census was set for January 1939, but on the eve of the census Popov, the foundation director of TsSU wrote to Stalin and Molotov warning that the census would again produce a lower than expected result, and that the reason for this was the excessive growth reported in the early 1930s.³² Popov's report was eventually accepted by the government and the 1939 census produced figures in line with those reported in 1937.

No censuses were carried out in the 1940s and the next census was only taken six years after Stalin's death in 1959.

6. What did these mortality data show?

The following graph is based on the table of data prepared by the French demographer Biraben (1976) pp. 441–478. It provides a very clear indication of the dynamic of Soviet demography in this period as a move along the lines of a demographic transition (from high mortality and natality in the 1890s to relatively low mortality and natality in the 1960s), but with the interruption of three major mortality crises in 1914–1923, 1928–1933 and 1941–1947 (Fig. 4).

Subsequent work, following the opening up of the Soviet archives have not greatly changed this picture, although they have attempted to fill out the contours of the second crisis a little.

The Soviet Demographers Andreev, Darskii and Kharkova (henceforth ADK) were given the task of recomputing the dynamic for the inter-census period of 1926–1939, in a way which gave greater emphasis to the famine of 1932/33, and they came up with the following dynamic for mortality (Fig. 5).

They used a technique which had earlier been used by Lorimer and Biraben. It allowed the forward projection of specific age cohorts from 1926 to 1939 census to calculate a series of cohort specific mortality, which could be used to calculate total mortality, as compared with recorded mortality. When the gap between estimated population size (based on registration data) and the census results had first been identified in 1937 Kurman had the task of explaining the 8.8 million person gap. Popov carried out a similar exercise in 1939. And Lorimer in the West, without access to Soviet archives, was able to identify a gap of 5.5 million when he undertook the same operation in 1949. Having identified the gap, there is then the task of reallocating it to correct the annual mortality and natality figures. Kurman, Popov and Lorimer all thought that the problem was the result of a series of errors and under-estimations that had a broad impact over several years although they all gave precedence to the famine. The ADK correction has been far more extensive and yet is far more concentrated in its impact, so that it really does emphasise the famine.

There are considerable grounds for doubting the appropriateness of loading so much of the correction into the single year 1933.³³ As I have explained above, the statistical recording system in the main parts of European USSR and Siberia did not collapse in 1933. The conjunctural system may have been greatly reduced in that year, but the full system continued to operate in

²⁹ This is the reasoning behind changing the name of the Central Statistical Administration (TsSU) to the Central Administration for National Economic Accounting (TsUNKhU). It was only in 1948 that the original name TsSU was restored.

³⁰ Stalin's speeches at the time emphasized the importance of population growth as an index of prosperity, and Kraval' was reluctant to tell Stalin that population growth had not been as rapid as he thought.

³¹ RGAE F.1562, Op.329, D.107, ll. 90-95. See description of this in Wheatcroft and Davies (1994, pp.74–76).

³² RGAE, F.1562, op. 329, d.279, ll.55-61.

³³ One of the grounds for my concern over the results of the ADK work concerns a discussion which I had with them before they started their work. Even before doing any work they were eager to assure me that their results would not in any way challenge the famous estimates of Robert Conquest that over 7 million people had died in the famine (Conquest, 1984, p. 306). They kept their word.

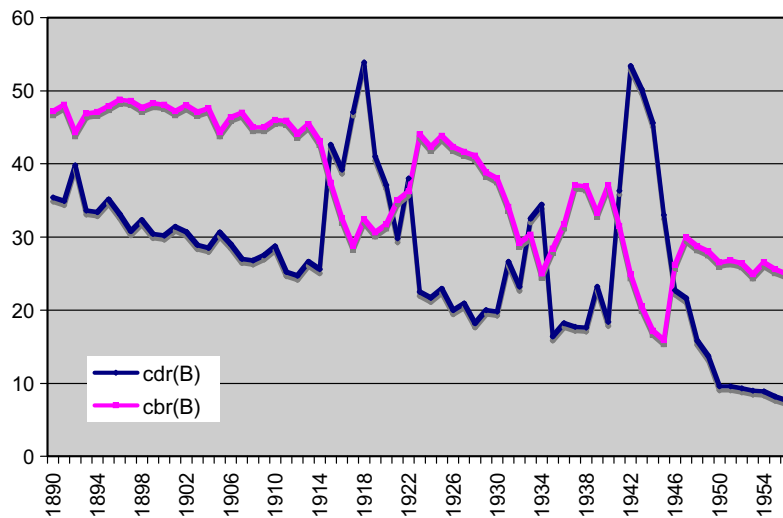


Fig. 4. Trends and crises in Soviet and Russian Mortality and Natality (Biraben).

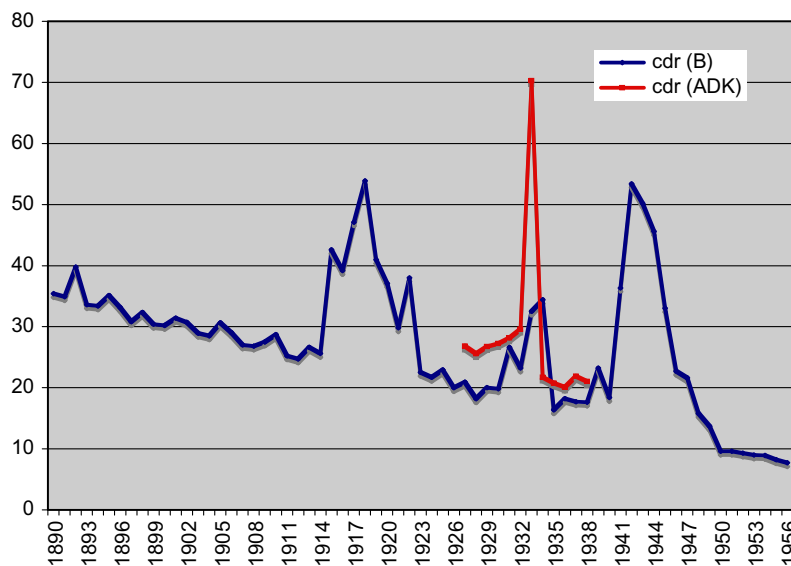


Fig. 5. ADK and Biraben estimates of Soviet Mortality.

most of the main areas. The main periods when distortions affected the system were in 1928–1931 and after 1934. The 1932–1933 years were ones in which the newly revived TsUNKhU was attempting to restore a degree of statistical reality and overcome the ‘plan constructivist’ distortion.

ADK justify their use of large corrections at this time by the claim that the observed decline in natality from 40.7% in 1929 to 31.7% in 1932 and 24.8% in 1933 was largely a statistical artifact and indicative of under-registration. They therefore increase the correction coefficient for births from 6.5% in 1927 and 1928 to 12.2% in 1930, 14.7% in 1931 and 13.8% in 1932 in the three years before the famine, and by 37.3% in 1933. This of course increased the size of the population and therefore the gap that had to be explained rather than decreasing them. This is why ADK need much larger corrections to the mortality data. Corrections that they largely concentrate it on the single year 1937 and thereby achieve a population fall in that one year of 5.6 million.

I expressed my doubts about ADK’s method and procedures at an international conference in Toronto in 1995 and suggested that there was little evidence to support their claim that the decline in natality from 1929 was far less than the basic data suggested. I added that the level of abortions was reported to be taking on mass proportions at this time.

In response to my criticisms ADK replied in a second book in 1998 by arguing that most of the catastrophic deaths occurred in the spring and summer of 1933, and that therefore it was unlikely that conceptions would have been reached their low point until then and that the birth rate would have remained fairly high until 1934. Further they denied that abortion was at all significant at this time and that it only became important after 1933. They cited figures claiming that the total number of abortions in Moscow and Leningrad was 120,700 in 1932 and that the number leapt to 214,100 in 1933 (Andreev

Table 4

Soviet Mortality data, different sources corrections from ADK

	Published USSR		Archival SGW-Arc		Popov Annual detail	ADK Arch-1939 USSR	ADK Arch USSR	Bek/Rod Corrected	ADK Corrected	Size of ADK correction	
	Eur part	RUB	Arch RUB detail	Arch USSR 1936						in min	in %
1924	2.233										
1925	2.546										
1926	2.259	2.520									
1927			2.685	3.029		2.736	2.954	3.582	3.984	0.955	31.5
1928			2.421	2.749		2.456	3.230	3.539	3.878	1.129	41.1
1929			2.727	3.063		2.756	3.608	3.917	4.132	1.069	34.9
1930			2.501	2.845		2.569	3.574	3.883	4.284	1.439	50.6
1931			2.610	2.922		2.578	3.699	4.008	4.501	1.579	54.0
1932			2.775	3.114		2.893	3.110	4.448	4.786	1.672	53.7
1933			4.856	5.248	4.993	4.999	5.647	6.885	11.45	6.202	118.2
1934			2.557	2.815	2.586	2.536	3.113	3.782	3.41	0.595	21.1
1935			2.287	2.431	2.501	2.501	2.449	3.118	3.282	0.781	31.2
1936			2.713		2.995	2.994	2.987	3.144	3.223	0.228	7.6
1937			2.689		2.977	2.978	2.969	3.126	3.557	0.580	19.5
1938			2.543		2.961		2.961	2.961	3.483	0.522	17.6
1939					2.975						

Sources: 1924–1925: European Part of USSR: Estestvennoe Dvizhenie Naseleniya SSSR, 1923–1925, Moscow 1928, 17.

1926: European Part of USSR: Estestvennoe Dvizhenie Naseleniya SSSR v 1926g., Moscow 1929, 37.

1927–1935: RGAE, F.1562, op. 329, d. 108, l.6, Excludes YakutASSR, KazakASSR, DagASSR, KaraKalpASSR and KirgizSSR.

Annual detailed data for 1933–1939:

1933: RGAE, F.1562, Op. 329, d.16, l.85: Note AzSSR, UzbSSR, Turkm SSR towns only, no other C. Asian ($R = 2,938,441$, excl. YakutASSR).

1934: RGAE, F.1562, Op.329, d.49, l.16: Note: Az, Turkm SSR urban only incompl Uzb ($R = 1,984,022$).

1935: RGAE, F.1562, Op. 329, d.790, l.274: Note: incl urban Az and Turkm ($R = 1951137$).

1936: RGAE, F.1562, Op. 329, d. 109, l.62: Covers all except 3 obl in DVK.

1937: RGAE, F.1562, Op. 329, d.790, l.246: Excludes Yakutiya SSR.

1938: RGAE, F.1562, Op. 329, d. 790, l.231.

1939: RGAE, F. 1562, Op. 329, d.790, l.213.

Popov, 1939 data: RGAE, F.1562, Op. 329, D. 279, ll. 55–61.

ADK: Andreev, Darskii, Kharkova, *Istoriya Naseleniya SSSR, 1920–1959*, Moscow 1990, pp. 54–56, 141–2.

et al., 1998) p. 84. This is demonstrably not the case. The number of abortions in Moscow and Leningrad had risen sharply from 152,517 in 1930 to 189,748 in 1931 and was already at 222,393 in 1932, before falling slightly to 214,053 in 1933.³⁴ It is unclear where ADK's figure of 120,700 for Moscow and Leningrad abortions comes from, but it is much closer to the actual number of births in these cities in 1932 (129,497) than to the recorded number of abortions, which was almost double this at 214,053 (Wheatcroft, 2001b, pp. 883–886).

In the table below I list the archival data on mortality from 1927 to 1938 that I have seen and that provide a detailed regional breakdown. These are given in two versions (a) the Russian, Ukrainian and Belorussian Republics, and (b) all, or almost all the USSR. Then there are two sets of data which featured in the Yakovlev 1937 report and the Popov 1939 report. Both of these series were listed at these times as being series that were available in the archives. Then there are a series of data that ADK presented as being (a) the uncorrected archival data, (b) a series of data corrected by Bekunova and Rodnoi in TsSU in 1964, and (c) their own recommended figures (Table 4).

For reasons that I have explained above, I remain doubtful of the value of the ADK corrections, but even if we disagree with them the overall picture is clear. There was a distinct move along the lines of a demographic transition, which was interrupted by three major crises.

A final word on assessing the scale of these demographic crises. The extremely rapid fall in the mortality trend at this time makes it very difficult to assess what figure we should take to be normal mortality, and this naturally affects our estimations of excess mortality. If this sharp downward trend in mortality had been interrupted by the Revolution, then the scale of excess mortality from that interrupted pre-revolutionary level would have been significantly less. But there was a continued sharp fall in mortality from a level of about 28.6 deaths per thousand population in 1911–1913 to under 20 per thousand in 1926 (TsSu, 1928, p. xxi). It is precisely the fact of the continuation of this downward trend after the revolution that explains why the levels of excess mortality were so large.

Let us now turn to consider the data we have for the groups of the population that are identified as being the most vulnerable. The refugees, and homeless population that had been the main victims of the first crisis remain difficult to identify in the statistical record. But the so called 'Kulaks' who were some of the major victims of the second crisis period, had their

³⁴ RGAE, F. 1562, Op. 20, D.41, L.12. The fall in 1933 may well be a consequence of the introduction of internal passports in August 1932 and the subsequent campaigns to remove illegal residents from the major cities.

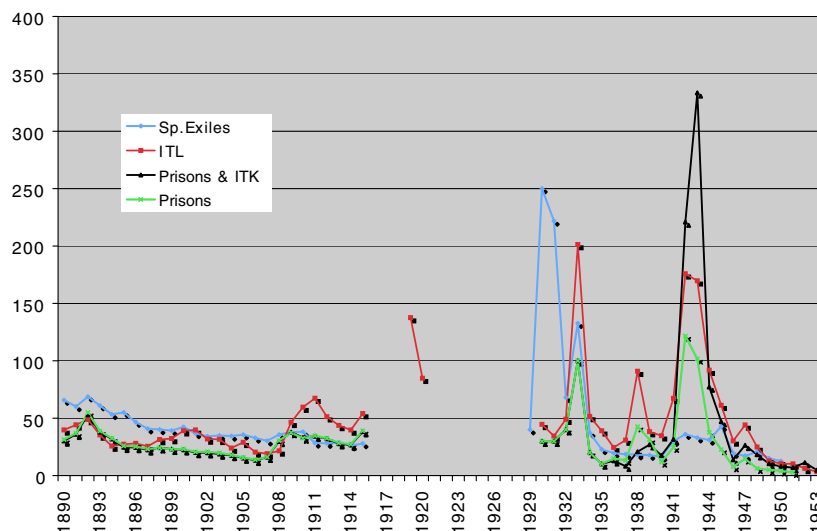


Fig. 6. The dynamic of crude death rates, 1890–1954 for different parts of the penal population. Sources: see Appendix table 1c.

fates documented in some detail by several different statistical departments within the state security system, and this enable us to assess the changes in penal mortality rates. These penal mortality rates were significantly higher than civil mortality rates and made a significant contribution to the overall mortality crises.

Penal mortality rates are difficult to compare with civil mortality rates because of the age structure of the population affected. Death rates are particularly high for the very young and the very old, but these are groups that are not normally present in penal establishments. To adjust penal mortality rates to make them roughly comparable with civil mortality rates for a normal population we would probably have to double them (Wheatcroft, 1996).

The overall dynamic of declining crude penal mortality rates are indicated in tables in Appendix and graph below (Fig. 6).

It is clear that the overall dynamic of penal mortality is similar to that for the civil population, with an overall downward trend and peaks during the famine of 1932/33 and the wartime years. The data for the prison and camps also show a secondary mortality peak in the years of the terror 1937/38 when both the prisons and camps suffered from over-crowding. However, it should be born in mind that these figures do not include the 680,000 executions that took place in these years and that need somehow to be included into our welfare measures. Finally, it should also be noted that popular consciousness of this scale of repression would also have a certain impact on social welfare.

Let us now turn to consider indicators of stature Appendix table 3b.

6.1. Stature indicators: trends and disturbances

Mortality as a welfare indicator is rather absolute. People either die or they do not. Anthropometric data can offer a more nuanced set of indicators as the record of malnourishment is stamped on the population in the way in which the secular trend towards growth in height is disturbed. There have been several attempts to use anthropometric data to indicate the rising trend towards improved welfare, but there have been relatively few attempts to measure the way in which anthropometric indicators respond to temporary welfare crises and famines.

Indicators of stature can be calculated in two ways, either through a series of longitudinal investigations of heights of young adults of the same age who are measured over a number of years, or by a much smaller number of more accumulative surveys in which adults of different ages are all measured at the same time.

The data that are used below are derived from a longitudinal survey of terminal heights from Russian military recruitment data, 1874–1913, and three accumulative surveys of terminal heights from surveys for the clothing industry conducted in 1927, 1957 and 1975. Longitudinal surveys were carried out in separate years on a certain age cohort. The Tsarist conscript data need some minor adjustments to account for minor changes in age of conscription and the extent to which this fell short of the age at which terminal height was achieved (Wheatcroft, 1999, pp. 39–40).

Accumulative surveys were carried out over a more limited number of years and in each survey numbers of people of different ages were measured to provide indications of the average terminal heights for all of these generations.

Stature indicators appear to have one major advantage over all of the other indicators mentioned above. There is no suggestion that these indicators were distorted in any way for political reasons. All 19th and 20th century armies measured their men as part of their regular medical investigations. Few of these medical officers would have thought that later-day historians would be using their data and it is inconceivable that these data would have been distorted with the intention of misleading future historians. Similarly as regards the surveys carried out by the Ministry of Light Industry. They had very clear

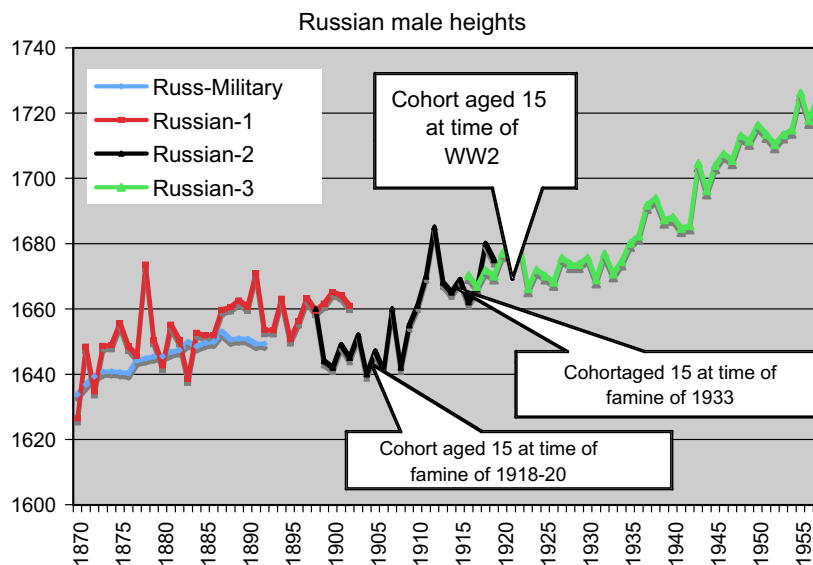


Fig. 7. Stature of Russian Males, born 1870–1955.

operational requirements that led them to make the calculations that they did. Unlike our previous sources of data there are no grounds for thinking that the indicators coming from these data would have been consciously distorted.

There are however have problems regarding the samples selected. While the sample of military recruits was fairly comprehensive within their age group, the accumulative samples covered different groups. The 1927 survey of 5000 men were predominantly peasants with a number of handicraft workers from the central part of Russia. The 1957 survey covered 954 Moscow workers. And the 1974/75 survey covered 10,000 urban men from 19 towns throughout Russia, including the Urals and North Caucasus.

The different data sets for the different years are linked together in Fig. 7 to provide a very rough indicator of the overall dynamic of stature growth during the 85 years from 1870 to 1955. Details of the data sets and sources are provided in Appendix Fig. 7.

The overall dynamic shows a fairly rapid growth of 20–30 mm, from 1630 to 1650 or 1660 mms in the 20 years 1870–1890. There is a much slower and disturbed period for the next 40 years 1890–1930 with a growth of only 10–20 mm. And then a 25-year period of rapid growth from 1935 to 1955 with a growth of 50 mms (Table 5).

A simple linear regression of stature against mortality shows a strong negative correlation. This is strongest when the stature data is lagged by 12 years. Much of the strength of the negative correlation is a result of the strong upward trend in stature and the strong downward trend in mortality. De-trending the data still results in a significant amount of negative correlation which is again strongest when there is a 12-year lag.

Because of the non-regular and critical nature of these relations in famine conditions, it is appropriate to consider each of the crises separately. The changes in stature of those males born before and during the first crisis period are indicated in the table below:

Fig. 8 below shows that the generations which had completed their growth before the years of crisis and were at least 22 years old in 1918 (born before 1898) had experienced a rapid height growth of on average of 1.5–2 mms per year. But the history of those who were still within their growth stage at the time of the first crisis was very different. There was a continuation of the growth for those aged 8–11, but for those children who were aged 11–20 in 1920 there was a serious decline or stagnation in growth. This might seem counter-intuitive, if we were to expect a greater effect on the younger children. But if we remember that in child development there is a growth spurt from roughly age 12–14, and that all growth stops after a certain age—around 20, then it does make sense. Those children who faced an assault on their development before they entered the age of the growth spur, had an opportunity to catch up on this setback, while those who faced an assault in later years, but still before attaining terminal height, would have less change to catch up, before their growth processes ceased.

If this is the case an explanation is needed as to why the growth in stature of those aged under 7 in 1920 was so much worse than that for the 8–12 years old? The answer is simply that these younger children were unfortunate to suffer addi-

Table 5
Growth in stature of males in RSFSR from 1870 to 1955 in mms/year

Years	Stature in mms	Average growth in stature in mms/year
1870–1890	1630–1650/60	1.5/2.0
1890–1930	1660–1670	0.25
1930–1955	1670–1720	2.0

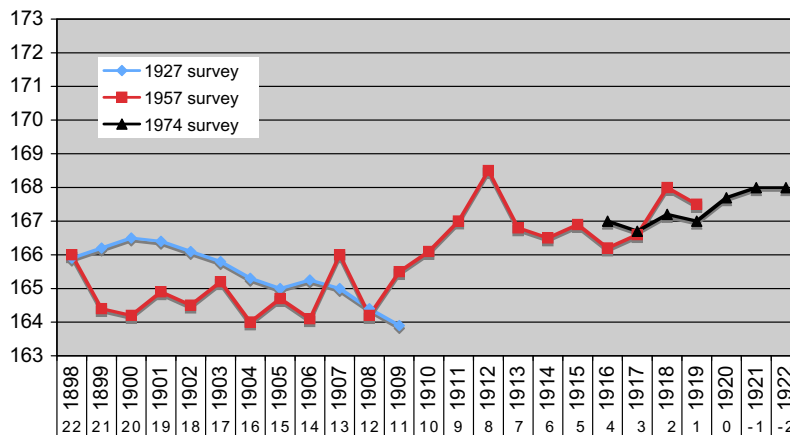


Fig. 8. The Stature of those born before and during the first crisis period.

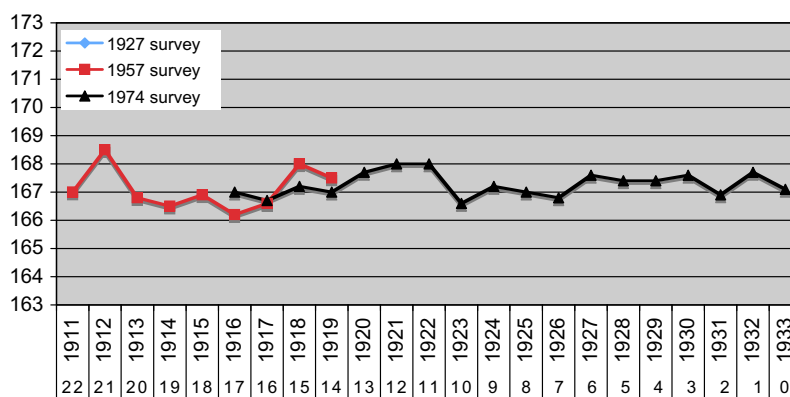


Fig. 9. The Stature of those born before and during the second crisis period.

tionally from the second crisis period. They were the generation aged 11–21 in 1933 at the peak of the second crisis. See Fig. 9 below:

Again we see the same dynamic for the more elderly group of children aged 14–21 in 1933 with a relative fall or stagnation in improvement of stature. But there was little improvement for the younger age groups. The reason for this would be similar to that for the earlier group, i.e. these children would be in their post acceleration growth stage when the next series of crises arrived in 1942–1947. See Fig. 10 below:

In this third and final crisis period we again see low and stagnating levels of stature for the children who faced the crisis in the later stages of their growth, when they had already passed through the catch up stage. For the younger children aged 0–12 in 1947 who had not yet entered their catch up stage, we see a continuation of the trend for a growth in stature, which will of course continue in subsequent years.

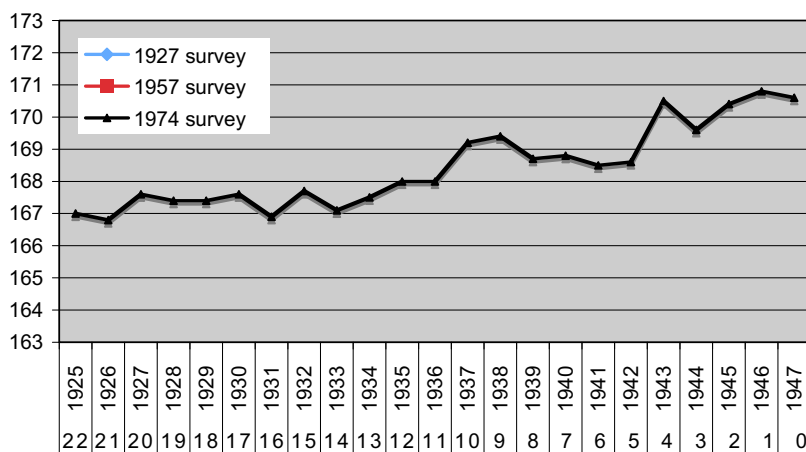


Fig. 10. The Stature of those born before and during the third crisis period.

The interesting point about these developments are the way that several setbacks have been compounded across several generations, during these three famine periods. Again the picture is clear of an ongoing trend intercepted by three major welfare crises.

Unfortunately data are currently not available on the heights of children born into the gulag or places of special exile in these years, but it would certainly be worthwhile looking for them.

7. Conclusions

This paper has argued that the Soviet Union experienced three major welfare crises in the first half of the twentieth century as it progressed towards sustained higher welfare in the second half of the twentieth century, and that the statistical record of this progression is remarkably good, given the severity of the crises and the various political problems of the times. The paper argues the importance of understanding the political context in which certain adjustments to figures were made, in order to understand the reliability of these figures. It notes that contrary to general presumptions the years 1932 and 1933 were less fraught with attempts to enforce political distortions than were the earlier and the later years. And throughout the period a greater degree of realism was preserved within secret internal evaluations than is often assumed.

It is argued that Soviet nutritional surveys were the best in the world in the 1920s, and that remnants of this tradition remained throughout the 1930s. Contrary to the recent claims of Professor Allen nutritional levels, measured in calorific consumption fell from the pre-revolutionary period to the late 1930s and only began to rise in the late 1950s. On the other hand mortality data showed a continued sharp decline throughout this period in non-crisis years. We have considerable data on mortality on the crisis periods, and the presumptions of the Russian demographers Andreev, Darskii and Kharkova that very large corrections are needed to the natality data, even larger ones to the mortality data, and that a very large proportion of these should be concentrated on the single year 1933, are questioned. Finally the available data on stature also provides an indication of a long-term trend towards higher stature that was disturbed by three major welfare crises. It points out that the impact of these crises appears to have been the largest in the age groups that had already begun or completed the catch up stage of growth in the early teens, but had not yet reached terminal height, and that several generations would have been subject to these crises in different stages of their earlier development, which complicates the question of providing a precise measure of the impact.

The available data for mortality and nutrition shortfalls for the exile and penal population confirm that these vulnerable groups suffered the highest degree of mortality in these crises. The rapid dismantling of these groups after 1953, and the continued expansion of the worker category that experienced superior welfare throughout the period was one of the major contributors to the overall increase in welfare in the later period. To argue that improvements in welfare in the post-Stalin period were simply a result of changes in policy after Stalin's death, is an oversimplification which lacks an appreciation of the complex dynamics contributing the long-term changes in mortality and stature.

Appendix A. Russian and Soviet Population located in various penal establishments and prisons

The following table lists the Russian and Soviet population that were excluded from civil society and placed in certain restricted exile locations, or in some form of confinement. The data in each year refer to the area of the country in that specific year, ie. the pre-revolutionary data covers the area of the Russian Empire (including Poland and Finland). The data from 1919 to 1939 covers that of the pre-1939 USSR. The data after 1945 refers to the post-1945 area of the USSR including Western Ukraine, Western Belorussia and the Baltic States. The data from 1941–44 covers the area of the USSR under the control of the Soviet Government.

The pre-revolutionary exile category did not imply forced labour or necessarily institutionalised transportation. Those who were rich enough to pay for their accommodation, care and transportation could make their own arrangements. The less wealthy classes were forced to undergo a harrowing institutionalized transportation process, and had little choice over working in order to provide for their own upkeep. The *Katorga* category, referred to forced labour and was initially associated with flogging, branding and exile for life. The flogging and branding component was dropped in the middle of the nineteenth century, and despite much discussion about an abolition of the exile component in the early 20th Century, a proposed reform of 1913 was never carried out. Correctional Arrest Houses were part of a modernizing western influence and were for shorter term and correctional purposes. Prisons covered prisoners awaiting trial, on remand awaiting appeals, those ordered to short term imprisonment, and some other cases eg. imprisonment of special prisoners in forts. The post-revolutionary exile category provided no privileges for the wealthy, quite the opposite. The early concentration camps of the civil war and the labour camps (ITL) of the later period are considered to be roughly comparable to prerevolutionary *katorga* without the branding and flogging, but including the exile component. Correctional Labour Colonies (ITK) were initially included with prisons and administered by the Department of Places of Imprisonment (OMZ) in Republican level Commissariates of Justice or Internal Affairs. They were treated as a separate category distinct from the prisons after 1935. The prisons were generally for prisoners under investigation, awaiting trial or appealing, or sentenced to short term imprisonment. ITK were generally for prisoners sentenced for longer but still relatively short terms. Prisoners sentenced to longer periods were supposed to be transferred to the harder regime Camps. ITL.

Appendix table la

Penal population in Russia and USSR, 1890–1953

	All			Prisons &		
	Exiles	Katorga	Arrest Houses	Prisons	Correctional Arrest House:	
1890						129,615
1891	129,368	26,210	7779	95,379	84,426	10,953
1892	135,869	28,000	6033	101,836	91,261	10,575
1893	140,039	29,196	5876	104,967	94,541	10,426
1894	132,390	28,822	5559	98,009	86,412	11,597
1895	104,713	29,983	5432	69,298	61,212	8086
1896	111,141	29,668	4376	77,097	70,009	7088
1897	100,886	28,472	3600	68,814	63,391	5423
1898	107,564	27,123	3610	76,831	69,313	7518
1899	112,619	27,065	3569	81,985	72,974	9011
1900	111,660	27,109	4195	80,356	71,615	8741
1901	110,705	26,876	4191	79,638	70,119	9519
1902	110,148	25,654	4767	79,727	69,548	10,179
1903	116,358	25,086	4680	86,592	75,246	11,346
1904	114,175	23,196	4364	86,615	73,347	13,268
1905	94,462	21,959	3186	69,317	59,750	9567
1906	106,525	21,458	1722	83,345	72,411	10,934
1907	139,808	21,156	4845	113,807	99,982	13,825
1908	173,956	22,431	6279	145,246	126,355	18,891
1909	196,193	24,338	9618	162,237	141,251	20,986
1910	191,631	25,365	10,757	155,509	135,731	19,778
1911	199,825	24,599	21,313	153,913	135,678	18,235
1912	208,426	25,290	25,530	157,606	138,306	19,300
1913	213,757	26,467	28,096	159,194	139,415	19,779
1914	201,156	27,095	25,651	148,410	132,204	16,206
1915	192,268	27,290	23,927	141,051	124,528	16,523
1916	166,448	27,571	22,338	116,539	101,762	14,777
				Prisons		
		Sp. Exiles	ITL	&ITK	Prisons	ITK
1919			5815			
1920			11,775			
1921			40,479			
1922			20,000			
1923	139,698	2000	6000	131,698	131,698	
1924	181,562	2000	7000	172,562	172,562	
1925	207,240	2000	8000	197,240	197,240	
1926	222,358	2000	11,000	209,358	209,358	
1927	264,350	5000	14,000	245,350	245,350	
1928	194,988	6000	24,000	164,988	164,988	
1929	279,488	8000	35,000	236,488	236,488	
1930	1,279,000	800,000	179,000	300,000	300,000	
1931	2,515,392	1,803,392	212,000	500,000	500,000	
1932	2,185,722	1,317,022	268,700	600,000	600,000	
1933	2,276,384	1,142,084	334,300	800,000	800,000	
1934	2,194,432	1,072,546	510,317	611,569	611,569	
1935	2,122,313	973,693	725,483	423,137	423,137	
1936	2,313,627	1,017,133	839,406	457,088	397,788	59,300
1937	2,725,709	916,787	820,881	988,041	612,553	375,488
1938	3,604,941	877,651	996,367	1,730,923	845,720	885,203
1939	2,805,879	938,552	1,317,195	550,132	225,493	324,639
1940	2,913,391	997,513	1,344,408	571,470	274,347	297,123
1941	3,192,288	997,110	1,500,524	694,654	301,998	392,656
1942	3,702,534	1,682,659	1,415,596	604,279	244,994	359,285
1943	3,210,988	1,810,599	983,974	416,415	204,737	211,678
1944	3,402,179	1,938,539	663,594	800,046	219,281	580,765
1945	3,731,467	2,094,562	715,506	921,399	260,149	661,250
1946	3,951,869	2,264,749	600,897	1,086,223	290,984	795,239
1947	4,426,744	2,280,542	808,839	1,337,363	284,642	1,052,721
1948	4,696,489	2,243,989	1,108,057	1,344,443	230,614	1,113,829
1949	4,933,524	2,309,898	1,216,361	1,407,265	198,006	1,209,259
1950	5,404,541	2,660,040	1,416,300	1,328,201	164,396	1,163,805
1951	5,277,617	2,683,046	1,533,767	1,060,804	152,614	908,190
1952	5,398,738	2,797,678	1,711,202	889,858	143,560	746,298
1953	5,353,074	2,819,776	1,727,970	805,328	105,328	

(continued on next page)

Appendix table la (continued)

1954	114,338
1955	104,104
1956	125,404

Sources: 1890–1915: S.G. Wheatcroft, 'The Crisis of the Late Tsarist Penal system', in: S.G. Wheatcroft, ed.

Challenging Traditional Views of Soviet History, Basingstoke: Palgrave-Macmillan, 2002, p. 45, based on separate issues of *Otchetpo Glav. Tyuremnomu Upravza ...*, St Petersburg 1884–1916.

1920, 1921: ITL Trudy TsSU, vol. 8, vyp. 2 Moscow 1922, pp. 58–59.

V.N. Zemskov, 'Gulag Istoriko-sotsiologicheskii aspekt', Sots. Iss. No. 69, 1991, pp. 14–15.

V.P. Popov, Gos. Terror v Sov. Rossn. 1923–1953', Otech.Arkhivy, No. 2, 1992, p. 28

1932–4: ITL: GARF, f. 9414, op. 1, d. 2740,1. 53.

1952: A.Dugma, A. Malygma, Soyuz, 1990, No. 26, June, pp. 12–13.

Notes: The data on the total number of exiles in the pre-revolutionary period is not known with any degree of precision. The Accounts of the Chief Prison Administration (GTU), which is my main source for these data, did not keep records on the total numbers of exiles. They listed the numbers who had been exiled in each year, i.e. the flow of exiles rather than the stock. In order to calculate a stock figure I have applied a rudimentary annual loss figure to each cohort of exiles and each year it had been exiled. I take the stock figure for any year to be the sum of the current cohort and the sum of the previous ten year flows with appropriate annual losses excluded.

Certain figures have been estimated. Where this occurs the figures have been rounded to the nearest thousand.

Appendix table lb

Deaths in Russian and Soviet Penal Institutions, 1890–1956

	All		Prisons & Arrest Houses	Prisons	Correctional Arrest Houses
	Exiles	Katorga			
1890	4892	1656	2917	2675	242
1891	5354	1579	3432	3115	317
1892	7616	1923	5398	5010	388
1893	5966	1782	3976	3668	308
1894	4803	1537	3123	2808	314
1895	3507	1650	1709	1585	124
1896	3392	1383	1885	1771	114
1897	2796	1162	1542	1471	71
1898	3077	1091	1872	1677	195
1899	3068	1061	1892	1664	228
1900	3118	1147	1807	1661	145
1901	2755	986	1602	1451	150
1902	2615	877	1586	1440	147
1903	2654	877	1630	1482	147
1904	2430	801	1525	1320	204
1905	1934	782	1060	938	122
1906	1858	704	1118	1010	109
1907	2556	640	1823	1617	206
1908	5263	800	4328	3856	472
1909	7498	924	6129	5279	850
1910	6777	967	5168	4409	759
1911	7415	698	5280	4711	570
1912	7074	714	5051	4502	550
1913	6422	763	4431	3975	456
1914	5686	706	3961	3612	348
1915	7461	762	5408	4855	553
1916	4892	1,656	2917	2675	242
		Sp.Exiles	Prisons & ITK	Prisons	ITK
1919			800		
1920			999		
1930	227,980	200,000	7980	20,000	20,000
1931	427,283	400,000	7283	20,000	20,000
1932	132,951	89,754	13,197	30,000	30,000
1933	298,898	151,601	67,297	80,000	80,000
1934	78,538	40,012	26,295	12,231	12,231
1935	54,832	22,173	28,328	4331	4331
1936	46,370	19,891	20,595	5884	5884
1937	50,536	17,037	25,376	8123	8123
1938	142,546	15,961	90,546	36,039	36,039
1939	81,992	16,691	50,502	14,799	7076
1940	73,104	16,401	46,665	10,038	3277
1941	152,952	30,000	100,997	21,955	7468
1942	442,348	60,000	248,877	133,471	29,788
1943	365,844	60,000	166,967	138,877	20,792
1944	182,733	60,000	60,948	61,785	8252
1945	176,838	89,659	43,848	43,331	5262
					38,069

Appendix table 1b (continued)

1946	77,377	44,391	18,154	14,832	2271	12,561
1947	110,076	39,104	35,668	35,304	4142	31,162
1948	98,263	46,162	27,605	24,496	1442	23,054
1949	65,272	34,940	15,739	14,593	982	13,611
1950	58,693	33,514	14,703	10,476	668	9,808
1951			15,587	7,303	424	6,879
1952			10,604	10,039		10,039
1953			5,825	3,803		3,803

Sources:

1890–1915: S.G. Wheatcroft, 'The Crisis of the Late Tsarist Penal system', in: S.G.

Wheatcroft, ed. *Challenging Traditional Views of Soviet History*, Basingstoke:

Palgrave-Macmillan, 2002, p. 45, based on separate issues of *Otchetpo Glav.*

Tyuremnomu Uprav za ..., St. Petersburg 1884–1916.

1920, 1921: Trudy TsSU, vol. 8, vyp. 2 Moscow 1922, pp. 58–9

1945–1950: Sp. Exiles, V.N. Zemskov, Spetsposelentsy v SSSR 1930–1960, Moscow,

2005, pp. 194–196.

Notes: The data on deaths amongst the exiles in the pre-revolutionary period was not collected by the penal authorities. The only data available relating to deaths amongst the exiles refers to deaths in the transportation system. At a time when exiles were requested to march to their place of exile, which could be thousands of kilometers away in Siberia, the exertions of the transportation system were immense and this accounted for a large share of deaths. In order to calculate the total number of deaths amongst the exiles I have begun with the reported deaths of the currently transported exiles. To this figure I have added a number of deaths to the estimated level of earlier transported exiles on the assumption that their death rate was about the same as for the population as a whole. Because of the age structure of the exiles we would expect the crude mortality rate to be lower than for that with a normal age structure, but on the other hand because they were in an alien environment we would expect their mortality rates to be a bit higher. So we might as well use the normal civilian rates. Again figures that have been estimated have been rounded to the nearest thousand.

Appendix table 1c

Penal Mortality rates in Russian and the USSR, 1890–1953 in deaths per thousand penal population

All				Prisons &	Prisons	Correctional
	Exiles	Katorga		Arrest Houses		Arrest Houses
1890	37.7	65.8	39.8	30.2	31.4	21.5
1891	41.4	60.2	44.2	36.0	36.9	28.9
1892	56.1	68.7	48.8	53.0	54.9	36.7
1893	42.6	61.0	35.4	37.9	38.8	29.5
1894	36.3	53.3	25.7	31.9	32.5	27.1
1895	33.5	55.0	27.3	24.7	25.9	15.3
1896	30.5	46.6	28.1	24.5	25.3	16.1
1897	27.7	40.8	25.5	22.4	23.2	13.1
1898	28.6	40.2	31.4	24.4	24.2	25.9
1899	27.2	39.2	32.3	23.1	22.8	25.3
1900	27.9	42.3	39.1	22.5	23.2	16.6
1901	24.9	36.7	39.8	20.1	20.7	15.8
1902	23.7	34.2	31.9	19.9	20.7	14.4
1903	22.8	34.9	31.6	18.8	19.7	13.0
1904	21.3	34.5	24.0	17.6	18.0	15.4
1905	20.5	35.6	29.0	15.3	15.7	12.7
1906	17.4	32.8	20.4	13.4	13.9	9.9
1907	18.3	30.3	19.1	16.0	16.2	14.9
1908	30.3	35.7	21.5	29.8	30.5	25.0
1909	38.2	38.0	46.4	37.8	37.4	40.5
1910	35.4	38.1	59.6	33.2	32.5	38.4
1911	37.1	28.4	67.4	34.3	34.7	31.2
1912	33.9	28.2	51.3	32.1	32.5	28.5
1913	30.0	28.8	43.7	27.8	28.5	23.0
1914	28.3	26.1	39.7	26.7	27.3	21.5
1915	38.8	27.9	54.0	38.3	39.0	33.5
All				Prisons &		
	Sp. Exiles	ITL		ITK	Prisons	ITK
1919		137.6				
1920		84.8				
1928						
1929		40				
1930	178.2	250	44.6	30	30	
1931	169.9	221.8	34.4	30	30	
1932	60.8	68.1	49.1	40	40	
1933	131.3	132.7	201.3	100	100	
1934	35.8	37.3	51.5	20	20	
1935	25.8	22.8	39.0	10.2	10.2	

(continued on next page)

Appendix table 1c (continued)

1936	20	19.6	24.5	12.9	14.8	
1937	18.5	18.6	30.9	8.2	13.3	
1938	39.5	18.2	90.9	20.8	42.6	
1939	29.2	17.8	38.3	26.9	31.4	23.8
1940	25.1	16.4	34.7	17.6	11.9	22.8
1941	48.0	30.0	67.3	31.6	24.7	36.9
1942	120.0	36.0	175.8	220.9	121.6	288.6
1943	114.0	33.0	169.7	333.5	101.6	557.9
1944	54.0	31.0	91.8	77.2	37.6	92.2
1945	47.4	42.8	61.3	47	22.7	57.6
1946	19.6	19.6	30.2	13.7	7.8	15.8
1947	24.9	17.1	44.1	26.4	14.6	29.6
1948	20.9	20.6	24.9	18.2	6.3	20.7
1949	13.2	15.1	12.9	10.4	5.0	11.3
1950	10.9	12.6	10.4	7.9	4.1	8.4
1951			10.2	6.9	2.8	7.6
1952			6.2	11.3		13.5
1953			3.4	4.7		5.4

Sources:

1890–1915: S.G. Wheatcroft, 'The Crisis of the Late Tsarist Penal system', in: S.G. Wheatcroft, ed. *Challenging Traditional Views of Soviet History*, Basingstoke: Palgrave-Macmillan, 2002, p. 45, based on separate issues of *Otchetpo Glav. Tyuremnomu Uprav za ...*, St Petersburg 1884–1916.

Note: Penal mortality rates have generally been calculated from the data on penal population, and those on penal mortality in the two tables above.

Appendix table 1d

Executions by security and civil authorities in Russia and the USSR, 1901–1953

	Executions		
	All	Military	Civilian
1901	9	1	8
1902	28	6	22
1903	11	1	10
1904	19	0	19
1905	25	13	12
1906	247	65	182
1907	627	84	543
1908	1342	50	1292
1909	629	25	604
1910	166	11	155
1911	113	12	101
1912	143	28	115
1913			
		Political	Other
1921	9701	9701	
1922	1962	1962	
1923	414	414	
1924	2550	2550	
1925	2433	2433	
1926	990	990	
1927	2363	2363	
1928	869	869	
1929	2109	2109	
1930	20,350	20,201	149
1931	10,651	10,651	
1932	2728	2728	
1933	2154	2154	
1934	2056	2056	
1935	1229	1229	
1936	1118	1118	
1937	356,250	353,074	3176
1938	330,279	328,618	1661
1939	3689	2552	1137
1940	3693	1649	2044
1941	18,666	8011	10,655
1942	30,928	23,278	7650
1943	5607	3579	2028
1944	4326	3029	1297
1945	5194	4252	942
1946	4913	2896	2017
1947	2726	1105	1621

Appendix table 1d (continued)

1948	0		
1949	0		
1950	475		475
1951	1609		1609
1952	1612		1612
1953			
1954		386	386
1955		1206	1206
1956		1276	1276

Sources:

1901–1913: D. Rawson, 'The Death Penalty in Late Tsarist Russia', *Russian History*, vol. 11, no. 1, 1984, pp. 36–37.

1921–1953: Colonel Pavlov Spravki, December 11, 1953, GARF, 9401/1/4157,11.

201–205.

1937–1956: Civil Courts GARF, 9492/6/14,1. 29.

Note:

Data refer to the area of the country under Russian or Soviet government control at the time. It excludes military executions in time of war.

Execution data for the post-revolutionary period is divided between those cases investigated, processed and executed by the Security Agencies, and those cases tried and executed through the regular judicial bodies. Before 1937 data for the judicial bodies was collected at the Republican level and is not readily available. However judicial executions were relatively few in comparison with the extra-judicial executions carried out by the security forces. Some cases investigated by the investigative agencies of the security forces were handed over to judicial bodies for trial and execution. Some of these cases may well be double counted. The only Security force data that we have are for cases passing through the investigative organs. We do not have any data for extrajudicial executions carried out without the involvement of the investigative agencies. These were mass operations in a specific sense in which sentences were imposed after arrest without further investigation. These were relatively rare cases during peacetime, but more regular in martial law circumstances, and in newly occupied areas. The Katyn massacre of 25,000 Polish officers and members of the intelligentsia in 1940 belongs to this category.

Appendix table 2a

Direct investigations of nutrition in households in KCals per person per day

	Peasant Cons Regs	hhds Prod Regs	All Peasants	Workers	1 Employees	All
1900–13			2913	2850		2900
1918/19				2455	2287	
1919/20	2440	2175	2281	2844	1627	2450
1920/21	2346	2052	2,170	2564	2736	2288
1921/22	2451	1486	1,872	2542	2888	2073
1922/23	2799	2915	2,869	3598	3445	3087
1923/24	2901	3009	2,966	3574	3418	3148
1924/25	3035	3004	3,016	3695	3243	3220
1925/26	3089	3044	3,062	3810	3609	3286
1926/27	2993	3031	3,016	3773	4021	3243
1927/28	3045	3051	3,049	3879	4248	3298
1928/29						
1929/30						
1930						
1931						
1932				2125		
1933			1711	2080		1979
1934			1955	2297	2594	2226
1935			2102	2409		2345
1936			2158	2563		2404
1937			2175	2637		2471
1938			2311	2679		2516
1939			2360	2696	2911	2542
1940			2182	2633	2894	
1941						
1942						
1943						
1944						
1945			2031			
1946			2105			
1947			2061			
1948			2224			
1949			2329			
1950			2426			2695

(continued on next page)

Appendix table 2a (continued)

1951			
1952	2488		
1953	2488	2912	2742

Sources: Pre-Revolutionary: Peasant consumption from A.V. Chayanov, *Materialy po voprosam razrabotki obshchego plana prodovol'stviya naseleniya*, vol. 1, Moscow 1916, pp. 84–85.

Workers consumption from E. Kabo, *Pitaniya russkogo rabochego do iposle voyny*, Moscow 1926, p. 36

Post revolutionary:

Peasants:

1919–1927: *Statisticheskii Spravochnik SSSR*, 1928, Moscow 1929, pp. 400–150.

1933–1934: *Byudzhety Kolkhoznikov za 1933i1934gg.*, Moscow 1936, pp. 81–84 (Classified-Ne podlezhit oglasheniyu), RGAE, 1562/77/5a, 11.

1935–1936: *Byudzhety Kolkhoznikov... mesyats 1936gg.* RGAE, 1562/80/1-4, 6.

1937: *Byudzhety Kolkhoznikov...mesyats 1937gg.* RGAE, 1562/81/34-5,38-40.

1938: *Byudzhety Kolkhoznikov...mesyats 1938gg.* RGAE, 1562/82/1.

1939: *Byudzhety Kolkhoznikov...mesyats 1939gg.* RGAE, 1562/83/.

1940, 1945–1950: *Istoriya Krest.SSSR*, Tom 4, M. 1988, p. 182, citing V.B. Ostrovskri, *Kolkhoznoe.*

krestyanstvo SSSR: Politikapartii v derevne iyeye sots, ekon rezultaty, Saratov, 1967 p. 80 (TsGANKh

SSSR, f 1562, op.323, d.I, 1.18–19, op324, dl92, 445, 666, 433, 931, 2227, 2662, 3176, 1829, 3713,

1.11–15.

Workers:

1919–1927: *Statisticheskii Spravochnik SSSR*, 1928, Moscow 1929, pp. 400–401.

1932–1940: RGAE, 1562/15/1119,11,6,46.

Employees:

1919–1927: *Statisticheskii Spravochnik SSSR*, 1928, Moscow 1929, pp. 400–401.

1932–1940: RGAE, 1562/15/1119,11,6,48.

Notes:

For the 1920s peasant consumption was given separately for the northern food deficit areas (consumer regions) and the normal food surplus areas of the Centre, South and East (Consumer Regions). The all USSR peasant consumption figure for these years has been calculated from these regional figures. For all years I have begun with the volume of the basic foodstuffs that were consumed per person per day and have converted them to their calorific values using the norms created by TsSU in their early nutritional studies. (*Normal 'nii sostav i pishchevoe znachenie prodovol' 'stvennykh produktov*, Trudy TsSU, Vol. XXII, vol. 1, Moscow 1925). This ensures that the same methodology has been used in all calculations.

Data for the different grain produce are the most significant and they present particular problems. Data were given for flour, bread, grain, groats and other grain produce like macaroni. Most surveys reported bread and flour together. Until 1938 the convention had been to convert flour into its bread equivalence, but from 1938 the convention change and flour began to be converted into its bread equivalence. As there is almost 30% difference between these coefficients, it is very important to be clear which concept is being used.

Appendix table 2b

Food consumption data based on estimates and balancing food production data

	C3 K Gosplan 1932	TsSU- 1956	SIPS 1976	Allen 2002
1900			2964	2100
1901			2964	1650
1902			2964	2240
1903			2964	2200
1904			2964	2380
1905			2964	2000
1906			2964	1560
1907			2964	1760
1908			2964	1800
1909			2964	2220
1910			2964	2210
1911			2964	1750
1912			2964	2550
1913		2608	2964	2600
1914				
1915				
1916				
1917				
1918				
1918/19				
1919/20			2527	
1920/21			2475	
1921/22			2422	
1922/23			2764	
1923/24			2980	
1924/25			2855	
1925/26			2951	2500
1926/27			2899	2550
1927/28			2783	2400

Appendix table 2b (continued)

1928/29	2688	2783	2410
1929/30	2687	2815	2000
1930	2663	2708	2150
1931	2597	2697	2100
1932	2510	2463	2000
1933		2449	2300
1934		2508	2450
1935		2541	2600
1936		2611	2400
1937		2578	2630
1938		2708	2850
1939		2743	2600
1940		2691	3180
1941			
1950	2695		3000
1951			2750
1952			2950
1953	2573		2800

Sources:

Gosplan 1932: RGAE, 1562/3/135,11. 49–50. These are calculated on the basis of the consumption norms provided by Gosplan in 1932 for work on its balances of the national economy.

TsSU-1956 Official Soviet data published in *Narodnoe Khozyaistvo SSSR za 1956g*, Moscow 1956. This was the first volume of a new series of statistical handbooks which after many years resumed publication. These were official figures and at the time Soviet historians were not allowed to challenge them in print.

SIPS data S.G. Wheatcroft, *The Population dynamic and factors affecting it in the Soviet Union in the 1920s and 1930s*, CREES Discussion Papers, SIPS Nos. 1–2. University of Birmingham, 1976, pp. 20–23, 93–96.

Allen, R.C. Allen, *Farm to Factory: A Reinterpretation of the Soviet Industrial Revolution*, Princeton and Oxford, Oxford University Press, 2003, pp. 134–137

Note: The Allen data are only approximate as their values have been inferred from the graph in R.C. Allen, *ibid.*, p. 135.

Appendix table 3a

Tsarist Army Recruit data

		All of recruit			Average
		Age			height in
Year of	Year of	All males	No	% of cohort	height in
Recruitment	Birth	of recruit	Recruited	recruited	cms of
		Age			recruits
1874	1853	702,689	148,904	21.2	162.17
1875	1854	696,435	178,913	25.7	162.25
1876	1855	681,063	192,305	28.2	162.23
1877	1856	682,201	212,139	31.1	162.26
1878	1857	763,432	213,872	28.0	162.26
1879	1858	767,288	214,422	27.9	162.22
1880	1859	803,936	231,054	28.7	162.17
1881	1860	787,670	209,267	26.6	162.16
1882	1861	808,757	208,165	25.7	161.74
1883	1862	840,976	214,774	25.5	162.01
1884	1863	806,522	220,508	27.3	161.88
1885	1864	859,022	226,886	26.4	162.21
1886	1865	843,989	231,684	27.5	162.09
1887	1866	837,423	234,331	28.0	162.22
1888	1867	967,022	250,483	25.9	162.19
1889	1868	965,653	246,186	25.5	162.23
1890	1869	994,795	260,133	26.1	163.19
1891	1870	986,324	259,523	26.3	163.38
1892	1871	994,869	261,133	26.2	163.69
1893	1872	756,196	258,026	34.1	163.93
1894	1873	1,048,029	269,274	25.7	164.08
1895	1874	1,084,874	275,582	25.4	164.09
1896	1875	1,088,826	280,288	25.7	164.06
1897	1876	1,094,862	285,154	26.0	164.03
1898	1877	1,081,989	288,510	26.7	164.42

(continued on next page)

Appendix table 3a (continued)

1899	1878	1,070,134	286,698	26.8	164.48
1900	1879	1,133,912	292,816	25.8	164.54
1901	1880	1,141,590	303,722	26.6	164.55
1902	1881	1,110,233	313,474	28.2	164.68
1903	1882	1,156,051	314,600	27.2	164.74
1904	1883	1,173,012	424,740	36.2	164.99
1905	1884	1,236,562	443,699	35.9	164.85
1906	1885	1,251,748	445,344	35.6	164.96
1907	1886	1,298,115	435,380	33.5	165.00
1908	1887	1,274,594	423,538	33.2	165.30
1909	1888	1,201,839	425,962	35.4	165.06
1910	1889	1,192,792	431,777	36.2	165.09
1911	1890	1,176,996	430,281	36.6	165.08
1912	1891	1,227,792	431,878	35.2	164.93
1913	1892	1,537,597	434,565	28.3	164.93
1927	1906				167.28
1927	1906				167.28

Appendix table 3b

Heights of Russian males in Central regions of RSFSR

(a) 1927 Survey of 5000 men from the central part of RSFS		c) 1957 Survey of 954 Moscow workers		b) 1974/75 survey of 10,000 urban me						
3458 peasants from Nizhegorod and Vetluzhki Regions		941 Kustar metal workers from Pavlovskii region		from towns in: Arkhangel, Astrakhan, Vladimir, Kalin Kuibyshev, Leningrad, Lyudinova, Moscow Murmansk, Novgorod, Perm, Pskov, Rostov						
741 Kustar cobblers from Kim rskii Region		Sverdlovsk, Stavropole, Ulyanovsk, UChelyabinsk, Yaroslav								
Year of birth	Sample	Sam 1927 Average Height	sam 1957 Average height	Year of birth	sam 1957 Average height	Year of birth	sample	sam 1974/5 Average height	sam1 Average height	
1857	36	163.86		1898	20	166	1916	61	167.03	1
1858	15	162		1899	15	164.4	1917	71	166.68	1
1859	9	164.44		1900	25	164.2	1918	72	167.19	
1860	13	164.38		1901	15	164.9	1919	80	167.01	1
1861	25	162.92		1902	76	164.5	1920	86	167.71	
1862	25	164.52		1903	48	165.2	1921	91	168.04	
1863	19	162.42		1904	39	164	1922	123	168.04	
1864	22	164.14		1905	52	164.7	1923	134	166.62	
1865	38	165.66		1906	46	164.1	1924	174	167.2	
1866	25	164.44		1907	44	166	1925	192	167.01	
1867	70	165.44		1908	58	164.2	1926	230	166.82	
1868	28	162.96		1909	53	165.5	1927	296	167.56	
1869	31	164.29		1910	57	166.1	1928	345	167.37	
1870	40	162.65		1911	58	167	1929	346	167.37	
1871	57	164.84		1912	44	168.5	1930	326	167.56	
1872	75	163.48		1913	56	166.8	1931	336	166.89	
1873	35	164.86		1914	47	166.5	1932	312	167.69	
1874	70	164.89		1915	60	166.9	1933	230	167.08	
1875	73	165.55		1916	32	166.2	1934	246	167.45	
1876	46	164.85		1917	26	166.6	1935	292	168.02	
1877	97	164.56		1918	40	168	1936	271	168.24	
1878	67	167.36		1919	43	167.5	1937	394	169.18	
1879	76	165.04			954		1938	385	169.39	
1880	77	164.26					1939	365	168.73	
1881	77	165.51					1940	370	168.81	
1882	106	165.04					1941	365	168.47	
1883	59	163.86					1942	240	168.55	
1884	117	165.26					1943	163	170.46	
1885	129	165.19					1944	158	169.62	
1886	86	165.2					1945	195	170.39	
1887	119	165.97					1946	234	170.75	
1888	100	166.05					1947	274	170.55	
1889	128	166.25					1948	328	171.31	
1890	106	166.06					1949	368	171.14	
1891	99	167.09					1950	364	171.63	

Appendix table 3b (continued)

1892	116	165.35		1951	461	171.35	
1893	87	165.34		1952	455	171.03	
1894	108	166.31		1953	473	171.33	
1895	114	165.07		1954	365	171.48	
1896	98	165.62		1955	177	172.61	
1897	148	166.32		1956		268	171.78
1898	145	165.93	166	1957		419	172.42
1899	131	166.15	164.4				
1900	134	166.51	164.2				
1901	142	166.42	164.9				
1902	203	166.09	164.5				
1903	179	165.75	165.2				
1904	177	165.33	164				
1905	219	164.96	164.7				
1906	201	165.25	164.1				
1907	293	165	166				
1908	219	164.4	164.2				
1909	149	163.87	165.5				

Sources:

S.G. Wheatcroft, 'The Great Leap Upwards: Anthropometric Data and Indicators of Crises and Secular Change in Soviet Welfare Levels, 1880–1960', *Slavic Review*, vol. 58, no. 1, (Spring 1999), pp. 27–60.

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