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DEMOGRAPHIC CHALLENGES AND THE IMPLICATIONS FOR CHILDREN IN CEE/CIS

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Demographic Challenges and the Implications for Children in CEE/CIS

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Summary: The paper discusses some of the implications of recent demographic changes in the CEE/CIS on children of the region. The first part of the paper documents the striking changes in population size and structures which have occurred since the beginning of transition, and which have led to a substantial reduction in the child population. It is argued that they have been mainly driven by the drop in birth rates which has characterised the whole region, but which has been most dramatic in the CEE and Western CIS. Some countries in these subregions now rank among those with the lowest levels of fertility in the world, and the shrinking cohorts of children in these countries face the prospect of a growing old-age dependency burden.

The second part of the paper discusses recent data on infant and under-five mortality, which are direct measures of child wellbeing and of the success of policy measures aimed at improving child survival and development. The paper highlights the marked differences not only in levels, but also in progress in reducing mortality rates across the CEE/CIS. Whereas some countries of Central Europe have made impressive progress during the past decade and now rank among those with the lowest levels of infant mortality in the world, the high levels in the Caucasus and Central Asian countries are a matter for concern. The paper also draws attention to the substantial monitoring challenges which still exist in estimating and tracking infant and child mortality, particularly in these latter two subregions, despite the recent official adoption of the internationally recommended definition of 'live births'. Official estimates based on civil registry records lead to an underestimation of the scale of the child survival problem and detract policy attention from the urgent need to improve the quality of pre and post natal care, mainly through incentives and training for medical staff. Without improvements in monitoring, it will be difficult for these countries to devise appropriate policy responses to correct the problems and remove existing barriers to improving child survival.

Keywords: children, demographic change, low fertility, dependency ratios, infant mortality, Central and Eastern Europe, Commonwealth of Independent States.

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INTRODUCTION AND OVERVIEW

This paper analyses some demographic trends and their implications on children in Central and Eastern Europe (CEE)[1] and the Commonwealth of Independent States (CIS).[2] It discusses the factors contributing to prospects of a rapidly growing dependency burden in CEE and Western CIS in coming years and the often overlooked distortion to assessment of live births and infant deaths in some countries of the CIS and its potential impact on care for premature and underweight infants in their first week of life.

Over the last 15-20 years, the countries in CEE/CIS have gone through rapid demographic changes, which can have significant implications for their future socio-economic development. Between the mid-1990s and 2005, the population of the region declined from 413.5 million to 405.5 million, with the decline in the child population (aged 0-17) particularly striking: the number of children decreased from around 120 million to around 95 million in ten years. However, this decrease in the child population was not spread uniformly, and has in fact contributed to an accentuation of long-existing differences in demographic trends and structures across the CEE/CIS subregions.

The two extremes are represented on the one hand by the countries of the Western CIS, which recorded the most drastic declines in birth rates and some of the lowest fertility rates in the world; and on the other hand by the countries of Central Asia, where there has also been a decline in birth rates, but from the much higher starting levels of the 1980s, and where fertility rates continue to exceed replacement levels. These trends have meant that the child population represents a decreasing share of the total population in all countries, but again with marked regional variation: children account for slightly less than 20 per cent of the total population in Bulgaria, and circa 40 per cent in Tajikistan.

Especially in the Western CIS, there is a growing awareness of the longer term economic and social implications of the rapidly declining birth rates. The Russian Federation in particular faces the prospect of a stark increase in dependency ratios in the near future, with a shrinking working age population having to support an increasing cohort of retired persons. One of the policy reactions to these concerns has been the introduction of cash and other incentives to encourage couples to have more than one child, and calls for more support to families with children.

At the other extreme, in Central Asia and the Caucasus, the rising dependency ratios is not so alarming, but infant and child mortality rates point to continuing challenges in providing quality care for newborns and young children. Between 1990 and 2005, the average infant mortality rate in the CEE/CIS did indeed decrease from 33 to 26 infant deaths per thousand live births, but the regional situation is again very mixed, with the Central European countries reporting very low levels of infant and child mortality, comparable to those in Western

[1]Czech Republic, Hungary, Poland, Slovakia and Slovenia (Central Europe), Estonia, Latvia and Lithuania (Baltic States), Albania, Bosnia and Herzegovina, Bulgaria, Croatia, The former Yugoslav Republic of Macedonia, Montenegro, Romania and Serbia (South-Eastern Europe).

[2]Belarus, Moldova, Russian Federation and Ukraine (Western CIS), Armenia, Azerbaijan and Georgia (Caucasus) and Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Tajikistan (Central Asia).

Europe; the Russian Federation and Bulgaria showing rather slow rates of improvement and strong differentials within the country; and the Caucasus and Central Asia countries still reporting much higher levels, particularly of infant mortality.

The main source for the data analysed in this paper is the UNICEF TransMONEE database (2007 edition),[3] which contains socio-economic data starting from 1989 for all the countries of CEE/CIS, derived mainly from administrative sources.

The first section of the paper provides a brief description of the main factors contributing to the demographic changes experienced by the countries of the region (birth and death rates, as well as migration) since 1989, and then goes on to look in more detail at the one phenomenon which is common to all the subregions, namely declining fertility rates, which have been the main factor driving the rapid change in the age structure of the population. All countries of the region experienced a rapid decline in fertility rates at the beginning of transition, with the total annual number of births decreasing from 6.8 million in 1989 to 4.4 million in 1999. However, as stated above, the countries began declining from different starting points, and therefore the effect on their population structures has been very diverse.

The economic revival of the early 2000s brought with it a slight recovery in fertility and birth rates in the Western CIS and Central and Eastern Europe. However, there is evidence to suggest that the rapid decline in fertility since the early 1990s was not just a reaction to the economic crisis. In the Russian Federation, for example, at the beginning of the 1990s it was also due to a compensation effect of the Soviet pro-natalist policies of the 1980s which had encouraged women to anticipate childbearing, as well as, in the following years, the consolidation of the one-child family model. Data for Central Europe, on the other hand, point to a tendency to postpone childbearing, but also to a less marked reduction in the number of children being born per woman than in the Western CIS, i.e. the one child model is less dominant. In the Caucasus, administrative data on the annual number of births reveal an abnormally high ratio of male to female births; a finding which begs more investigation.

The second section of the paper analyses the available data on infant and child mortality for the region. Recent estimates, based on a mix of administrative and survey data, show improvements, with some countries in Central Europe now having the lowest level of infant mortality rates in the world. This has been largely due to concentrated efforts to improve survival rates for pre-term as well as newborns with low- and very-low birth weights. On the other hand several countries in the Western CIS, such as the Russian Federation and Bulgaria, record slow improvements (and even periods of stagnation) during the 1990s and early 2000s and considerable sub-national inequalities. The countries of Central Asia and the Caucasus report the highest levels of infant and under-five mortality in the region, and the gap between their rates and those of the rest of the CEE/CIS has actually increased since the early 1990s. Recent estimates suggest that these two subregions are unlikely to meet the MDG4 target of reducing the 1990 level of the under-five mortality by two thirds by 2015.

[3]The public version of the database can be accessed at the UNICEF Innocenti Research Centre website at www.unicef-irc.org.

The challenge of finding suitable policy responses to tackle infant mortality is complicated by the considerable challenges which remain in monitoring levels and causes. There are two sources of information for infant and child mortality rates, namely administrative data based on the number of deaths registered at the civil registries, and data derived from sample surveys. The paper presents evidence that, particularly in the Central Asian and Caucasus countries, the official statistics derived from civil registries represent an under-estimation of infant and child mortality rates. Comparison between official figures and results from sample surveys, as well as estimations derived from models using a mix of official and survey data, show large discrepancies (also for some countries outside these two subregions). This is partly due to the delays of countries to adopt and implement international standard definitions, especially live birth definitions, but also to mis-registration or non-registration of births and infant deaths. As a result, official statistics derived from the vital registration system can lead to a serious underestimation of the gravity of the child survival situation in these parts of the region. Since these official statistics are the ones used by some countries to set baselines and targets for MDG 4, there is a risk that both policy makers and the donor community do not devote enough attention to the considerable challenges still facing these countries in improving child survival rates.

SECTION 1: RAPID DEMOGRAPHIC CHANGES IN CEE/CIS: LOW FERTILITY RATES AND AGING POPULATIONS

Over the last 15 to 20 years, the countries of the Central and Eastern Europe (CEE) and the Commonwealth of Independent States (CIS) have experienced striking demographic changes, and the region has been the only one in the world to register an overall decrease in its population over that period. This decrease has not, however, been uniform and there are marked differences in demographic dynamics and structures between the CEE/CIS subregions. Three main factors contributed to the overall population change: a rapid reduction in birth rates, an increase in adult mortality and rising migration flows. Declining birth rates are the single factor most common to all countries and it has led to a striking reduction in the region's child population, from around 120 million in 1995 to around 95 million only ten years later.

This section focuses in particular on the dynamics and patterns of fertility decline in the CEE/CIS subregions, and how these have affected absolute child population numbers, demographic structures and dependency ratios.

1.1. Major Population Changes in the Transition Period

In the mid 1990s, the population of the CEE/CIS peaked at approximately 413.5 million.[4] At the beginning of 2006, the total population of the region was approximately 405.5 million (2 per cent less than 10 years before), with slightly more than half of the population living in the Western CIS countries, 18 per cent in Central Europe and the Baltics, and just under 15 per cent in Central Asia. South-Eastern Europe and Caucasus accounted for 13 and 4 per cent respectively of the total population of the region.

The decline of some 8 million people between the mid-1990s and the mid-2000s has been fuelled mainly by the demographic trends in the Western CIS countries, where the population decreased from 214 million in 1995 to 204 million in 2005 (with an average rate of reduction of - 0.5 per cent per year), and to a lesser extent by population reductions in South-Eastern Europe and Central Europe and the Baltic States. In contrast, the population of the Central Asia countries has grown by about 1 per cent annually throughout this period, from 53 million in 1995 to 58.5 million in 2005. The population in the countries of the Caucasus has also increased, but at a much slower rate: by slightly more than 300 thousand (an annual growth rate of 0.1 per cent).

[4]Population figures from the National Statistical Offices have been adjusted by the authors to account for the populations of Abkhazia and Transdniestr, which have not been included in the official statistics for Georgia since 1994 and for Moldova since 1998.

These trends are the result of a combination of different demographic dynamics,[5] but the rapid decrease in birth rates has been the single feature common to all countries of the region. This section looks first at the impact of changes in crude birth and deaths rates (or 'natural change'), and then briefly at the impact of migration flows on population trends. The latter are very difficult to monitor in the region, but there is sufficient evidence to conclude that migration has had an impact on population trends in some countries, but to a lesser extent than decreasing birth rates.

The varying dynamics of natural population change across CEE/CIS subregions

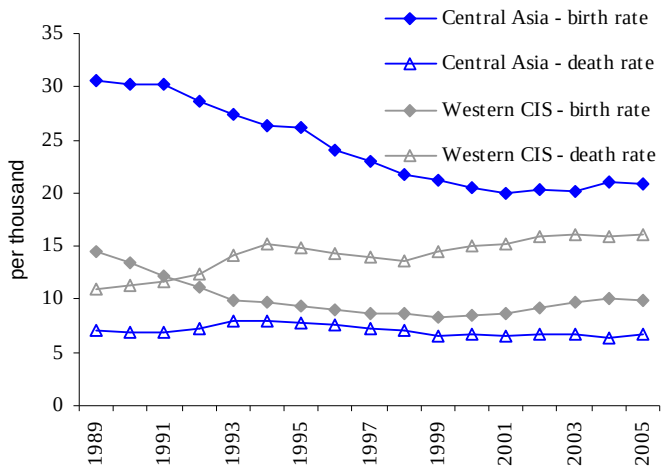
The 'natural change' rate is strongly influenced by the age structure of the population. The natural change dynamics of CEE/CIS are characterized by two extremes, namely that of the Western CIS and that of Central Asia: these two subregions have had the greatest influence on population changes in the region. The Western CIS has the oldest age structures across the CEE/CIS subregions, with less than 20 per cent of children (aged 0-17) in the total population, and around 18 per cent of the population aged 60 years and above. On the other hand, Central Asia has the youngest age structure, with children representing on average 38 per cent of the population, and people aged 60 years and older accounting for less than 7 per cent of the total population. Figure 1 shows the trends in crude birth rates and crude death rates for the two subregions.

In the Western CIS, the average crude birth rate decreased rapidly at the onset of the transition, from 14 per thousand in 1989 to 10 per thousand in 1993, and stagnated thereafter at between 8 and 10 per thousand. The crude death rate showed the opposite trend, with a rapid growth in the period 1989-1995, from 10 per thousand to 15 per thousand. In 1992 the crude death rate surpassed the crude birth rate, and since then the subregion has experienced negative natural population growth, ranging between -5 and -7 per thousand for the period 1995-2005. This negative natural population growth is the combined result of the extremely large reduction in birth rates, and the equally striking rise in death rates since the early 1990s, when adult male mortality increased substantially, leading to what has been described as a

[5]Population change is the sum of two components: 'natural change', or the difference between the number of births and deaths; and 'net migration', which is the difference between the number of immigrants and the number of emigrants. Both of these are key to understanding the demographic changes experienced by the region since the onset of the transition. However both represent monitoring challenges. For 'natural change', crude birth and death rates are the monitoring indicators. These are respectively the annual number of births and number of deaths per one thousand people. These (crude) measures are strongly influenced by the age structure of the population. Populations with younger age structures are more likely to report higher crude birth rates, while populations with older age structures are more likely to report higher crude death rates. The challenge for monitoring 'natural change' is mainly associated with the under-registration of births and deaths, particularly infant deaths. Evidence of under-reporting is discussed in the section of this paper dealing with child mortality. Monitoring international migration flows represents another challenge, partly due to the complex nature of the migration flows (for example, a lot of the migration is temporary and circular, with migrants coming and going from their countries of origin); and partly due to the fact that a large fraction of the migration flows are undocumented, and by their nature are not subject to registration for statistical counting. This makes it extremely difficult to estimate the scale of migration and immigration in any given country, and thus to evaluate the impact of migration on population change in the region. The impact of migration becomes clearer when a full population census is carried out, and population statistics (size and age distribution of the population) are adjusted retrospectively on the basis of the census results.

mortality crisis.[6] The Russian Federation registered the greatest increase in death rates in the Western CIS (from 10.7 per thousand in 1989, rising to a peak of 16.4 per thousand in 2004), while Moldova experienced the most striking decrease in birth rates (from 18.9 per thousand in 1989 to a minimum 9.9 per thousand in 2002).

Figure 1: Trends in average crude birth rates and death rates in Central Asia and Western CIS, 1989-2005 (rates per thousand populations)



Source: Authors' calculations based on TransMONEE 2007 data.

In contrast, the population natural change in the Central Asia countries remained positive throughout the transition period. This subregion had experienced high birth rates in the 1970s and 1980s, when Soviet pro-natalist policies acted to re-enforce cultural traditions favouring large families, and from the 1980s onwards some of the countries had begun to experience problems in absorbing into the labour market their growing working age and predominantly rural populations. Even if the average crude birth rate for this subregion declined from over 30 per thousand in the early 1990s to approximately 20 per thousand in 2000, it remained substantially higher than the crude death rate. The latter increased slightly in the early 1990s from 7 per thousand in 1989 to 8 per thousand in 1993, and then entered a slow decline. These dynamics resulted in a positive natural population growth rate, which slowed down over time: from the very high 20 per thousand a year in the early 1990s, to approximately 14 per thousand a year around 2005.

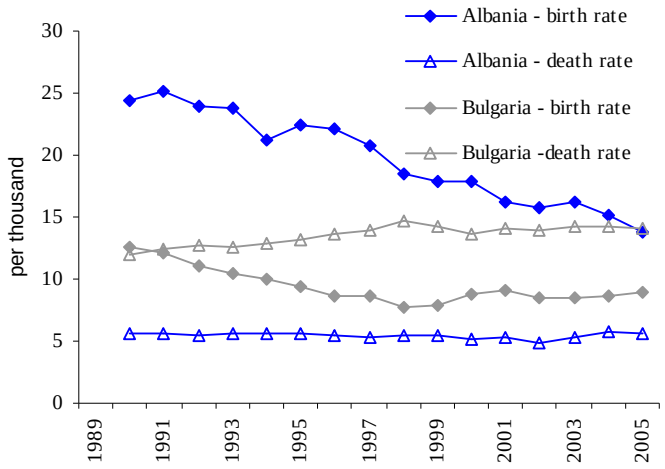
The Baltic States started to experience a negative natural growth rate at the same time as the Western CIS (with increases in adult mortality and decreases in birth rates occurring almost in parallel), whereas the Central European and South-Eastern European countries began to register negative natural growth only in the second half of the 1990s. This trend is less accentuated than that seen in the Western CIS, and has been driven by declining birth rates, and very slight changes in crude death rates. In Central European countries the crude birth

[6]See, for example, Cornia and Paniccià (2000) for a discussion of the sudden rise in mortality that accompanied the transition to market economy; and Eberstadt (2004) for a discussion of the demographic situation and the high levels of adult mortality in Russia.

rate declined from 14 per thousand in 1989 to around 9.5 per thousand in the first half of the 2000s; while in the same period the crude death rate decreased only slightly from around 11 to 10.5 per thousand.

In the 1995-2005 period the Central European countries had relatively homogeneous crude birth and death rates (with 2005 rates ranging from 9 to 10 per thousand in all countries, with the exception of Hungary, where the crude death rate was 13.5 per thousand). The situation is more complex in South-Eastern Europe, with Albania and Bulgaria representing two extreme cases (see figure 2). Albania had a low and stable crude mortality rate (around 5 per thousand), while its crude birth rate halved between the early 1990s and 2005, with a consequent drop in the natural growth rate from 20 per thousand to 7 per thousand. Bulgaria experienced negative natural population growth, with a rapid decrease in birth rates during the 1990s and a symmetric growth in the crude death rates.

Figure 2: Trends in average crude birth rates and death rates in Albania and Bulgaria, 1989-2005 (rates per thousand populations)



Source: TransMONEE database 2007.

Finally, the countries of the Caucasus reported positive rates of natural population growth, from 15 per thousand in 1990 to 6 per thousand in 2005, but with notable variations in levels between countries: Azerbaijan saw its natural population growth rate halve from around 20 per thousand to around 10 per thousand; and in Georgia it fell from around 8 per thousand to 0.1-0.2 per thousand. This slowdown of the natural growth rate in Georgia has been in part fuelled by large emigration flows which involved mainly people in the reproductive age groups.

The impact of migration flows on population changes

With the transition, there have been considerable movements of people within, between and from the countries of CEE/CIS.[7] It has been estimated that, by the beginning of the 2000s, the region accounted for over one third of total world international migration (an estimate that excludes flows between industrialized countries).[8] Migration patterns differ throughout the region, and have also changed over time. At first many of the flows were induced by ethnicity, with nationals returning to their place of ethnic origin after the break up of the Soviet Union and Yugoslavia. More recently, since the mid 1990s, most of the migration has been driven by economic reasons. At present migration in the region shows an almost bi-axial pattern, with most of the flows from Central, Eastern and South-Eastern European countries directed to Western Europe, and most of the emigration in CIS directed to other CIS countries, in particular to the Russian Federation, which is now the second largest immigration country in the world (after the United States). The scale of international migration within the CIS is now such that it has become one of the world's biggest migration systems.[9] Another recent change is that an increasing number of countries in the region are also gradually becoming migration destination countries, with most of Central Europe reporting positive net migration.[10]

A large part of the economic migration within the CIS and CEE is informal and undocumented. However, available estimates show that in some of the smaller countries, migration's effect on the size of the population can be significant. For example, the results of the 2002 population census in Georgia led to an estimate of a negative net migration of 1.1 million since 1990, corresponding to 20 per cent of the initial population.[11]

However, in the region as a whole, and especially in those countries with large populations, the impact of 'natural change' on population trends has been much greater than that of migration. Official statistics from the National Statistical Offices of 22 CEE/CIS countries show that in the period 2000-2005, only 8 countries (Belarus, Croatia, Czech Republic, Hungary, Slovakia, Slovenia, The former Yugoslav Republic of Macedonia and the Russian Federation) reported positive net migration rates.[12] The Russian Federation is the country with the most positive migration balance, but even this has not been enough to offset the natural population decline due to falling birth rates and high adult mortality rates. In the early

[7] The former USSR was characterized by large flows of domestic migration which, during the 1980s, were mainly work or family related. After the dissolution of the USSR movements between the CIS countries drastically decreased compared to the previous period, largely due to the economic crisis and the social and political instability. Despite these trends, in migration to Russia has remained high since the dissolution of the USSR – with those who would previously have been categorized as national migrants becoming international migrants (for more details see Zayonchkovskaya, 2000). For more detailed discussion of migration trends during the transition in CEE and the CIS see respectively Malačič (2002) and Iontsev and Ivakhniouk (2002)

[8] See World Bank (2006) p.3

[9] Ivakhnyuk (2006)

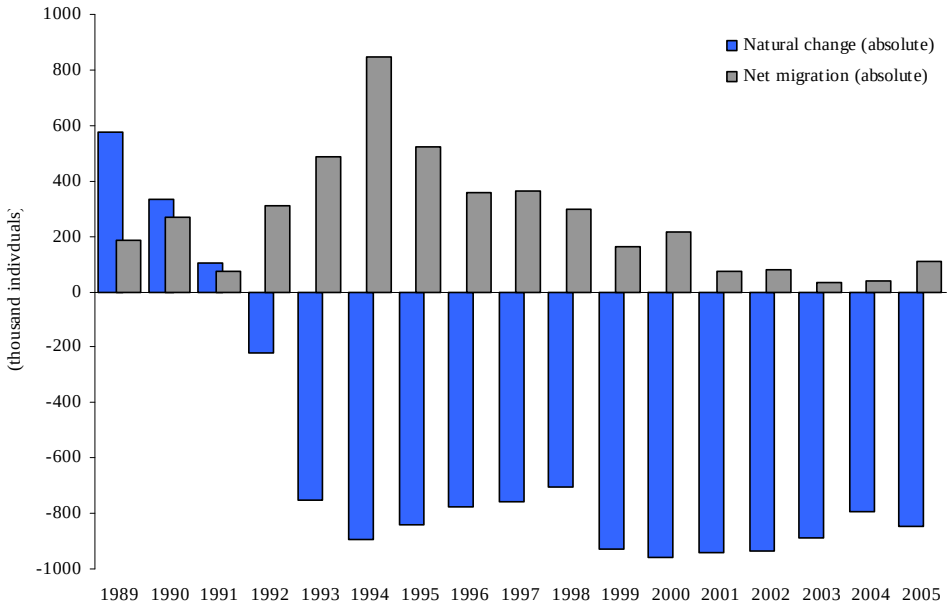
[10] World Bank (2006), UNICEF (2004) and TransMONEE database. Some Central European countries are experiencing significant inflows of migrants, in particular from CIS countries and Asian countries which use them as a jump-off point for entering the Western Europe, in most cases illegally (ILO 2005, pp. 78-79).

[11] World Bank (2006) p. 49.

[12] TransMONEE data.

1990s the migration flow into the country was largely driven by the return to the Russian Federation of ethnic Russians living in the other Soviet Republics. It is estimated that in the Russian Federation official international net migration accounted for a population increase of 3 per cent for the period 1989 – 2005, while its natural population decrease was approximately -7 per cent for the same period.[13] At the same time, internal migration is resulting in a major redistribution of the population within the country.[14] The internal population flows are mainly in a north-south and east-west direction, and are largely driven by increased economic prospects and climatic preferences.[15]

Figure 3: Population dynamics in the Russian Federation. Yearly absolute natural change and net migration, 1989-2005 (thousand individuals)



Source: Authors' calculation based on TransMONEE 2007 data.

1.2. Fertility: Past and Present Trends

As outlined above, the decline in birth rates is the single most important factor contributing to the population dynamics of the entire region. Rises and falls in crude birth rates reflect a combination of (i) the number of women in the reproductive age groups and their share in the population and (ii) the average number of children borne by women during their reproductive life. The first factor is linked to the age structure of the population (and is thus mainly influenced by earlier trends in birth rates); while the second factor is linked to fertility preferences and is influenced by prevailing societal norms and socio-economic conditions that may encourage couples to have children or discourage them from starting a family.

[13] TransMONEE data.

[14] Blum and Lefèvre (2006).

[15] World Bank (2005b), pp. 11-58.

The number of women in the reproductive age groups[16] is easy to predict for the immediate future, since those who will begin their reproductive life in the next 15-20 years have already been born. In the case of the countries of Central Europe, South-Eastern Europe and the Western CIS, the total number of women of fertile age will continue to rise in the next few years (with a few exceptions), but in 5-10 years their number will start to decline rapidly, as the (smaller) cohorts of women born after the onset of the transition will reach reproductive age. On the other hand, the number of women in reproductive age will continue to rise in countries in Central Asia and the Caucasus countries, although in some cases at a slower pace. Migration may also affect fertility patterns, but in ways that are less easy to predict. Women who migrate for work tend to be those in the most fertile age groups, and may either postpone childbearing in order to work abroad; or, in other cases, may wait until their partner returns from working abroad.

The second factor ─ the average number of children which women in the reproductive ages give birth to each year ─ can be monitored by looking at country Total Fertility Rates (TFR). Changes in annual TFRs can reflect changes (either increases/decreases) in the average number of births, or shifts in the timing of births.[17]

During the 1990s all the countries in the CEE/CIS region experienced a decline in TFRs. Although there have recently been some signs of recovery, in many countries the average number of children per woman is now among the lowest in the world. With the exception of Hungary, all Central European and Western CIS countries have TFRs of less than 1.3 children per woman, a level that is referred to by some authors as 'lowest-low fertility'[18] and that is usually thought to be a cause for alarm, because it signals levels that are so low, that it will be difficult for fertility rates to recover and regain replacement levels.

Figure 4 and table 1 report TFR levels for 1989-1990 and 2004-2005. In 1989-1990, all countries in Central Asia and the Caucasus, as well as Albania, Moldova, Romania and Estonia had fertility levels that were above the replacement level, while the majority of the other countries had levels that were close to 2 children per women. Only two countries, Croatia and Slovenia, registered TFRs lower than 1.7. By 1992, all countries had started to experience a decline in fertility rates and most of them reached their lowest levels between 1998 and 2003. By 2004-2005 only the Central Asian countries and Azerbaijan had TFRs above the 2.1 replacement threshold (although Azerbaijan had recovered the replacement level in 2005). All the other countries registered less than 1.7 children per woman.

[16]Usually defined as those aged 15-49 years old.

[17]The Total Fertility Rate (TFR) is the most common indicator used to monitor fertility trends and is defined as the average number of births that a hypothetical woman would have if she were to live through her reproductive years, and bear children at each age at the rates observed in the reference year. A TFR of 2.1 is considered the replacement fertility level, i.e. the minimum total fertility rate which is necessary for women to have enough children to replace themselves and their partners. TFR is a measure of current fertility, and trends in TFRs have to be interpreted carefully, as they can reflect either changes in the so-called fertility "quantum", i.e. the number of children born by women in the cohort in their entire reproductive life; or changes in the fertility "tempo", i.e. the timing of births. If there is an overall shift in the cohort towards having babies at an earlier or later age, this will affect the level of TFR, but does not necessarily mean that at the end of their reproductive life they will have a lower number of children ("quantum"). For more details see Bongaarts and Feeney (1998).

[18]See Kohler, Billari and Ortega (2002).

Table 1: Total Fertility Rates in CEE/CIS in 1989-1990 and 2004-2005, and minimum levels reached in those two periods (number of births per woman aged 15-49)

	1989	minimum level in 1989-2005	2005 or most recent year
Countries with TFR lower than 1.30 in 2005:			
Ukraine	1.90	1.10 (2000)	1.20
Moldova	2.46	1.20 (2002 and 2005)	1.20
Belarus	2.03	1.20 (2004)	1.21
Bosnia and Herzegovina	1.70	1.23 (2002)	1.23
Poland	2.05	1.22 (2003)	1.24
Slovakia	2.08	1.20 (2001)	1.25
Slovenia	1.52	1.20 (2003)	1.26
Lithuania	1.98	1.24 (2002)	1.27
Czech Republic	1.87	1.13 (1999)	1.28
Russian Federation	2.01	1.17 (1999)	1.29
Countries with TFR between 1.30 and 2.10 in 2005:			
Bulgaria	1.90	1.09 (1997)	1.31
Latvia	2.04	1.11 (1998)	1.31
Romania	2.20	1.23 (2001)	1.32
Hungary	1.78	1.28 (2003)	1.32
Armenia	2.61	1.11 (2000)	1.37
Croatia	1.63	1.33 (2003)	1.42
Georgia	2.13	1.37 (2003)	1.44
TfYR Macedonia	2.09	1.46 (2005)	1.46
Estonia	2.22	1.28 (1998)	1.50
Albania	2.96	1.60 (2005)	1.60
Serbia and Montenegro *	2.06	1.63 (1999)	1.71
Countries with TFR higher than 2.10 in 2005:			
Kazakhstan	2.84	1.80 (1999)	2.22
Azerbaijan	2.79	1.83 (2001)	2.33
Uzbekistan	4.07	2.36 (2003 and 2005)	2.36
Kyrgyzstan	3.80	2.40 (2001)	2.50
Turkmenistan	4.30	2.60 (2002-2004)	2.60
Tajikistan	5.08	3.00 (2003)	3.00

Source: TransMONEE database 2007.

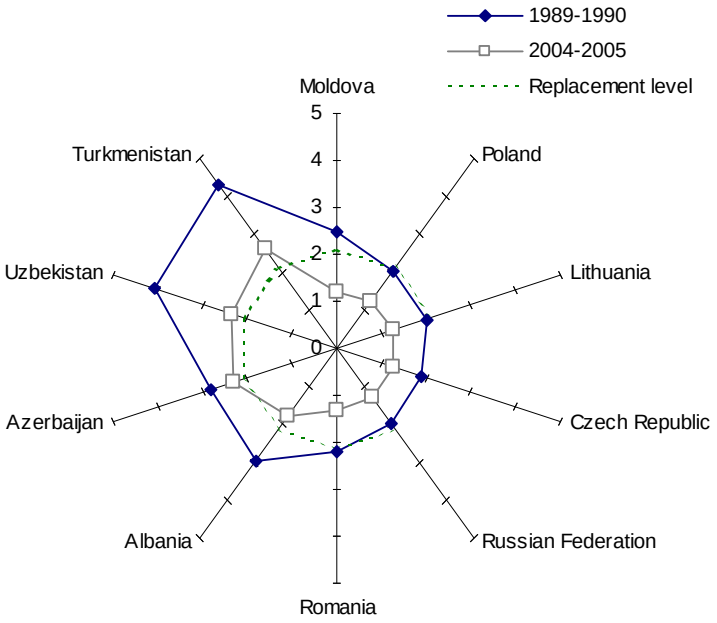
Note: countries are ranked according to their TFR for 2005. For some countries data for 2005 were not available. In these cases, the most recent estimates are used: thus data for Bosnia and Herzegovina refer to 2002, for Serbia and Montenegro to 2001, for Georgia and for Turkmenistan to 2004. 2005 data for Tajikistan refer to 2003 and are taken from The European Health for All Database (accessed on 15 March 2007). 1989 data for Uzbekistan refer to 1990. * Aggregated data are provided for Serbia and Montenegro pre-cession.

The onset of the transition marked the start of a period of rapid decline in TFRs, and seems to have acted to accelerate, and also deepen, longer ongoing trends towards families having fewer children, typical of all countries going through a phase of modernization and urbanization.[19] The sudden acceleration in the decline (illustrated for some countries in figure 5) was only in part a response to the economic and social insecurities experienced by most people in the region in the early 1990s.[20]

[19]Sobotka (2002).

[20]In some countries fertility behaviour may also be influenced by the violent conflicts have affected parts of the region during the transition period.

Figure 4: TFR in selected countries in 1989-1990 and 2004-2005 (number of births per woman aged 15-49)



Source: TransMONEE database 2007.

Changes in TFR can reflect not only changes in the 'quantum' of fertility, i.e. the average number of births, but also the fertility 'tempo', or the timing of child bearing.[21] The latter, in fact, has also had an important influence on recent fertility trends in the region. For example, part of the decline in some countries of the former Soviet Union in the early 1990s represents a compensation effect after the Soviet pro-natal policies of the 1980s, which had encouraged women to anticipate childbearing.[22]

More generally, some studies show that two different patterns of fertility changes have emerged since the 1990s in Western CIS and Central Europe.[23] In the countries of Central Europe the more recent decline in the TFR has been driven mainly by a postponement of childbearing, in particular of the first birth,[24] and only to a lesser extent by a decline in cohort fertility levels.[25] In the Western CIS countries, on the other hand, the postponement of the first birth has become less common.[26] The main factor driving the decline in TFR here is the reduction in the quantum of fertility (in particular the low propensity to have a second

[21] See footnote 17.

[22] See Adveev (2001) p. 15.

[23] Sobotka (2002).

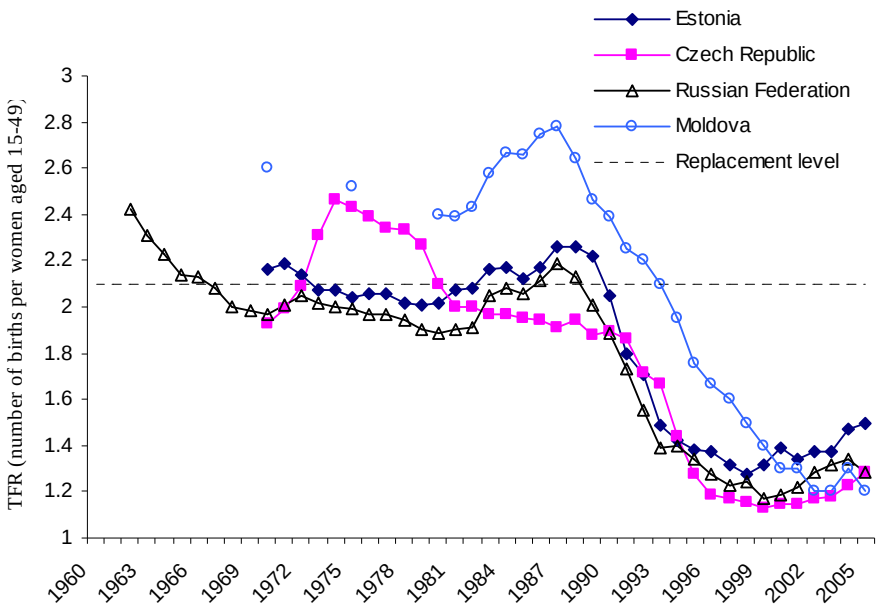
[24] In 1989, in Central Europe, the average age at first birth ranged from 22 years in Slovakia to 23.7 years in Slovenia, while in 2005 it ranged from 25.4 years in Poland to 27.8 in Slovenia (MONEE data).

[25] As seen in the case of Czech Republic in Sobotka (2005).

[26] Average age at first birth in Western CIS changed slightly in 1989-2005: for the whole period this indicator ranged between 22 years and 24 years (TransMONEE data).

child).[27] In the first case the timing effect is important, while in the second case it is more a question of declining numbers of births and, probably, a shift towards the one-child family model.[28]

Figure 5: Trends in TFR in Estonia, Czech Republic, Russian Federation and Moldova



Source: TransMONEE database 2007, The European Health for All Database (accessed on 15 March 2007) and Goskomstat of Russia (1997).

Data on average age at first birth and on the share of births to mothers younger than age 25 seem to support these interpretations (see table 2). Between 1989 and 2005, all countries in Central Europe and, to a lesser extent, the Baltic States and South-Eastern Europe experienced a noticeable increase in average age at first birth and a marked reduction in the share of births to women under age 25. In the Czech Republic, for example, the average age at first birth increased from 22.5 years in 1989 to 26.9 years in 2005 and, over the same period, the percentage of live births from young women (under 25) decreased from 58 to 13 per cent. In 2005, Slovenia registered the highest average age at first birth for the region (27.8 years), while Lithuania, Bulgaria, Romania and Bosnia and Herzegovina reported an average age at first birth of 24-25 years. In the CIS countries, on the other hand, changes in the average age at first birth have been very limited, with most of the countries reporting averages of less than 24 years, and shares of births from young mothers higher than 40 per cent.[29]

[27] As suggested by Barkalov (2005) in the case of Russia in the 1990s..

[28] Adveev (2001) argues that in the case of the Russian Federation the social and economic transformations since the 1990s have probably encouraged the trend away from the two-child family to the one-child family model.

[29] See, for example, Philipov and Jasilioniene (2007) for a discussion of the case of the Russian Federation.

Table 2: Average age at the first birth and share of births to mother under age 25 in CEE/CIS countries, 1989 and 2005

	Average age of mothers at first birth (years)		Share of births to mothers under age 25 (as percentage of total live births)	
	1989	**2005**	**1989**	**2005**
Czech Republic	22.5	26.9	58	13
Hungary	23.1	27.0	51	24
Poland	23.0	25.4	43	31
Slovakia	22.0	25.7	55	32
Slovenia	23.7	27.8	41	17
Estonia	22.8	25.2	48	22
Latvia	23.4	25.2	49	36
Lithuania	23.4	24.9	49	37
Albania	-	-	33	39
Bosnia and Herzegovina	23.6	24.4	49	37
Bulgaria	22.0	24.8	65	43
Croatia	24.2	26.5	47	23
TfYR Macedonia	23.3	25.0	51	37
Romania	22.5	24.9	60	39
Serbia and Montenegro *	23.9	-	46	-
Belarus	23.1	23.9	51	47
Moldova	-	23.6	48	53
Russian Federation	23.1	23.8 **	47	48
Ukraine	-	23.8	54	50
Armenia	22.7	22.7	53	60
Azerbaijan	23.8	23.9	43	53
Georgia	23.7	-	52	49
Kazakhstan	22.6	24.3	45	41
Kyrgyzstan	22.3	23.4	44	44
Tajikistan	22.6	-	41	-
Turkmenistan	24.3	24.6	33	39
Uzbekistan	22.6	23.6	46	45

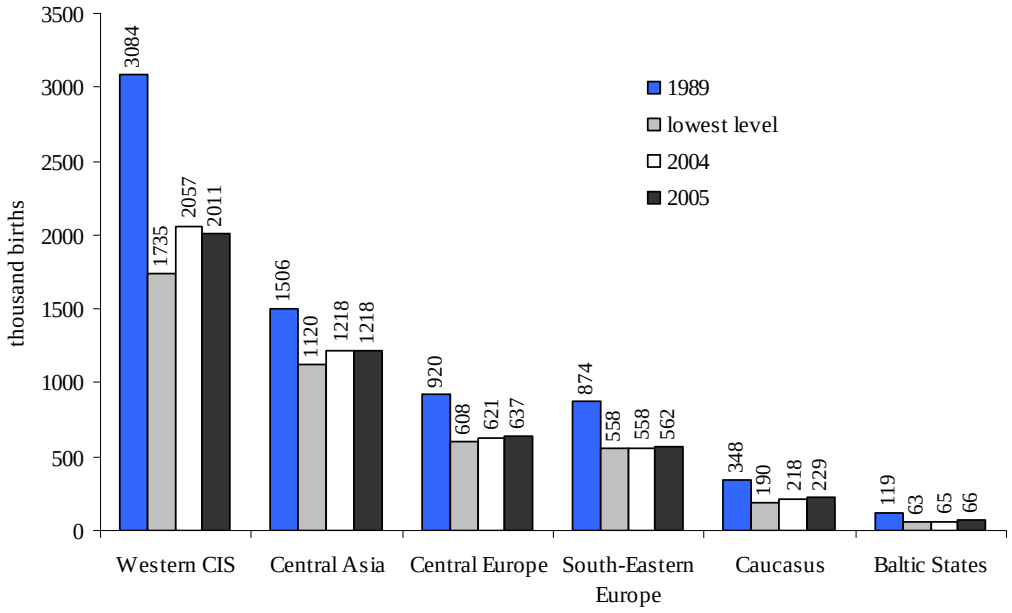
Source: TransMONEE database 2007.

Note: * Aggregated data are presented for Serbia and Montenegro, pre-cession; ** this figure refers to 2002 and it is taken from Philipov and Jasilioniene (2007).

Large declines in the total number of births during the 1990s. A slight recovery in the early 2000s

The trends in total fertility rates described above, together with trends related to the numbers of women of reproductive ages, resulted in significant changes in the total number of live births. This figure declined from an estimated 6.8 million in 1989 to 4.4 million in 1999. In this period, the Russian Federation alone experienced a decrease with the number falling from 2.2 million to 1.2 million live births, while Moldova experienced the highest relative decline, more than halving its annual total number of births.

Figure 6: Total annual number of live births in the CEE/CIS subregions (figures for 1989, 2004 and 2005, and lowest numbers reached during 1989-2005, thousand live births in the given year)



Source: TransMONEE database 2007.

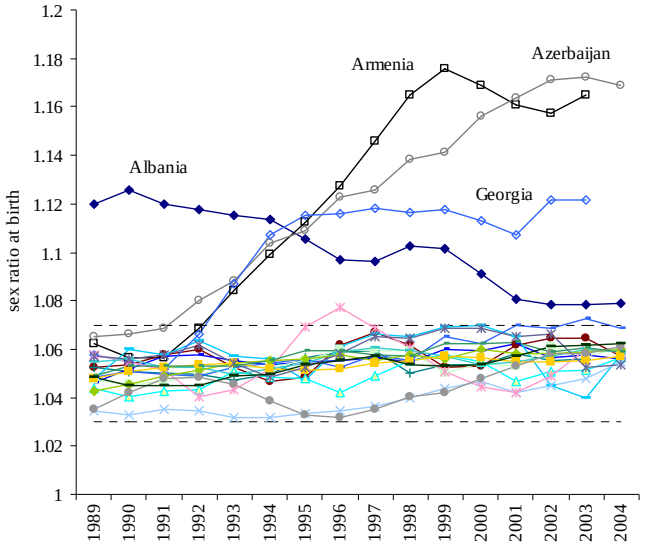
Note: The regional lowest numbers of births have been reached respectively: Western CIS in 1999, Central Asia in 2001, Central Europe in 2003, South-Eastern Europe in 2004, Caucasus in 2002 and Baltic States in 2002.

The other CEE/CIS subregions reached their lowest absolute levels of live births in the early 2000s. The lowest level for South-Eastern Europe was reached in 2004, but in some countries of this subregion, for example Albania and the former Yugoslav Republic of Macedonia, the number of births continues to decline. Since the early 2000s, most other countries have reported increases in the number of births, with Kazakhstan and the Russian Federation registering the highest relative growth. In the latter country, the total number of births in 2005 was 20 per cent higher than that the number in 1999.

Box 1: An excess of male births in the Caucasus?

The decline in the overall number of babies born during the 1990s was common to all the countries in the CEE/CIS; both those that started the 1990s with higher levels of fertility (i.e. Central Asia and the Caucasus countries) and those starting with lower fertility rates. However, the Caucasus countries are among those that experienced the most dramatic fall in fertility rates during the transition. Analysis of the official statistics for this subregion has brought to light another concerning trend, namely that the fall in fertility rates has been accompanied by a rapid increase in the sex ratio (male-to-female) at birth. In the 1990s, the sex at birth ratio reached values that are far beyond the range for the so-called normal level, namely 103-107 male births per 100 female births. This 'normal' level is found in almost all the other CEE/CIS countries. Albania was another exception at the beginning of the transition, but since then it has experienced a trend towards 'normal' levels. All the Caucasus countries, on the other hand, have seen a rapid increase in the ratio of male to female births since the 1990s, and by the early 2000s they were reporting an excess of male births in the range of 5 to 10 per cent above the 'normal' levels.

Figure 7: Sex ratio at birth in CEE/CIS. A focus on Albania and the countries of the Caucasus 1989 - 2004



Source: Authors' elaboration based on TransMONEE data 2007. Note: the sex ratio at birth is the ratio between the number of male live births and the female live births. The data are presented as three-year moving averages (i.e. the 1990 data are the arithmetic average of data related to 1989, 1990 and 1991). The dotted lines delimit the 1.03-1.07 band which is considered to be the 'normal' range for the sex ratio at birth.

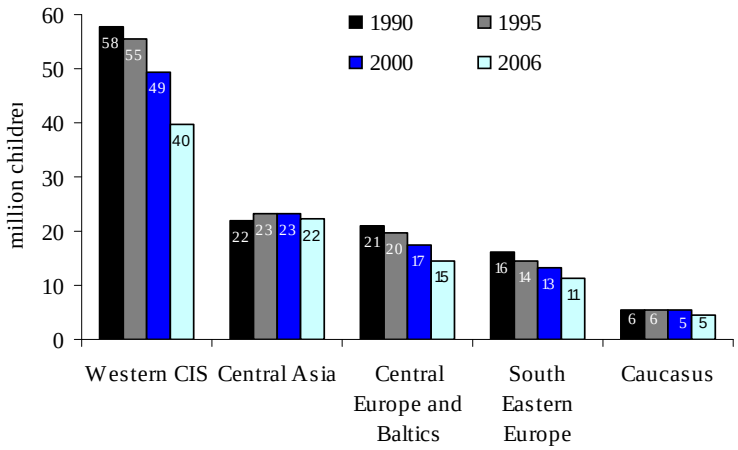
This upward trend could also reflect a deterioration in the quality of the data coming from the civil registration offices. However, survey results suggest that this cannot explain the entire increase in the ratio. Data from the Demographic and Health Survey carried out in Armenia in 2005 show a rapid growth in the sex ratio at birth since the mid-1990s, and suggest that gender bias in birth registration was very limited. Analysis of survey data on birth orders for Georgia and Armenia shows that this increase in sex ratio at birth relates mainly to 3rd order births. While these trends would seem to indicate a preference for sons, there is no concrete evidence that the abnormal ratio is the result of selective induced abortion. Further data and analysis are necessary to better understand the nature and the causes of these trends.

[a]According to DHS data, in 2005 in Armenia, the percentage of boys and girls aged 0-4 whose births have been registered was 96.6 per cent and 96.1 per cent, respectively. See National Statistical Service [Armenia], Ministry of Health [Armenia], and ORC Macro. (2006), pp. 26 and 272. [b]Meslé, Vallin and Badurashvili (forthcoming).

1.3. Declining Child Populations and Ageing Population Structures

The consequence of declining birth rates has been shrinking child populations and striking shifts in the age pyramids of individual countries. Figure 8 presents data on the shifting size of the child population (aged 0-17 years) in the CEE/CIS subregions. From 1990 to 2006 the total regional child population declined from approximately 122 million to 93 million, i.e. a decline of around one quarter. All the subregions report a substantial reduction compared with their 1990 levels, apart from Central Asia where the child population reached its maximum around 2000 and in 2006 had values similar to those registered in the early 1990s.[30]

Figure 8: Changes in the size of child population in the CEE/CIS subregions, 1990-2006 (million children aged 0-17)



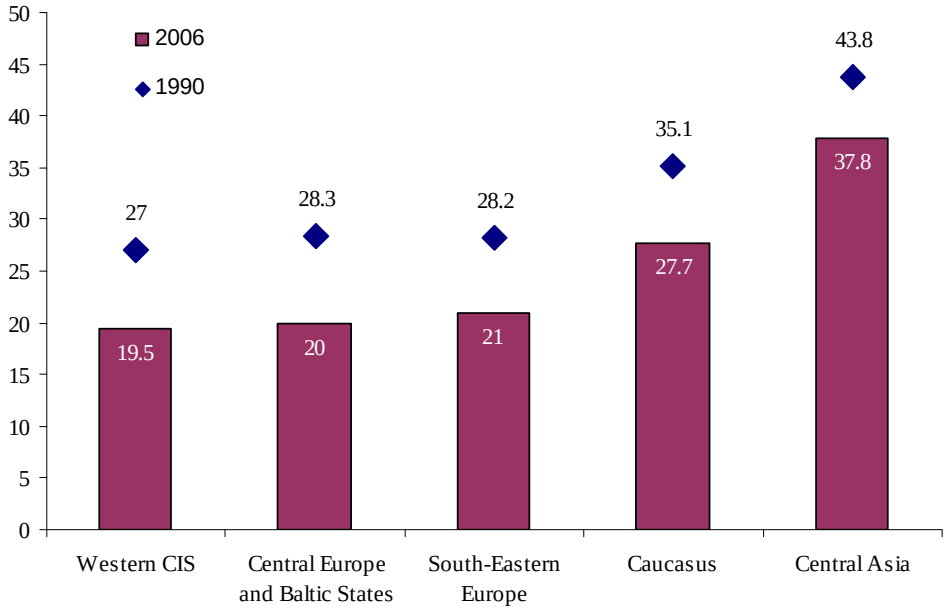
Source: TransMONEE database 2007.

Western CIS countries accounted for most of the absolute decrease (there was a reduction of 18 million in the child population, corresponding to a 30 per cent decline from 1990 to 2006), while the largest country-level decreases were experienced by Bulgaria, Estonia and Latvia (with reductions ranging from 35 per cent to 40 per cent). In all the subregions, the shrinking of the child population accelerated over time, as a cumulative effect of the declining birth rates (more than half of the overall decline in child population occurred between 2000 and 2006).

These trends resulted in a marked decline in the share of children in the total population (see figure 9). In 2006, children represented circa 20 per cent of the population in the Western CIS, Central Europe, Baltic States and South Eastern Europe, compared with 27 per cent to 28 per cent in 1990. Central Asia represents the other extreme, where the share of children in the population is almost double than that in the Western CIS or in some Central and South-Eastern Europe countries. Tajikistan has the highest share of children; here they account for around 44 per cent of the entire population, compared with slightly less than 50 per cent in 1990.

[30]Kazakhstan was the only country in Central Asian that deviated from this pattern. It experienced a 24 per cent decline in its child population between 1990 and 2005.

Figure 9: Share of children (aged 0-17) in total population in CEE/CIS regions, 1990 and 2006 (per cent)



Source: TransMONEE database 2007.

Figures 10a and 10b show how the population structures (represented as age pyramids) evolved over time between 1990 and 2006 in two very different countries, namely Tajikistan and Bulgaria, which represent two extreme cases for the CEE/CIS region.

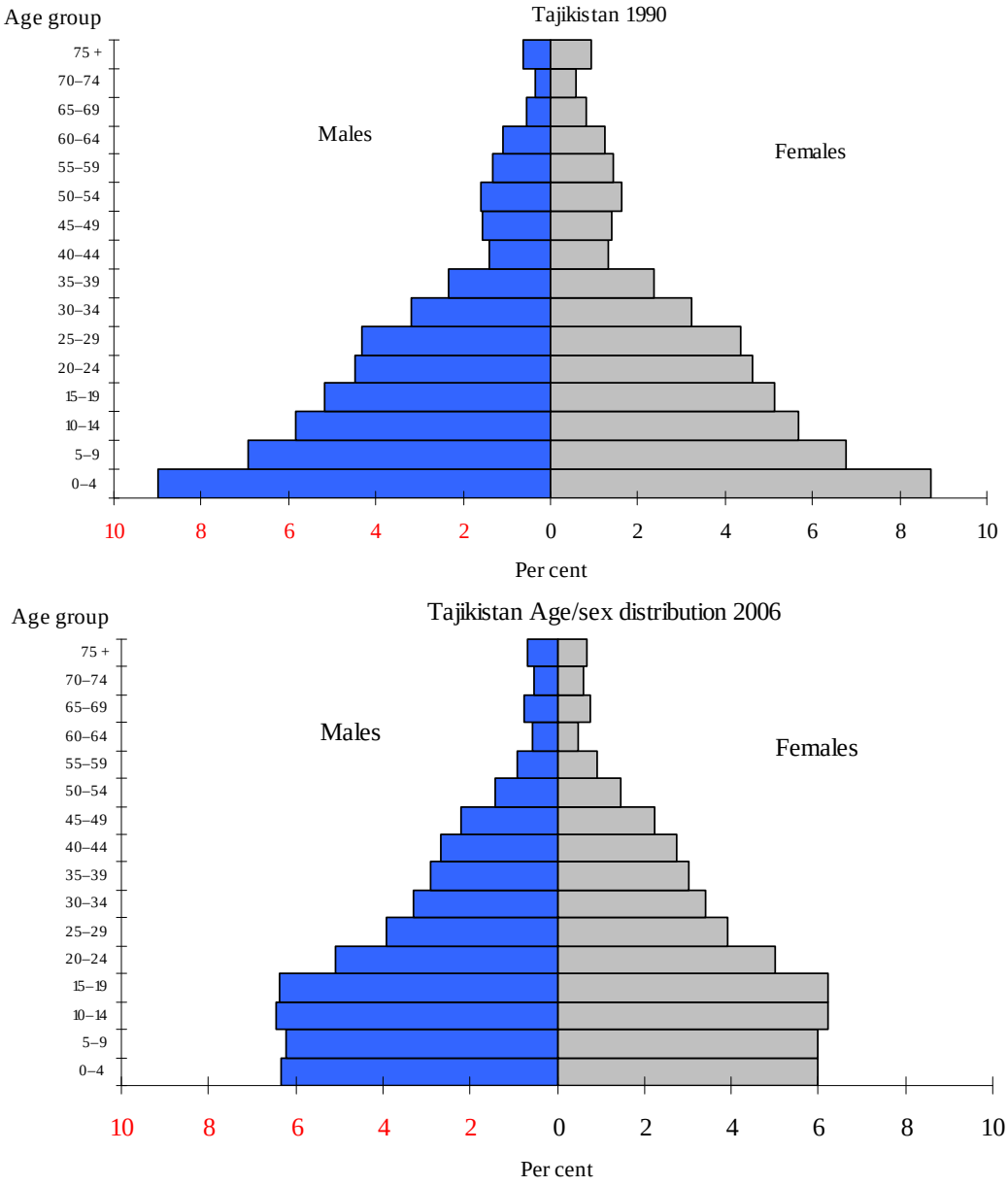
Tajikistan has the youngest age structure of the region. The reduction in the share of children since 1990 is mainly due to trends in the numbers of the very young: in 1990, children aged 0-4 years accounted for circa 18 per cent of the total population, compared to 12 per cent in 2006; a share close to that of children aged 5-9 and 10-14 years, which changed only slightly over the same period. Both the child dependency ratio and the total dependency ratio[31] decreased substantially, from 84 to 64 per cent and from 96 to 73 per cent respectively.

In Bulgaria, the base of the age pyramid continued to shrink between 1990 and 2006, while the top broadened. In 2006, the age groups 0-4, 5-9 and 10-14 represented between 4 and 5 per cent of the whole population, compared to 6-7 per cent in 1990. The overall dependency ratio decreased from 65 per cent to 55 per cent, as a result of the shrinking child dependency ratio (from 34 per cent to 21 per cent) and the increasing elderly dependency ratio[32] (from 31 per cent to 36 per cent).

[31]The child dependency ratio is defined as the ratio between the population aged 0-14 and the working age population (aged 15-59), while the total dependency ratio is the ratio between the sum of the population aged 0-14 and the population aged 60 and above, divided by the working age population.

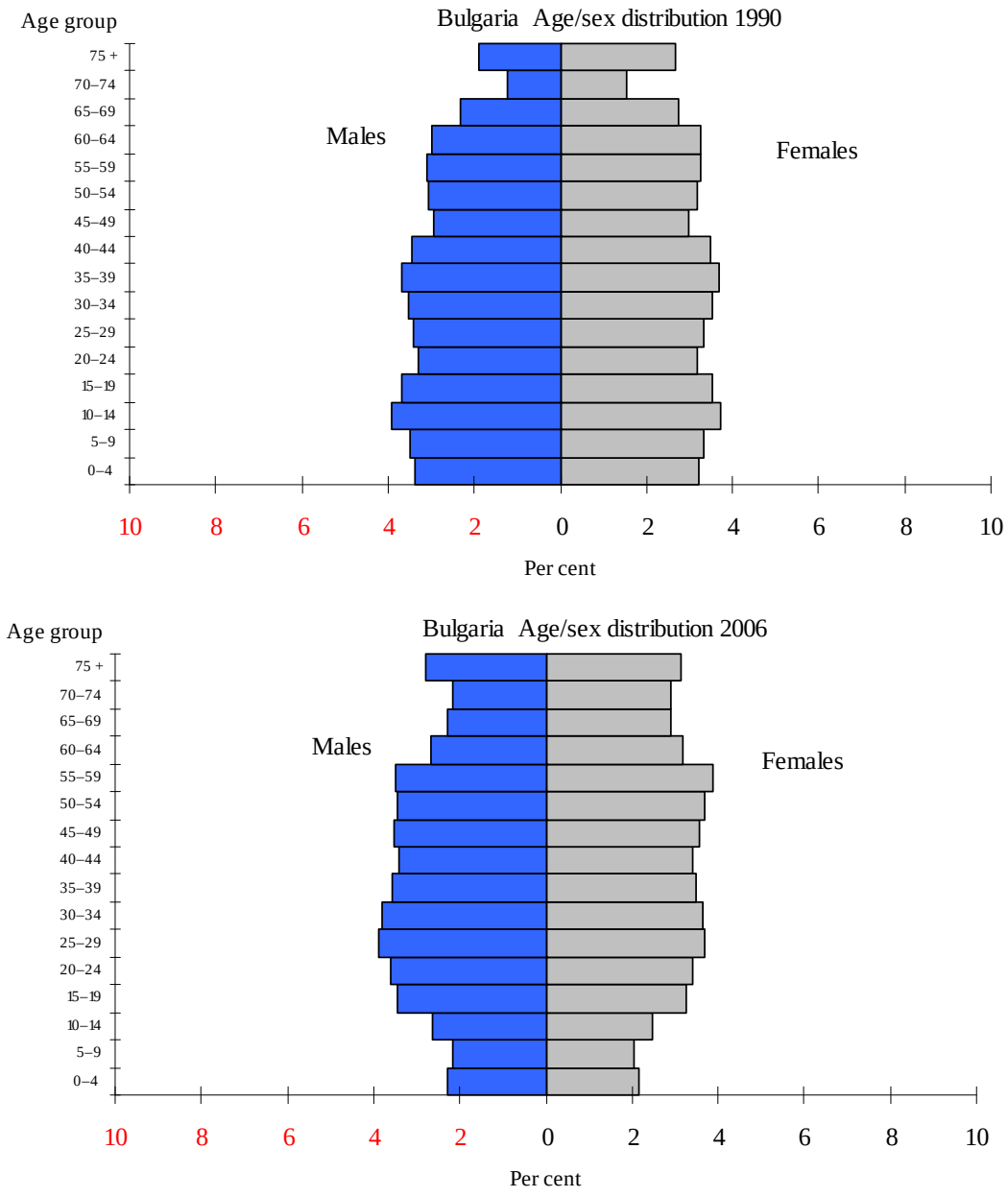
[32]The elderly dependency ratio is the ratio between the number of individuals aged 60 and above and the number of people of working age (15-59).

Figure 10a: Age and sex distribution of the population in Tajikistan, 1990 and 2006 (per cent)



Source: TransMONEE database 2007.

Figure 10b: Age and sex distribution of the population in Bulgaria, 1990 and 2006 (percent)

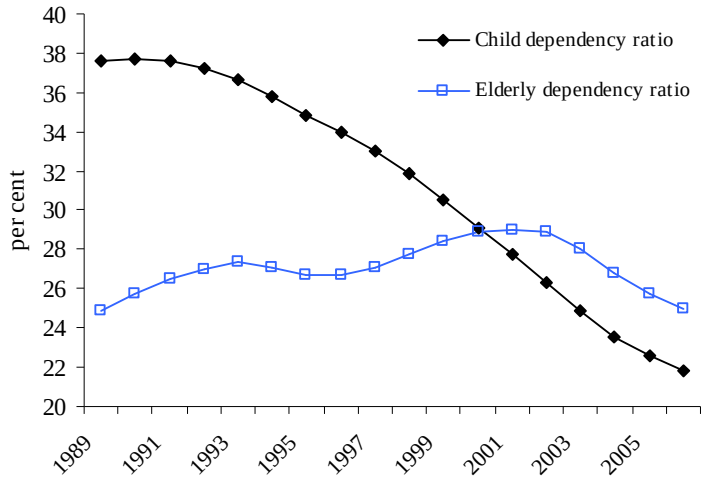


Source: TransMONEE database 2007.

In fact, the large contraction in the child population has led to a decrease in overall dependency ratios in all the countries of the region. However, overall dependency ratios will grow (rapidly) in the near future, because of the growing number of elderly will start to more than compensate for the decline in the ratio of children to working age individuals. Central

Europe and South Eastern Europe have had rising elderly dependency ratios since the early 2000s. In the Western CIS and Baltic states the elderly dependency ratio increased during the 1990s and started to decrease at the end of the decade: this trend reflects the entrance into the working age population of the large cohorts of children who were born during the 1980s ─ a decade which saw an increase in birth rates, as a result of the explicitly pro-natalist policies of the Soviet Union ─ and the entrance into the elderly group of the small cohorts of people born immediately after the II World War (see Figure 11 for the Russian Federation). From now on the cohorts entering the older age groups are forecast to grow considerably.

Figure 11: Trends in child and elderly dependency ratios in the Russian Federation, 1989-2006 (per cent)

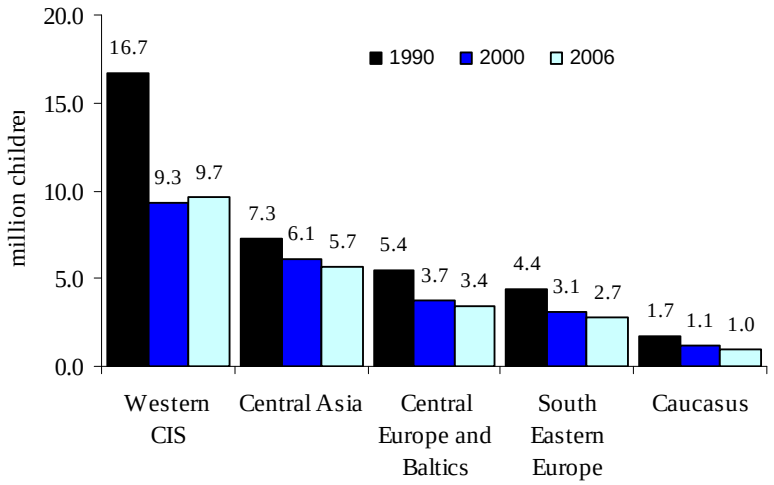


Source: TransMONEE database 2007.

Note: The child dependency ratio is the ratio of the size of the population of children aged 0-14 to the size of the population aged 15-59, the elderly dependency ratio is the ratio of the size of the population aged 60 years and more to the size of the population aged 15-59.

There are now some signs that, at least in some countries, the end of the phase of rapidly declining birth rates may be in sight. The trends in the population of young children (0-4 year olds), reported in figure 12, show that after a decade of continuous and accelerating decline, the pace of decline in the number of children aged 0-4 in the CEE/CIS subregions has slowed down visibly, and in the Western CIS the trend has even been reversed. While in the 1990 – 2000 period, the overall number of children aged 0-4 declined from 35.5 million to 23.5 million, with an annual average reduction of more than 1 million a year; in the 2000-2006 period the number fell by another 1 million to 22.5 million, however this time the reduction occurred over a period of 6 years.

Figure 12: Changes in the size of the population of children aged 0-4 in the CEE/CIS subregions, 1990-2006 (million children aged 0-4)



Source: TransMONEE database 2007.

However, while these recent trends do signal a reversal of the population decline - possibly connected to a period of greater social and economic stability ─ many governments in the region remain justifiably worried about the demographic situation in their countries. The President of the Russian Federation, for example, devoted much of his 2006 State of the Nation Address to highlighting the urgency of increasing the country's birth rate, as well tackling the causes of high male adult mortality rates. The country's demographic situation was called 'the most acute problem facing our country today', and low incomes, inadequate housing, poor-quality health care and inadequate educational opportunities for children were listed as the main factors discouraging couples to have more than one child.[33] Romania is another example where concern has been expressed that the fall in birth rates and 'lowest low fertility rates' (below 1.3) may lead to a situation where the accelerating rate of population decline will be difficult to reverse.[34]

[33]Population and Development Review (2006), pp. 385-389.

[34]Alexandrescu (2005).

SECTION 2: FEWER INFANT AND CHILD DEATHS BUT CHALLENGES REMAIN. BETTER MONITORING NEEDED FOR EFFECTIVE POLICY RESPONSES

2.1. Infant and Child Mortality Levels and Trends in the Subregions of the CEE/CIS

Infant and under-five mortality rates (IMR and U5MR) are key indicators of child wellbeing, but are also used more broadly as indicators of access of households to basic social services and infrastructure in a given country or region. Under-five mortality rates are influenced by an interplay of different factors such as the health and nutritional status of mothers, their knowledge of basic healthcare and hygiene, the level of immunization coverage, the availability of maternal and child health care services (including pre-natal and neo-natal care), household income levels, the availability and nutritional value of food, safe drinking water and basic sanitation, and the overall safety of the environment in which the child grows up. All of these factors in turn reflect not just the level of resources or inequality in a given country, but also the degree of priority given to child wellbeing.

The most recent standardized estimates of IMRs and U5MRs point to a gradual improvement in the survival of infants and young children in the majority of the Central and Eastern Europe (CEE) and the Commonwealth of Independent States (CIS) countries, although the pace of the decline is not yet sufficient for most countries to meet the Millennium Development Goal 4 (MDG 4) target of reducing under-five mortality by two thirds between 1990 and 2015. The data also point to marked differences across the region and within countries.

However in some countries of the region, estimates of IMR and U5MRs vary considerably, depending on the source of data, i.e. on whether they are based on administrative data or survey data. The large discrepancies in data derived from these different sources highlight the ongoing challenges of monitoring child mortality in the region, particularly, but not only, in the countries of the CIS. Better data are urgently required as a basis for designing more targeted interventions to improve perinatal and neonatal care, as well as services for mothers and young children. Misreporting and underestimates of infant and child mortality can lead to a lack of understanding of the urgency of introducing such improvements.

Lack of progress in improving monitoring of IMR and U5MRs is partly related to the slow introduction of internationally accepted (World Health Organization) definitions of infant births and deaths. Use of such definitions would lead to more precise reporting, and would provide the basis for honouring the right of the child to be registered immediately after birth (article 7, CRC). This in turn would contribute to the upholding of the child's right to full attention and care in health facilities, the rights of parents as users of health services to demand accountability from providers, as well as the rights of mothers to maternity benefits and leave. The challenges of improving statistics on child mortality are many and not just technical: political will as well as public demand are required to involve different agencies in breaking past and current practices and the existing disincentives for improvements. Without such improvements, there is a risk that infant and child mortality rates will continue to be

underestimated, leading to lack of priority being given to child survival in public health policies, and consequently in public expenditure.

Changes in Infant and Under-5 Mortality Rates

According to the estimates reported in UNICEF (2006b),[35] the average IMR for the CEE/CIS countries in 2005 was slightly more than 26 infant deaths per thousand live births, meaning that approximately 120-130 thousand children were dying before their first birthday. In 1990, the average IMR for the region was circa 33 per thousand, corresponding to 215-220 thousand infant deaths. Thus, between 1990 and 2005, the total number of infant deaths declined by circa 90-100 thousand. These data suggest a substantial improvement in child survival rates, but require some qualification. Firstly, only a part of the absolute decline of infant deaths (46 per cent of the total) was due to improvements in infant survival; the rest was the result of the large reduction in the number of births in the same period (see section I of this paper). Secondly, the average rates for the region hide a very mixed picture regarding infant and child mortality for CEE/CIS countries. Figure 13 provides an overview of the levels of IMR, showing the maximum, the minimum and the average rates for the CEE/CIS subregions in 1990 and in 2005: the countries of Central Asia and Caucasus have markedly higher infant mortality levels; Western-CIS and South-Eastern European countries have intermediate to low levels of mortality; and Central and Eastern Europe and Baltics countries have low and very low infant and child mortality levels.

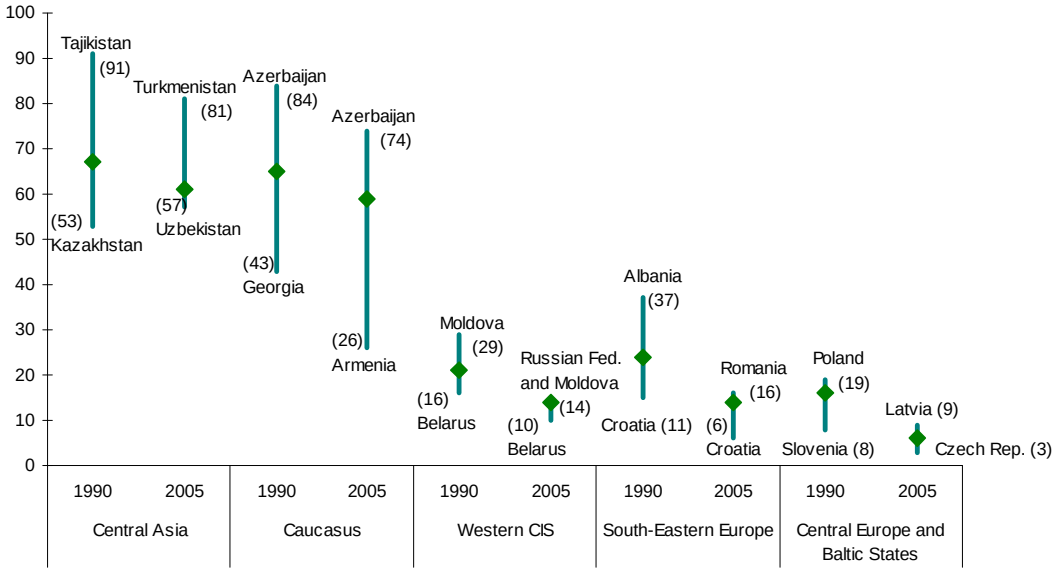
In 2005, Central Asia and the Caucasus had the highest IMR levels, 61 and 59 infant deaths per thousand live births respectively (compared with circa 65 per thousand in 1990), with the highest rates in Turkmenistan (81 per thousand) and the lowest in Armenia (26 per thousand, compared to 47 per thousand in 1990). New infant and child mortality estimates[36] should be available towards the end of 2007 for the majority of the countries in these two subregions, and these are expected to show further improvements in child survival.[37] However, it is also expected that the new data will re-confirm that this group of countries has by far the highest levels of infant mortality in the region, and that the differentiation between countries remains substantial.

[35]The statistics on IMRs and U5MRs used in this section for the individual countries of CEE/CIS are taken from the *State of the World's Children 2007* (UNICEF 2006b). The regional average IMR refers to all the countries of the region and has been obtained by weighting the IMR for individual countries using the data on the number of live births from the TransMONEE database 2007, and adjusted to take into account of the probable under-registration in Central Asia and Caucasus. Similarly, the estimates of the total number of infant deaths have been calculated by combining these two sources.

[36]These new infant mortality estimates will be derived from the 3rd round of the Multiple Indicator Cluster Survey (MICS). For more details see www.childinfo.org.

[37]See the speech by Maria Calivis, director of the UNICEF Regional Office for CEE/CIS and Baltics at the '10th Mother and Child Health Forum' held in Tashkent on the 2nd November 2006 (http://www.unicef.org/ceecis/media_5371.html)

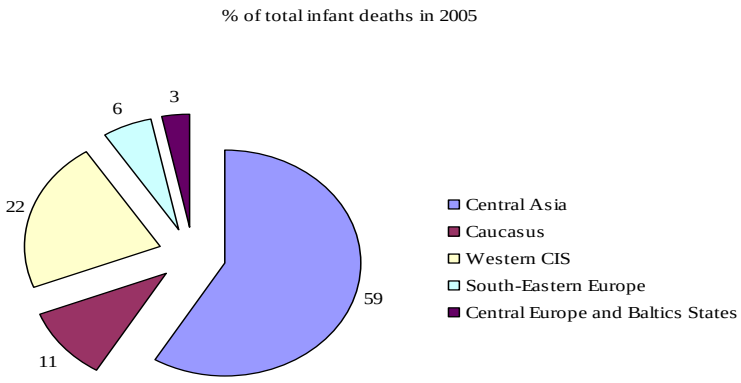
Figure 13: Estimates of infant mortality rates in CEE/CIS subregions (infant deaths per thousand live births)



Source: Authors' calculations based on data from UNICEF (2006b). See Table A2 in the Appendix for data on individual countries.

Note: The mark in the line for each subregion corresponds to subregional weighted average IMR: the averages have been calculated weighting by number of live births of the individual countries (data from the 2007 edition of the TransMONEE database) The number of live births have been adjusted for estimated levels of under-reporting.

Figure 14: Distribution of infant deaths in the CEE/CIS region, 2005 (per cent)



Source: Authors' calculations based on data from UNICEF (2006b) for mortality rates and from TransMONEE database 2007 for the number of live births.

Note: Percentages in the figure do not sum to 100 due to rounding. In 2005, 42 per cent of all live births in CEE/CIS occurred in the Western CIS, 26 per cent in Central Asia, 15 per cent in Central Europe and Baltic States, 12 per cent in South-Eastern Europe and 5 per cent in the Caucasus.

The 2005 figures for the Western CIS and South Eastern Europe subregions were very similar, close to 14 per thousand, with a high degree of homogeneity in infant mortality levels between countries. However, these average national estimates hide considerable variation within the individual countries, for example in the Russian Federation.[38] By 2005, the South-Eastern European countries had IMRs which were almost half of their 1990 levels, with Albania having the most significant reduction (from 37 to 16 per thousand), followed by the former Yugoslav Republic of Macedonia (from 33 to 15 per thousand). In the Western CIS, the estimates of IMR for the Russian Federation fell from 21 to 14 per thousand, while Moldova reported the best improvement, more than halving its 1990 level by 2005, from circa 29 to 14 per thousand.

Finally, the eight Central and Eastern Europe and Baltics countries which joined the European Union in 2004, have seen a decrease in their IMR from 16 infant deaths per thousand live births in 1990 to 6 per thousand in 2005, with Slovenia and the Czech Republic now recording levels which are among the lowest in the EU.

In absolute terms, these estimates mean that in 2005 approximately 59 per cent of the infant deaths in the CEE/CIS region occurred in Central Asia (Figure14), although this subregion accounted for circa a quarter of all births that year. In contrast, the Central Europe and Baltic countries accounted for 14 per cent of all births and 3 per cent of total infant deaths.

The picture for under-five mortality is quite similar to that for infant mortality.[39] Turkmenistan had the highest estimated U5MR in 2005, and the countries of Central Asia and Caucasus had the highest average U5MR and the least (relative and absolute) improvement on their 1990 levels. In 2005, on average, a child born in one of the countries of the Caucasus and Central Asia was ten times more likely to die before the age of 5 years, than a child born in Central Europe and the Baltic countries (compared to five times more likely in 1990).

Table 3: Estimates of the U5MR for the CEE/CIS subregions, 1990 and 2005 (probability of dying before reaching the age of 5, per thousand live births)

	1990	2005	Highest level of U5MR in 2005	Lowest level of U5MR in 2005
Central Asia	82	73	Turkmenistan (104)	Uzbekistan (68)
Caucasus	78	69	Azerbaijan (89)	Armenia (29)
Western CIS	26	17	Russian Federation (18)	Belarus (12)
South-Eastern Europe	28	16	Romania (19)	Croatia (7)
Central Europe and Baltic States	16	7	Latvia (11)	Slovenia (4)

Source: Authors' calculations based on data from UNICEF (2006b), and from the TransMONEE database 2007 for data on the under-five population.

Note: The subregion average U5MRs have been calculated by weighting the individual country U5MR by the number of live births, adjusted for estimated levels of under-reporting.

[38]UNICEF (2006a) p. 43.

[39]Infant deaths in the different countries represent between 75 and 85 per cent of all deaths of children under 5 years.

2.1.1. 'Harmonized' Estimates of Infant and Under-Five Mortality

The data on infant and under-five mortality rates reported in Figures 13 and 14, as well as Table 3, were based on the statistics published by UNICEF in the *State of World's Children 2007* and estimated using a methodology developed by the Inter-Agency Group for Mortality Estimations.[40] This methodology provides so-called 'harmonized' estimates, which combine and use all available estimates of infant and under-five mortality rates from different sources (civil registration systems, census data, and surveys) and, based on an assessment of the quality of the data from each source, attempt to minimize the errors incorporated in each estimate and to harmonize trends across time.[41]

These 'harmonized' estimates for the CEE/CIS region are based on the statistical information available at the end of 2006. For some countries they are derived by extrapolating trends from statistics on mortality rates derived from different sources, which however give more weight to data from demographic surveys. But in some countries these surveys were carried out more than five years earlier (for example, the last survey data available for Turkmenistan are those from the Demographic and Health Survey conducted in 2000).[42] New mortality estimates from surveys for 12 countries in CEE/CIS should be available towards the end of 2007, and will allow the regional picture of childhood mortality to be updated, especially for those countries with the highest infant and under-five mortality levels.[43]

These new estimates will be derived from the 3rd round of the Multiple Indicators Cluster Surveys (MICS). The MICS is a household survey program developed by UNICEF to assist countries in filling gaps in monitoring the situation of children and women. Around 50 countries conducted MICS in 2005-2006, including the following countries in the CEE/CIS region: Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan and Turkmenistan (Central Asia), Georgia (Caucasus), Belarus and Ukraine (Western CIS) and Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro and Serbia (South-Eastern Europe). Only estimates for Tajikistan derived from MICS3 data are included in the calculations presented in this paper. New data for Azerbaijan and Ukraine will also be available shortly, once the results from DHS surveys carried out in 2006 and 2007 have been processed.

2.2. Monitoring Infant and Child Mortality in CEE/CIS

As explained above the infant and child mortality estimates for the region cited in the previous sections are derived from three sources, namely national civil registration systems,

[40]Besides UNICEF, this Inter-Agency Group includes also WHO, the World Bank and the UN Population Division.

[41]Hill, Rohini, Mahy and Jones (1999).

[42]For a discussion on the validity and limitations of extrapolation models, and in general on estimates of child mortality produced by international agencies, see Child Mortality Coordination Group (2006). This methodology has recently received considerable attention in an article authored by Murray et. al. and published in *The Lancet* (Murray et al. 2007). The issues raised in the article pertain in particular to U5MR. The discussion in the current paper remains valid.

[43]The final MICS 3 report for Uzbekistan, for example, shows for this country an infant mortality rate of 48 per thousand for 2006 (UNICEF and State Statistical Committee of the Republic of Uzbekistan, 2007, pp.25-27), while the corresponding figure published in UNICEF (2006b) for 2005 was 57 per thousand.

surveys and census data. The reliability of these sources is frequently questioned. In particular, official statistics based on civil registration data in several countries of the CIS and SEE are thought to underestimate the scale of the problem.[44] There are two main reasons for this: the first is related to the use of the Soviet – rather than the internationally-accepted World Health Organisation (WHO) definition of live births; and the second concerns the under-registration and misreporting of infant deaths. Each of these factors undermines the reliability of the registration system and thus official statistics.

Surveys are used as a complementary source to the official administrative data to assess progress in improving infant and child survival rates, and also to help evaluate the reliability of mortality data derived from the civil registration systems. However, mortality estimates computed from surveys are themselves not above criticism. Concerns about the accuracy of such estimates arise partly due to the representativeness of survey samples, or decisions on which age groups of the female population to question.[45] Limited sample sizes mean that it is also difficult to capture rare events like infant deaths, especially in countries with low fertility levels. Moreover, estimates derived from surveys tend to have large confidence intervals, often refer to 5 or 10-year periods (which are too long to judge the sensitivity of infant and child mortality to economic or policy changes) and do not permit sub-national analysis, except for large sub-categories (e.g. by urban or rural residence). The reliability of estimates derived from survey data can also be negatively affected by non-sampling errors; for example, the retrospective interviews used to collect information on births and child deaths can be affected by misreporting of dates and ages, or even non-recording of infant deaths or miscarriages, especially when there are long recall periods.[46]

While it is recognized that survey-based data are not the definitive solution, the use of surveys to complement statistics from the civil registration systems can provide a useful countercheck on the quality and reliability of the latter. Figure 15 compares the infant mortality rates derived from the national civil registration systems[47] with estimates from the Inter-Agency Group for Mortality Estimates. The latter are heavily weighted in favour of survey data, especially in the case of the Central Asian and Caucasian countries and Albania, although in only a few cases – namely Armenia, Moldova and Tajikistan – were the surveys conducted within the last 2-3 years.

The countries of Central Asia and the Caucasus show the highest absolute differences between civil registration data and the model's estimates. But some countries in South-Eastern Europe and the Western CIS, with lower average infant mortality levels, also show important discrepancies: for example in Albania and Bosnia and Herzegovina the rates

[44]See Aleshina and Redmond (2005) and UNICEF (2003).

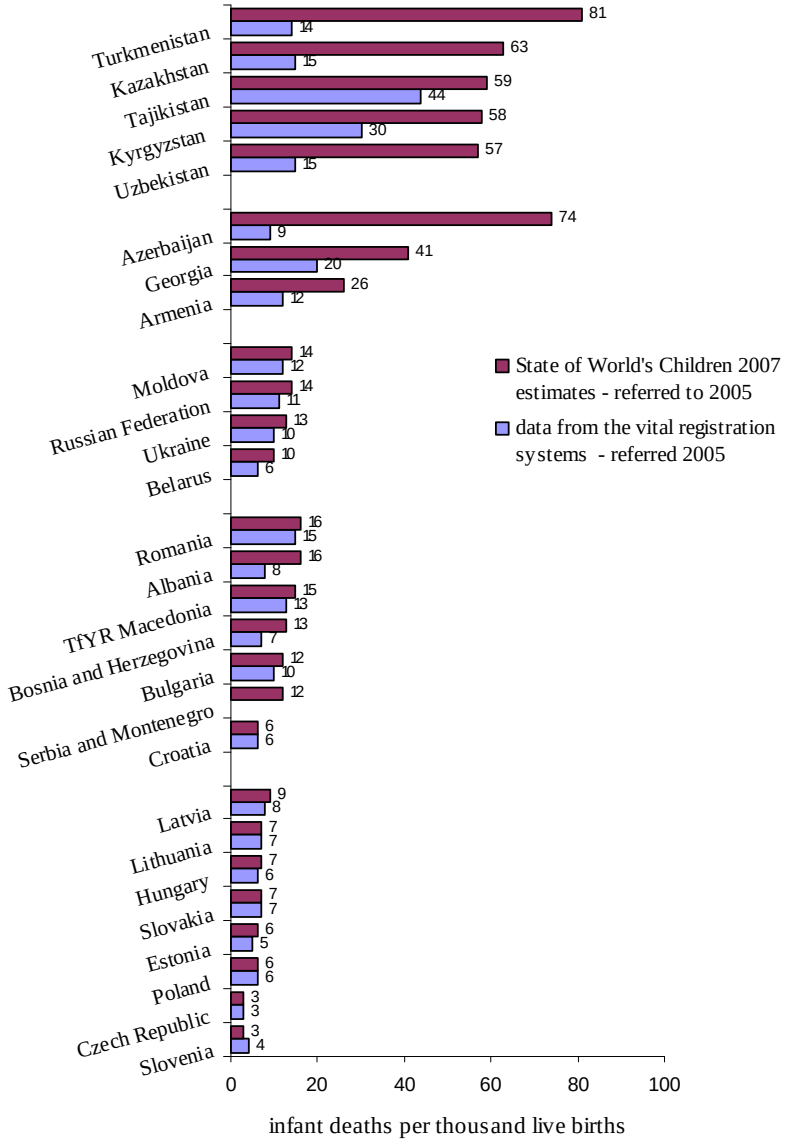
[45]For example, the DHS collects information from women aged 15-49 and excludes older women who could have given birth during the period of analysis. Moreover, children can be excluded from the sample selection because of the premature death of their mothers.

[46]For example, the analysis of the infant mortality data obtained from the Moldovan DHS carried out in 2005 seems suggest some degree of underreporting for neo-natal mortality as argued in National Scientific and Applied Centre for Applied Medicine [Moldova] and ORC Macro (2006) p. 104.

[47]These data are reported by the National Statistical Offices to UNICEF IRC and presented in the TransMONEE database.

derived from the vital registration systems are almost half of the rates computed using the model, and circa forty per cent in Belarus.

Figure 15: Comparison between the infant mortality rates from vital registration systems and UNICEF estimates

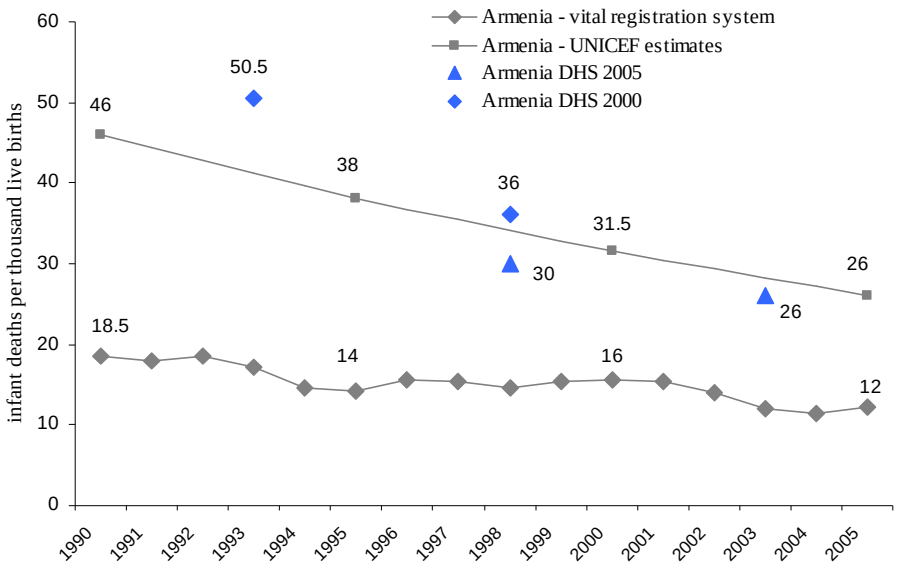


Source: The State of the World's Children 2007. Estimates for 2005 are from UNICEF (2006b) and are derived using the model developed by the Inter-Agency Group for Mortality Estimates. Most of the data for the Central Asian and Caucasus countries are based on extrapolation of trends, which draw largely on the results of surveys carried out at the end of the 1990s/early 2000s. The new set of estimates derived from MICS3 will most likely show less difference between the model's estimates and official estimates. UNICEF estimates for Tajikistan, Armenia and Moldova are based on results from surveys carried out in 2005.The data from the vital registration systems are taken from the TransMONEE database 2007. See tables A1 and A2 in the appendix for more data from these two sources on the individual countries.

Note: TransMONEE data for Turkmenistan refer to 2004, for Tajikistan to 2003. The European Health for All Database (accessed on 15 March 2007) reports IMRs of 8 per thousand for Serbia and 10 per thousand in Montenegro for 2005 (see www.euro.who.int).

To illustrate the discrepancies, their size and how they have changed over time, figure 16 shows how the IMRs derived from civil registration records and the model's estimates[48] evolved in Armenia in the period 1990 to 2005. The distance between the two data series decreases but remains substantial, with the rate estimated for 2005 using the model still being more than double the official rate provided by the Armenian National Statistical Service and derived from civil registry data.

Figure 16: IMR trends in Armenia from different sources (infant deaths per thousand live births)



Source: Civil registry data are from the TransMONEE database 2007, UNICEF estimates are from: UNICEF (2006b), DHS estimates are from National Statistical Service [Armenia], Ministry of Health [Armenia], and ORC Macro (2006).

2.2.1. Child Mortality Data from Vital Registration Systems: Many Challenges Remain

The discrepancies between data from civil registration systems and estimates based on survey data illustrated above have given rise to concerns regarding the reliability and international comparability of infant mortality data from the national official registration systems in some countries of the region, especially in Central Asia and the Caucasus.[49] These differences are not highlighted in order to show that survey data are necessarily better or superior to administrative data. They are cited to show that there are good reasons to pay attention to the quality of routine official statistics in the region. A long term solution is not to replace official administrative statistics with surveys; rather that the former have to be improved to provide a reliable and regular source of information on child survival. Without a reliable civil

[48]The figure report also direct estimates of IMRs from the Demographic and Health Surveys carried out in Armenia in 2000 and in 2005. The survey estimates refer to a 5-year period, and the estimate is actually that for the middle year of the period, e.g. the estimate reported as 2003 refers to the period 2001-2005.

[49]For a general discussion and for more references see UNICEF (2003).

registration system, policy makers and analysts lack a regular source of up-to-date information on infant and child mortality. This in turn means that they do not have a sound basis for evaluating the effectiveness of current policies, the quality of health management and provision of care; or for identifying challenges and inequalities, and drawing up appropriate policy measures and actions to tackle them.

2.2.2. Live Birth Definition: Not Just a Statistical, but also a Rights Issue

Although most countries in the region have now officially adopted the WHO definition of live births, in practice different definitions are still in use, especially in the CIS. The WHO defines 'live birth' as "the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life: each product of such a birth is considered live-born".[50]

The Soviet definition of live birth differs in two crucial respects. Firstly it considers the presence of breathing to be the only criteria to establish if infants are born alive; and secondly it defines as 'live foetuses' (as opposed to 'live births') infants born before the completion of 28 weeks of gestation, or who weigh less than 1,000 grams, or who are less than 35 centimetres in length. These live foetuses are registered as live births only if they survive more than seven days. As a result, use of the Soviet definition leads to a lower number of deaths being registered than would be the case if the WHO definition were used, due largely to the fact that many deaths occurring within the first 7 days are not counted: they are not classified as live births in the first place, and the loss of the foetus is registered as a stillbirth or miscarriage. The death is not registered, because officially the product of conception never existed beyond the 'foetus' stage.[51]

The fact that these infants have no status in the first 7 days can influence the type of neonatal care provided and the priority given to applying, for example, intensive resuscitation care protocols. In practice the Soviet definition creates disincentives to health care workers and managers and has a negative effect on the survival chances of pre-term newborn. Use of the Soviet definition can also lead to misguided decisions for public policies on priority interventions to reduce infant mortality, and consequently to inefficient resource allocation. A study[52] of one region in Kazakhstan in 1996 showed that use of the Soviet definition meant that a very high share (67 per cent) of infant deaths were considered as connected with infant health care, while only a small part (10 per cent) was directly connected to maternal health status. As a result the overwhelming share (92 per cent) of the health budget for maternal and

[50]The WHO further recommends that all foetuses and infants weighing at least 500 grams, whether alive or dead, should be included in national statistics; but that this should be done in such a way that they can be easily identified as a group. It also recommends that the extremely low-birth-weight group (i.e. those with a birth weight lower than 1,000 grams) are not included in any statistics used for international comparison; or if included, that there is an explicit explanatory note. WHO (2006) p.6.

[51]For estimates of the impact on infant mortality rates of the switch from Soviet to WHO definition in Estonia, Latvia, Moldova and Poland, see Aleshina and Redmond (2005), Table 3. Wuhib et al. (2003) reported an IMR of 32 per thousand using the Soviet definition for the Zhambyl Oblast in Kazakhstan in 1996, compared to 58.7 per thousand according to WHO definition.

[52]Wuhib et al. (2003).

child health interventions in the region was allocated for measures to improve infant care. Use of WHO definitions, on the other hand, showed that the majority of infant deaths were connected to care at the neonatal stage (41 per cent of all infant deaths), followed by infant care (35 per cent). A substantial share was also linked to maternal health (24 per cent). These results suggest that more effort and resources should have to be directed towards improving maternal health (an important factor influencing birth weight) and the care and standards provided at delivery, rather than concentrating exclusively on infant care.

While in most South-Eastern European and Central European countries the formal adoption of the international definition of live birth pre-dates the onset of the transition period, in the Baltic, Western CIS and Caucasus countries the legal changes required for the adoption of the new criteria were approved in the 1990s (in Azerbaijan in 2001). Central Asian countries adopted the WHO definition progressively during the 2000s, the last one being Turkmenistan, which announced the adoption at the end of 2006. But, even when officially adopted, the implementation of the new criteria has proved difficult to achieve. In many countries the WHO definition has been introduced on a pilot project basis, and it will take many more years before it can be introduced on a national basis.

The full implementation of the new rules and protocols surrounding the registration of live births also slows down the process. For example, Armenia introduced the WHO definition for registration in medical documents with a decree of the Ministry of Health in 1994, but approved and introduced new norms and instructions for its full implementation in the registration offices only at the end of 2005.[53] And slow adoption and implementation is not limited to the CIS: the national statistical office in Bulgaria, for example, is also still using a definition (adopted in 1970) which has many elements in common with the Soviet one.[54]

The process is complicated further by the fact that there are two sets of administrative data collected on infant and child deaths: one set is 'sectoral' data collected by the Ministries of Health on the basis of hospital records entered by medical staff, and the second set is the data recorded by the civil registration systems, based on the registration by parents of the infant's or child's birth and death at the local civil registration office. In some cases, the WHO definition has been adopted only for the registration in medical documents, while the civil registries continue to use a definition close to the Soviet one. In the Russian Federation, for example, the Ministry of Health issued a decree in 1992 which introduced the new definition of live births for medical records, and which refers to any product of conception with a birth weight above 500 grams, which breathes or shows any other evidence of life.[55] However, for the purposes of civil registration, the definition of live birth is limited to newborns with a birth weight above 1,000 grams (or, if the weight is unknown, who are more than 35 centimetres in length, and are born after 28 weeks of gestation), while newborns weighing

[53]National Statistical Service [Armenia], Ministry of Health [Armenia], and ORC Macro (2006), pp.104-5.

[54]If the foetus weighs less than 1000 grams it is recorded as a live birth only if it lives for at least 6 days. See http://www.nsi.bg/Population_e/Population_e.htm. Carlson and Tsvetarsky (2000) report some statistical evidence on the implication of the adoption of this 'live birth' definition in Bulgaria in the early 1990s.

[55]But with restrictions if the child is born before 28 weeks of gestation are completed. See Aleshina and Redmond (2005) p.43.

from 500 to 999 grams are registered only if they survive 168 hours (7 days) after birth. Such dual criteria are also found in Moldova.

As noted above, IMRs are also used more broadly at the national and international level as a measure of social and economic development. An increase in IMR following a change in definition could therefore be misinterpreted as a backward trend in the country's development. For this reason, Ministries of Health may fear repercussions due to lack of understanding of the need for the new criteria and its implications at higher political levels. In Kyrgyzstan, for example, the Ministry of Health issued initial instructions for the adoption of the WHO definition in 2002, and actual implementation began in 2004. This led to an increase in official IMR estimates from 20.9 per thousand in 2003, to 25.7 per thousand in 2004, and to 29.7 per thousand in 2005, with the upward changes reflecting, mainly the transition to the internationally accepted definition of live birth.[56]

Introduction of the new definition can also have fiscal implications, since mothers who may not have been entitled to maternity leave and benefits using the Soviet definition (since their babies were registered as miscarriages), may acquire more rights to social security. These costs have to be planned for, and appropriate changes made in labour and social security legislation.

2.2.3. Reliability of Registration: Underreporting and Misreporting of Infant Deaths

The slow introduction of the WHO live birth criteria is not the only reason for the marked discrepancy between infant mortality data derived from the vital registration systems and the estimates derived from surveys. In some parts of the region, there are disincentives for the registration of births and infant deaths by parents and/or medical staff.

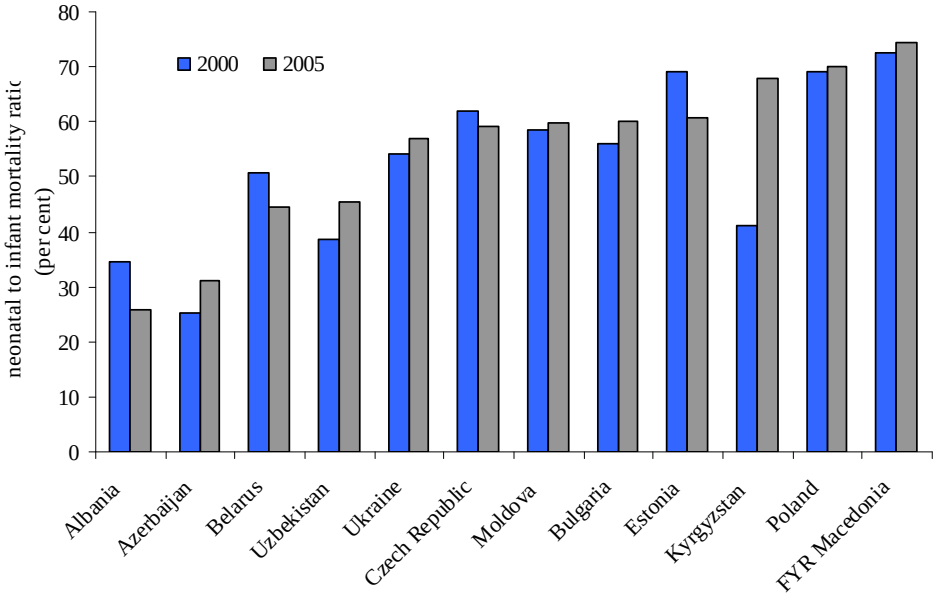
Evidence of the scale of under-registration can be found by looking at the ratio of the number of deaths occurring in the first 27 days after birth (neo-natal deaths) to the total number of infant deaths.[57] Figure 17 reports the values of this indicator, based on civil registration statistics from selected CEE/CIS countries in 2000 and 2005. The ratios for Central Asian and Caucasus countries and Albania are abnormally low (below 50 per cent – whereas the norm for countries with similar levels of IMR would be at least over 50 or 60 per cent), suggesting an under-estimation of neonatal mortality, and consequently also of infant mortality rates. Even countries such as Belarus, with low official levels of IMR (6 per thousand), report a lower-than-expected ratio of neonatal deaths to infant deaths, suggesting again some under-registration of the former. The change from a relatively low ratio (circa 40 per cent in 2000) to a relatively high ratio (slightly less than 70 per cent in 2004) in

[56]Preliminary data from the Ministry of Health of Kyrgyzstan for the first 6 months of 2006 show that slightly more than 15 per cent of all registered infant deaths are children whose weight at birth ranged between 500 and 999 grams, and that 98 per cent of these deaths occurred in the early-neonatal period (first 7 days of life). Using the Soviet criteria, these births would not be classified as live births. 13 per cent of infant deaths are infants weighing 1,000-1,499 grams and 26 per cent of infants weighing 1,500 – 2,499 grams. According to these data the registered early neonatal mortality increased from 8.5 per thousand live births in 2003 to 18.3 per thousand in 2006, with the highest level recorded in Bishkek city (24.3 per thousand). (Information supplied by the Kyrgyzstan UNICEF country office, March 2007).

[57]This may also reflect the use of a more restrictive live birth definition than the WHO one.

Kyrgyzstan reflects recent improvements in the registration system, but also the implementation of WHO criteria for defining live births in 2004.[58]

Figure 17: Ratio of neonatal to infant mortality in selected countries, 2000 and 2005 (per cent)



Source: Elaboration of data from TransMONEE database.

Note: the 2000 figures for Ukraine and Uzbekistan refer to 2001; the 2005 figure for Kyrgyzstan refers to 2004. Countries are ranked by ratio levels in 2005.

Disaggregation of IMR data by urban and rural areas and by sub-national entities sheds further light on under-reporting in the civil registration systems. In Uzbekistan, for example, the official data on infant mortality suggests that children in urban areas have a substantially higher risk of dying before their first birthday than children in rural areas. This result is the exact opposite of that obtained from the Uzbek Health Examination Survey in 2002. Moreover, civil registration statistics show that the IMR for Tashkent city is one of the highest in the entire country, although it is the richest part of the country, with an extreme poverty rate of 4 per cent compared, for example, to 43 per cent in other urban areas.[59] In this case, it seems more likely that either registration procedures are stricter or easier in Tashkent city compared to other regions of the country, and probably that infants admitted to hospitals in the capital from areas outside Tashkent are recorded as deaths in Tashkent city.

[58]UNICEF (2003, pp. 39-40) drew attention also to the abnormally high, and in some cases growing, ratio of stillbirths to early neonatal deaths in Ukraine, Turkmenistan and Georgia in the late 1990s, pointing to an increasing mis-classification of neonatal deaths as stillbirths.

[59]Poverty estimates based on the $PPP 2.15 per day poverty line, see World Bank (2005a) page 244.

Table 4: IMR in the provinces of Uzbekistan (infant deaths per thousand live births)

	IMRs from the civil registration system – 2004			
	urban	rural	total	rural/urban ratio
Republic of Uzbekistan	18.9	13.8	15.4	0.73
Rep. of Karakalpakstan	22.0	15.2	18.4	0.69
Andijan province	20.2	11.8	14.0	0.58
Bukhara province	16.5	13.2	14.0	0.80
Djizzak province	11.1	12.3	12.0	1.11
Kashkadarya province	14.3	13.9	14.0	0.97
Navoi province	16.2	10.2	12.6	0.63
Namangan province	17.1	12.5	14.0	0.73
Samarkand province	12.0	12.2	12.2	1.02
Surkhandarya province	16.1	10.8	11.6	0.67
Syrdarya province	17.4	18.4	18.1	1.06
Tashkent province	16.8	15.0	15.6	0.89
Ferghana province	23.1	19.2	20.1	0.83
Khorezm province	26.9	14.8	17.1	0.55
Tashkent city	22.6	-	22.6	

IMRs from Uzbekistan Health Examination Survey (2002) 1992 – 2002				
	Urban	rural	Total	rural/urban ratio
Uzbekistan	42.9	74.6	62.6	1.74

Source: IMRs from the civil registration system are from UNDP Uzbekistan (2006a); IMRs from UHES 2002 are from Analytical and Information Center, Ministry of Health of the Republic of Uzbekistan, State Department of Statistics, Ministry of Macroeconomics and Statistics [Uzbekistan], and ORC Macro (2004).

The factors behind the under-recording or mis-recording of infant deaths can be various, some of them specific to the individual country. For example, if the infant survives its stay in hospital, it is the parents who are responsible for registering the birth (or later death) with the civil registry system. But parents are sometimes discouraged from registering births and deaths due to the costs involved ─ either registration fees, or transport costs, especially for those living far from the local registry offices.[60]

Hospitals on the other hand are responsible for registering deaths (or stillbirths) which occur before the mother leaves the hospital. Mis-reporting on the part of hospital staff may be voluntary or involuntary. The fact that IMR was traditionally used in the Soviet period as an indicator to judge the performance of medical facilities has encouraged under-reporting or mis-reporting on the part of medical staff, who wish to keep the numbers of deaths as low as

[60]Survey estimates for 2005 in Tajikistan report that 88 per cent of children aged 0-4 have been registered (82 per cent for those under 1 year, 92 per cent for those 4 years old). Among those children whose births have not been registered, the main cause of non-registration was the cost. Lack of supporting documents, lack of knowledge about birth registration and travel distance were also important factors explaining non-registration. See Tajikistan State Committee on Statistics (2006) p.31.

possible, due to fear of punitive actions. Another strong incentive to mis-report, and also not to provide timely neonatal care, is the fact that, in some parts of the CIS, all deaths in hospitals can be investigated by the judiciary as criminal acts. In other parts of the world, the judiciary is normally involved only when there is a suspicion of gross negligence. Health care providers therefore prefer to report neonatal births as still births, and have little incentive to do their best to save a pre-term newborn who may die later (after 7 days). The incentive is therefore to try to detract from the problem by, for example, retaining the Soviet definition, and reporting neonatal deaths as stillbirths.[61]

Involuntary mis-reporting occurs when medical staff have insufficient training to know how to complete the necessary documentation on the infant death. In most countries of the region, births attended by qualified health personnel are the norm, yet the most common causes of infant deaths are asphyxia and birth injuries (rather than low birth weight). This suggests that there are in fact often problems with the quality of care provided, due to management and technical problems. Improved medical training in the necessary skills for resuscitation and intensive therapy measures for newborns is required. The introduction of the WHO definition has to be accompanied by basic training in recognizing low-weight pre-term births as live births, and promoting awareness of when to intervene to prevent some factors contributing to mortality, for example, hypothermia. In some countries there is a shortage of working equipment to deliver such intensive care, and of staff trained in the correct use and maintenance of the equipment.[62]

However, such training and equipment will not work if the incentives for health workers and health managers to provide intensive care are lacking, or if health personnel cannot be held accountable for the treatment provided in the health facilities. Training of health care workers, increases in their material and other incentives, has to be accompanied by an increase in the rights of parents. While medical staff should not fear that the registration of infant deaths will reflect badly on their performance ─ or that their performance will be judged solely on this criteria ─ neither should they be completely absolved from responsibility for the care which they provide. Parents have to know that they have legal rights to demand certain standards of care, and that these rights can be upheld.

In fact the two factors ─ use of the Soviet definition of live birth, and under-recording or mis-recording of infant deaths ─ contributing to the underestimates of IMR are linked. Use of the Soviet criteria for the definition of live births influences the extent to which these events are or can be under-reported by the medical staff who attend them, and consequently the numbers quoted in official statistics. The fact that health staff often fear the use of IMR to evaluate their performance, means that they prefer the Soviet definition, which gives them more flexibility in classifying infant births as stillbirths or miscarriages.

[61]See for example, UNDP Uzbekistan (2006b).

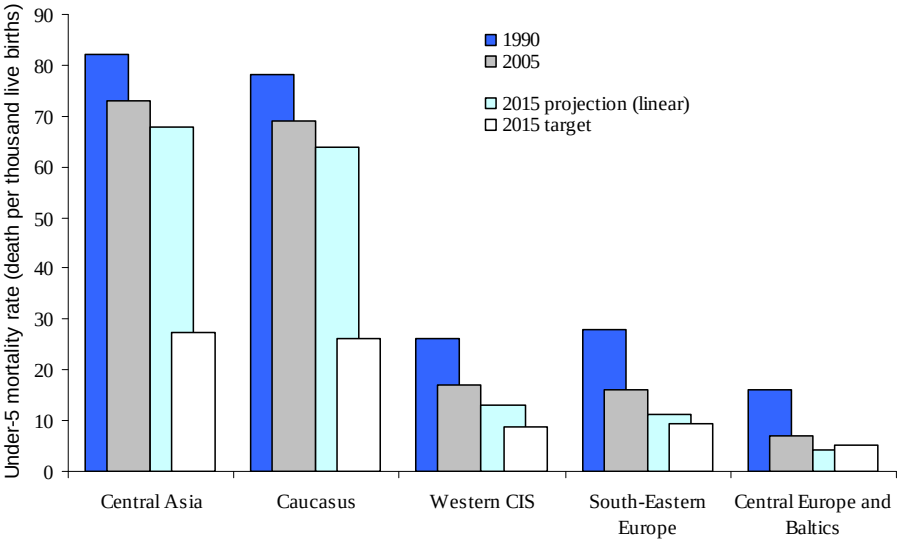
[62]In general, there is also a need to move away from over-medicalisation of neonatal care, and to give more priority to simpler cost-effective interventions.

2.3. Are CEE/CIS Countries on Track to Meet the Goal of Reducing the Under-5 Mortality Rate by Two Thirds By 2015?

The continuing difficulties in arriving at reliable estimates of the levels of infant and child mortality for most countries in the region present in turn considerable challenges in evaluating progress of these countries towards achieving MDG 4. The task of setting meaningful baselines for 1990, quantifiable time-bound targets for 2015, and evaluating progress towards achieving these targets is complicated by the fact that many national baselines and targets are based on the official data derived from civil registries, which are most likely to underestimate the scale of the problem for the reasons set out in the previous section.[63] Monitoring trends since 1990 and evaluating progress towards achieving MDG 4 by 2015 using administrative data will moreover also be influenced by the progress made by the countries in implementing internationally accepted definitions of live births. As was shown by the example of Kyrgyzstan, adoption of new definitions may lead to a higher but more accurate estimate of mortality rates. This progressive step towards achieving a better understanding of the scale of the problem could easily be misinterpreted as lack of progress in achieving the goal of reducing child mortality.

The estimates of the Inter-Agency Group model, based on information from sources available at the end of 2006 (see section 2.1.1 above) are used here (in figure 18) to show the average 1990 and 2005 U5MR for the CEE/CIS subregions, and to evaluate the progress being made by countries towards achieving MDG4. The target for 2015, as with the global MDG 4 target, is set at one third of the 1990 estimated average value.

Figure 18: Levels of U5MRs in the subregions of CEE/CIS, 1990 and 2005 and MDG4 target



Source: Authors' calculations based on data from UNICEF (2006b) for estimates on individual countries U5MRs, and from TransMONEE database 2007 for data on live births used to calculate weighted subregional averages. Note: 2015 targets are set at one third the 1990 U5MR value. The '2015 projection' is calculated assuming that the subregions will register the same rate of progress (linear) which they experienced during the period 1990-2005.

[63] UNDP (2006)

According to these estimates, the two subregions with the highest under-five mortality levels, Central Asia and in particular, the Caucasus, show very slow and inconsistent improvements, with some countries reporting progress in the early 1990s and stagnation or slight deterioration in the following period. Unless there is a marked acceleration in progress, they are unlikely to meet the target of reducing the U5MR by two thirds by 2015. Yet, within these two groups, the situation is quite heterogeneous, with Armenia, for example, on track to attain the target if it keeps the same rate of progress achieved in 1990-2005.

The Western CIS countries need to improve the pace of improvement in order to accelerate U5MR reduction if they want to achieve the two thirds reduction by 2015, (from the 1990 level of 26 to the target level of 9 per thousand): the slow improvement in this subregion is largely due to the lack or slow progress in the Russian Federation and Ukraine. South-Eastern European countries are on the whole well-positioned to meet the target reduction by 2015, with the exception of Bulgaria, where the decline in the U5MR during 1990-2005 was very slow.[64]

Finally, Central Europe and the Baltic States as a group registered the most rapid pace of improvement in the region, and are already close to achieving the target reduction. In fact, the Czech Republic has already attained the two thirds reduction of its U5MR while Lithuania and Latvia still require an acceleration in the rate of improvement to fully compensate the delay due to the deterioration in mortality rates in the early 1990s.

CONCLUSIONS

Section 1 of this paper has shown that the Western CIS and CEE countries have gone through particularly striking demographic changes in the last 15 years, which have been driven by several factors, but mainly by falls in TFRs. Fertility rates are now well below replacement levels in several countries, and there is a growing awareness of the long term impact of these trends on children, both in their childhood years and in their adult lives. Today's shrinking cohort of children will have to support a large elderly population once they reach working age. This large elderly population will also require increasing shares of public expenditure for pensions, health care and other social support, which could put pressure on resources to be redirected from child health and education expenditure.

While some of the drop in TFRs can be explained by the social and economic insecurities of the transition, there is some evidence that it is also due to changes in the preferences of women and couples. For this reason, the recent economic revival can likewise not be taken as a guarantee of a sustainable recovery in fertility rates and natural population increase. Low fertility rates have been found in several western European countries since the 1980s, in a period of economic and social growth and stability. For example, West Germany registered a TFR of 1.4 in 1980, and Italy 1.7. In the 1990s, these two countries as well as Austria, Greece and Spain reached the lowest low fertility mark. Changes in societal attitudes and personal preferences, as well as the nature and extent of state support to families, also play key roles in

[64]In Bulgaria, rates rose during the first part of the 1990s, reached a peak in 1977, after which there was a period of slow decline or stagnation. The increase in infant and child mortality during the 1990s occurred in a context of rapid drop in fertility rates, where the proportion of low and very low weight births in total births increased substantially. See Carlson and Tsvetarsky (2000).

driving down fertility and birth rates.[65] Some of the countries in the region, like their western neighbours, face major challenges in meeting the needs a growing elderly population with decreasing working age cohorts. In the short term, some of these challenges may be met through labour migration, but the literature on migration and development provides convincing arguments to suggest that immigration alone does not represent a sustainable strategy to address population ageing and rapidly growing old-age dependency ratios.

The challenge for the low-fertility countries remains that of revitalizing birth rates. Public policy can play an important role in removing material disincentives to couples considering having children. Policies should be designed not only to provide financial support, but also public services and infrastructure to support families, as well as measures to help women combine child bearing with participation in the labour market.[66] It is also important that the countries of the region realise how important it is to invest in the current generation of children and young people. Today's younger generations will be the ones who will have to deal with the consequences of growing imbalances in the demographic structures of their countries, and will have to be well-equipped to cope with increasing old-age, but possibly also young-age dependency ratios.

Apart from providing support to families, several countries in the region, particularly in the Central Asian and Caucasian subregions, but also in the Western CIS, still have to work on improving the quality of care provided to infants, both prenatal and postnatal. Section 2 drew attention to the very diverse levels of child mortality rates in CEE/CIS countries. There are also striking differences in the recorded causes of mortality, with infectious and respiratory diseases being more common in those countries with higher levels of mortality, and perinatal condition and congenital problems contributing to a higher share of infant deaths in countries with intermediate and low levels. This suggests that different levels and different causes of child mortality may require different strategies to achieve reductions. Provision of adequate care at all stages, including in the prenatal period, is fundamental, as is moving away from widespread practices of over-hospitalization and over-medicalisation.

In Central Asia and the Caucasus more targeted interventions to reduce deaths due to infectious, respiratory and neonatal diseases could significantly improve children's survival chances. Official data show that immunization coverage is over 95 per cent in Central Asia and between 90 and 95 per cent in Caucasus,[67] but there are also reports of problems with the 'cold chain' (storage and distribution of vaccines), incomplete coverage and late immunization of children in some countries.[68] Improving child survival in rural areas is fundamental to increase the rate of progress in reducing mortality and tackling disparities. Further investments are required to introduce or strengthen antenatal and neonatal care (in order to tackle perinatal pathologies), to improve the standards and quality of care in maternity facilities, and to establish transparent mechanisms for holding providers

[65]Kohler, Billari and Ortega (2002).

[66]For a review of the policies designed to provide support to families with children (i.e. provision of family allowances, preschool services and parental leave) in South-Eastern Europe and the Commonwealth of Independent States, see Stewart and Huerta (2006).

[67]TransMONEE data.

[68]UNICEF and WHO (2007).

accountable for the care provided in public health care systems.[69] Actions aimed at supporting health education and at reducing exposure to risks and addressing malnutrition should also be part of the strategy. For this group of countries long term support from the international donor community remains important to reduce the main contingent of child mortality, i.e. deaths occurring in the first days after delivery.

In the Western CIS and South-Eastern European countries, improvements in neonatal care – especially for low weight newborns ─ and efforts to reduce sub-national disparities, both geographical and by population groups, and increase the quality of care in the most disadvantaged areas are needed in order to achieve a further reduction in mortality rates. In Russia in 2003, for example, the official IMR was circa 28 per thousand in the Republic of Tuva compared to circa 8 per thousand in Saint Petersburg city and circa 10 per thousand in Tyumen oblast.[70] In some South-Eastern European countries Roma infants are at particular risk: for example in the Sliven and Montana regions of Bulgaria, two regions with high shares of Roma in their populations, have official infant mortality rates of respectively circa 28 and 23 per thousand, compared with the national average of circa 12 per thousand.[71] Similarly, in 2005 the IMR for Roma children in Roma settlement in Serbia was 25 per thousand[72] compared with a national average circa 8 per thousand.[73] Improved access to good quality antenatal, delivery and neonatal care, and also paediatric services, especially for rural residents and Roma, need to be prominent in national strategies to improve child survival.

Overall, reducing infant and child mortality in the region requires investments to maintain, improve the quality and, in the poorest countries, also to build health infrastructure, as well as improvements in staff training, quality of care, health management, and the creation of clear channels through which users can demand accountability from providers. It also requires resources to improve the quality of the environment in which the child grows and a strategy to guarantee inclusion of the most vulnerable, those living in rural areas, the poor and those belonging to disadvantaged ethnic minorities. Community and family level care in common childhood illnesses also have to be improved, through more promotion of exclusive breastfeeding practices, improving infant and young child feeding practices and improving ORT use rate. All of these can contribute to a reduction in child malnutrition, which is the underlying cause of an important share of under-five deaths. For prevention of deaths in the 12-48 month age group, there is also a need to adopt measures aimed at improving the prevention of intentional violence and non-intentional injuries (accidents at home and on the road), and access to quality emergency and non emergency paediatric care.

But underpinning all such measures, there is a need for effective and reliable monitoring of infant and child mortality, based on improved civil registration systems, in order to draw attention to these problems, and monitor successes in combating them. Complete implementation of the international standard definition of live births would likewise provide

[69]In Armenia, for example, important reductions in the IMR have been obtained mainly with the improvements in primary health care interventions. See Hakobyan et al. (2006).

[70]UNICEF (2006a).

[71]Georgieva et al. (2007), pp. 9-13.

[72]Statistical Office of the Republic of Serbia, Strategic Marketing Research Agency and UNICEF (2007).

[73]Data from the European Health for All Database (www.euro.who.int, accessed on 15 March 2007).

medical staff with clear rules, guidelines, and protocols, and incentives to maximize efforts to save the lives of premature and very low birth-weight infants. Both improved monitoring and full introduction of the standard definition of live births could make a significant contribution towards guaranteeing children's right to survival.

References

Aleshina, Nadezdha and Gerry Redmond (2005) 'How High is Infant Mortality in Central and Eastern Europe and the CIS?', *Population Studies*, vol. 59 (1), pp. 39-54.

Alexandrescu, Aura-Mihaela (2005) 'Why Fertility Should Become a Matter of Public Concern in Romania' paper presented at the Joint Eurostat-UNECE Work Session on Demographic Projections, Vienna, 21-23 September 2005.

Analytical and Information Center, Ministry of Health of the Republic of Uzbekistan, State Department of Statistics, Ministry of Macroeconomics and Statistics [Uzbekistan], and ORC Macro (2004) *Uzbekistan Health Examination Survey 2002*, Analytical and Information Center, State Department of Statistics and ORC Macro, Calverton.

Avdeev, Alexandre (2001) 'The Extent of the Fertility Decline in Russia: is the one-child family here to stay?' paper presented at the IUSSP Seminar on International Perspective on Low Fertility: Trends, theories and policies, Tokyo, March 2001.

Barkalov, Nicholas B. (2005) 'Changes in the Quantum of Russian Fertility During the 1980s and Early 1990s' *Population and Development Review*, vol. 31(3), pp. 545-556.

Blum, Alain, and Cécile Lefèvre (2006) 'After 15 Years of Transition, the Russian Population is still in Turmoil' *Population & Societies*, No. 420, pp. 1-4.

Bongaarts, John, and Griffith Feeney (1998) 'On the Quantum and Tempo of Fertility' *Population and Development Review*, vol. 24(2), pp. 271-291

Carlson, Elwood and Sergey Tsvetarsky (2000) 'Birthweight and Infant Mortality in Bulgaria's Transition Crisis' *Paediatric and Perinatal Epidemiology*, vol. 14, pp. 159-162.

Child Mortality Coordination Group (2006) 'Tracking Progress towards the Millennium Development Goals: Reaching Consensus on Child Mortality Levels and Trends' in *Bulletin of the World Health Organization*, vol. 84 (3), pp. 225-232.

Cornia, Giovanni Andrea, and Renato Paniccià, eds (2000) *The Mortality Crisis in Transitional Economies*, UNU/WIDER Studies in Development Economies, Oxford University Press, New York.

Eberstadt, Nicholas (2004) 'The Russian Federation at the Dawn of the Twenty-first Century: Trapped in a Demographic Straitjacket' *NBR Analysis*, vol. 15(2), pp. 5-53.

Georgieva, Lidia, Petko Salchev, Rostislava Dimitrova, Antoniya Dimova, Olga Adveeva (2007) 'Bulgaria: Health System Review' Health *Systems in Transition*, vol. 9 (1): 1-156.

Goskomstat of Russia (1997) *The Demographic Yearbook of Russia*, Goskomstat of Russia, Moscow.

Hakobyan, Tatul, Mihran Nazaretyanm Tatyana Makarova, Movses Aristakesyan, Hovhannes Margaryants and Elle Nolte (2006) 'Armenia: Health System Review' *Health Systems in Transition*, vol. 8 (6), pp. 1-180.

Hill, Kenneth, Rohini Pande, Mary Mahy and Gareth Jones (1999) *Trends in Child Mortality in the Developing World: 1960 to 1996*, UNICEF, New York.

International Labour Office (2005) Managing Transitions: *Governance for Decent Work*. Report of the ILO Director-General, ILO Regional Office for Europe and Central Asia, Geneva.

Iontsev, Vladimir and Irina Ivakhniouk (2002) 'Russia in the World Migration Flows: trends of the last decade (1992-2001)' in Vladimir Iontsev (editor) *World in the Mirror of International Migration*, Scientific Series: International Migration of Population: Russia and the Contemporary World, Vol. 10, MAX Press, Moscow.

Ivakhnyuk, Irina (2006) 'Migration in the CIS region: common problems and mutual benefits" paper presented at the *International Symposium on International Migration and Development*, Turin, 28-30 June 2006.

Kohler, Hans-Peter, Francesco C. Billari, and José Antonio Ortega (2002) 'The Emergence of Lowest-Low Fertility in Europe during the 1990s' *Population and Development Review*, vol. 28 (4), pp. 641-681.

Malačič, Janez (2002) 'International Migration Trends in Central and Eastern Europe during the 1990's and at the Beginning of the 21st Century' in Vladimir Iontsev (editor) *World in the Mirror of International Migration*, Scientific Series: International Migration of Population: Russia and the Contemporary World, Vol. 10, MAX Press, Moscow.

Meslé, France, Jacques Vallin, and Irina Badurashvili (forthcoming) 'A Sharp Increase in Sex Ratio at Birth in the Caucasus. Why? How?' in Isabelle Attané and Christophe Guilmoto (eds) Female Deficit in Asia, CICRED, Paris.

Murray, Christopher JL, Thomas Laakso, Kenji Shibuya, Kenneth Hill and Alan D Lopez (2007) 'Can We Achieve Millennium Development Goal 4? New analysis of country trends and forecasts of under-5 mortality to 2015' *The Lancet*, Vol 370, pp. 1040-54.

National Scientific and Applied Centre for Applied Medicine [Moldova] and ORC Macro (2006) *Moldova Demographic and Health Survey 2005*, National Scientific and Applied Centre for Applied Medicine of the Ministry of Health and Social Protection [Moldova] and ORC Macro, Calverton.

National Statistical Service [Armenia], Ministry of Health [Armenia], and ORC Macro. (2006) *Armenia Demographic and Health Survey 2005*, National Statistical Service, Ministry of Health, and ORC Macro, Calverton.

Philipov, Dimiter and Aiva Jasilioniene (2007) 'Union Formation and Fertility in Bulgaria and Russia: A Life Table Description of Recent Trends' *MPIDR Working Paper*, WP 2007-005, Max Planck Institute for Demographic Research, Rostock.

Population and Development Review (2006) 'Vladimir Putin on Raising Russia's Birth Rate' *Population and Development Review*, vol. 32 (2), pp. 385-389

Sobotka, Tomáš (2002) 'Ten Years of Rapid Fertility Changes in the European Post-Communist Countries: Evidence and Interpretation' *Working Paper Series* 02-1, Population Research Centre, Groningen.

Sobotka, Tomáš (2005) 'Changes in Fertility Quantum and Tempo in Austria, Czech Republic, and Slovakia. A Parity-specific View' in Felix Koschin (ed.) *Fertility and Family Trends in Austria, Czech Republic and Slovakia: Towards a Convergence?*, University of Economics, Prague, pp.45-68.

Statistical Office of the Republic of Serbia, Strategic Marketing Research Agency and UNICEF (2007) *Serbia Multiple Indicator Cluster Survey 2005: Monitoring the Situation of Children and Women*, Statistical Office of the Republic of Serbia, Strategic Marketing Research Agency and UNICEF Serbia, Belgrade.

Stewart, Kitty and Carmen Huerta (2006) 'Reinvesting in Children? Policies for the very young in South Eastern Europe and the CIS' *Innocenti Working Paper* 2006-01, UNICEF Innocenti Research Centre, Florence.

Tajikistan State Committee on Statistics (2006) *Multiple Indicators Cluster Survey 2005: Finding from Tajikistan* (preliminary report), Tajikistan State Committee on Statistics, Dushanbe.

UNDP (2006) "National Millennium Development Goals: A framework for action" *Europe and the CIS Regional MDG Report*, UNDP Regional Bureau for Europe and the Commonwealth of Independent States, Bratislava

UNDP Uzbekistan (2006a) *Health for All: A Key Goal for Uzbekistan in the New Millennium*, UNDP Uzbekistan, Tashkent.

UNDP Uzbekistan (2006b) *Millennium Development Goals Report: Uzbekistan 2006*, UNDP Uzbekistan, Tashkent.

UNICEF (2003) *Social Monitor 2003*, UNICEF Innocenti Research Centre, Florence.

UNICEF (2004) 'Economic Growth and Child Poverty in the CEE/CIS and the Baltic States' *Innocenti Social Monitor 2004*, UNICEF Innocenti Research Centre, Florence.

UNICEF (2006a) 'Understanding Child Poverty in South-Eastern Europe and the Commonwealth of Independent States' *Innocenti Social Monitor 2006*, UNICEF Innocenti Research Centre, Florence.

UNICEF (2006b) 'Women and Children: The Double Dividend of Gender Equality', *The State of the World's Children 2007*, UNICEF, New York.

UNICEF (2007) *TransMONEE Features 2007: Data and analysis on the lives of children in CEE/CIS and Baltics*, UNICEF Innocenti Research Centre, Florence.

UNICEF and State Statistical Committee of the Republic of Uzbekistan (2007) *Uzbekistan Multiple Indicator Cluster Survey*. Final report, UNICEF Uzbekistan, Tashkent.

UNICEF and WHO (2007) *Immunization Summary: The 2007Edition*, UNICEF, New York.

World Bank (2005a) *Growth, Poverty and Inequality: Eastern Europe and the Former Soviet Union*, World Bank, Washington D.C.

World Bank (2005b) *From Transition to Development: A Country Economic Memorandum for the Russian Federation*, World Bank, Moscow.

World Bank (2006) *Migration and Remittances*. Eastern Europe and the Former Soviet Union, World Bank, Washington D.C.

World Health Organization (2006) *Neonatal and Perinatal Mortality: Country, Regional and Global Estimates*. World Health Organization, Geneva.

Wuhib, Tadesse, Brian J. McCarthy, Terence L. Chorba, Tatiana A. Sinitsina, Ivan V. Ivasiv and Scott J.N. McNabb (2003) 'Underestimation of Infant Mortality Rates in One Republic of the Former Soviet Union', *Pediatrics*, vol. 111 (5), pp. e596-e600.

Zayonchkovskaya, Zhanna (2000) 'Recent Migration Trends in the Commonwealth of Independent States', *International Social Science Journal*, vol. 52 (156), pp. 343-355

ANNEX: Table A1: Infant mortality rates in CEE/CIS, 1989-2005, data from the national statistical offices (derived from the vital registration systems)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Czech Republic	10.0	10.8	10.4	9.9	8.5	7.9	7.7	6.0	5.9	5.2	4.6	4.1	4.0	4.1	3.9	3.7	3.4
Hungary	15.7	14.8	15.6	14.1	12.5	11.5	10.7	10.9	9.9	9.7	8.4	9.2	8.1	7.2	7.3	6.6	6.2
Poland	19.1	19.3	18.2	17.3	16.1	15.1	13.6	12.2	10.2	9.5	8.9	8.1	7.7	7.5	7.0	6.8	6.4
Slovakia	13.5	12.0	13.2	12.6	10.6	11.2	11.0	10.2	8.7	8.8	8.3	8.6	6.2	7.6	7.9	6.8	7.2
Slovenia	8.1	8.4	8.2	8.9	6.8	6.5	5.5	4.7	5.2	5.2	4.5	4.9	4.2	3.8	4.0	3.7	4.1
Estonia	14.8	12.3	13.3	15.7	15.6	14.4	14.9	10.5	10.0	9.4	9.6	8.4	8.8	5.7	7.0	6.4	5.4
Latvia (a)	11.3	13.7	15.7	17.6	16.2	15.7	18.8	15.9	15.3	15.0	11.3	10.4	11.0	9.8	9.4	9.4	7.8
Lithuania (a)	10.7	10.3	14.4	16.3	15.4	14.0	12.4	10.0	10.3	9.2	8.6	8.5	7.8	7.9	6.8	7.9	6.9
Bulgaria	14.4	14.8	16.9	15.9	15.5	16.3	14.8	15.6	17.5	14.4	14.6	13.3	14.4	13.3	12.3	11.6	10.4
Romania	26.9	26.9	22.7	23.3	23.3	23.9	21.2	22.3	22.0	20.5	18.6	18.6	18.4	17.3	16.7	16.8	15.0
Albania (b)	30.8	28.3	32.9	33.8	35.4	35.3	30.0	25.8	22.5	15.0	12.3	12.1	11.4	10.4	8.4	7.8	7.6
Bosnia and Herzegovina (c)	18.4	15.3	14.6	20.6	22.7	13.8	13.2	14.0	12.5	11.0	10.1	9.7	7.6	9.4	7.6	7.2	6.7
Croatia	11.7	10.7	11.1	11.6	9.9	10.2	9.0	8.4	8.2	8.2	7.7	7.4	7.7	7.0	6.3	6.1	5.7
TfYR Macedonia	36.7	31.6	28.2	30.6	24.1	22.5	22.7	16.4	15.7	16.3	14.9	11.8	11.9	10.2	11.3	13.2	12.8
Serbia and Montenegro (d)	29.3	22.8	20.9	21.7	21.9	18.4	16.8	15.0	14.3	13.9	13.6	13.3	13.1	10.2	-	-	-
Belarus	11.8	11.9	12.1	12.3	12.5	13.2	13.3	12.5	12.4	11.3	11.5	9.3	9.1	7.8	7.7	6.9	6.4
Moldova (e)	20.4	19.0	19.8	18.4	21.5	22.6	21.2	20.2	19.8	17.5	18.2	18.3	16.3	14.7	14.4	12.2	12.4
Russian Federation	17.8	17.4	17.8	18.0	19.9	18.6	18.1	17.4	17.2	16.5	16.9	15.3	14.7	13.3	12.4	11.6	11.0
Ukraine	13.0	12.8	13.9	14.0	14.9	14.5	14.4	14.3	14.0	12.8	12.8	11.9	11.3	10.3	9.6	9.5	10.0
Armenia	20.4	18.5	17.9	18.5	17.1	14.7	14.2	15.5	15.4	14.7	15.4	15.6	15.4	14.0	12.0	11.5	12.3
Azerbaijan	26.2	23.0	25.3	25.5	28.2	25.2	23.3	19.9	19.6	16.6	16.5	12.8	12.5	12.8	12.8	9.8	9.3
Georgia (f)	19.6	20.7	20.8	22.1	27.6	28.6	28.2	28.0	23.9	22.0	22.2	22.6	22.9	23.8	24.8	23.8	19.7
Kazakhstan	25.6	26.3	27.3	25.9	28.1	27.1	27.0	25.4	24.9	21.6	20.4	18.8	19.1	17.0	15.7	14.5	15.2
Kyrgyzstan	32.2	30.0	29.7	31.5	31.9	29.1	28.1	25.9	28.2	26.2	22.7	22.6	21.7	21.2	20.9	25.7	29.7
Tajikistan (g)	43.2	40.7	40.6	45.9	47.0	42.5	44.0	47.4	48.4	44.8	44.2	43.9	43.2	43.8	43.6	-	-
Turkmenistan	54.7	45.2	47.0	43.6	45.9	46.4	42.2	40.5	37.8	32.9	25.4	21.4	20.1	17.7	16.4	14.1	-
Uzbekistan	38.1	34.6	35.5	37.4	32.0	28.2	26.0	24.2	22.8	21.8	20.2	18.9	18.3	16.7	16.4	15.4	14.9

Source: TransMONEE database 2007. Notes: a. Data for 2005 taken from web-site of Statistical Office, b. Since 1988 data on deaths based on death form declarations (INSTAT data). c. Data for 1992-1995 are for the Federation of Bosnia-Herzegovina. d. Data for Kosovo 1998-2001 are SMSO estimates; data for 2002 exclude Kosovo. IMR for 2005: for Serbia 8; for Montenegro 9.5 (HFA database, 2007). e. Data for 1997-2005 exclude Transdniestr. f. Data for 1992-2005 exclude Abkhazia and Tskhinvali. Data for 2005 taken from HFA database (2007). g. Data for 1994-2003 are Tajik State Statistical Agency estimates based on evaluation of unregistered events.

Table A2: Infant mortality rates in CEE/CIS, 1990, 1995, 2000 and 2005, UNICEF estimates based on the combination of different sources

	Infant mortality rate				Under-5 mortality rate			
	1990	**1995**	**2000**	**2005**	**1990**	**1995**	**2000**	**2005**
Czech Republic	10	9	6	4	13	9	5	4
Hungary	15	11	8	7	17	12	11	8
Poland	19	14	8	6	18	15	9	7
Slovakia	12	11	9	7	14	12	10	8
Slovenia	8	6	5	3	10	7	6	4
Estonia	12	15	8	6	16	19	11	7
Latvia	14	19	10	9	18	21	13	11
Lithuania	10	13	9	7	13	15	11	9
Bulgaria	15	15	13	12	18	18	16	15
Romania	27	21	19	16	31	26	22	19
Albania	37	29	22	16	45	34	25	18
Bosnia and Herzegovina	18	16	14	13	22	19	17	15
Croatia	11	9	7	6	12	10	8	7
TfYR Macedonia	33	23	14	15	38	26	16	17
Serbia and Montenegro	24	17	14	12	28	20	16	15
Belarus	16	17	14	10	19	20	16	12
Moldova	29	25	22	14	35	30	26	16
Russian Federation	21	22	19	14	27	29	24	18
Ukraine	19	22	18	13	26	30	24	17
Armenia	46	38	32	26	54	44	36	29
Azerbaijan	84	80	77	74	105	98	93	89
Georgia	43	41	41	41	47	45	45	45
Kazakhstan	53	57	63	63	63	67	73	73
Kyrgyzstan	68	63	60	58	80	74	70	67
Tajikistan	91	90	75	59	115	114	93	71
Turkmenistan	80	72	77	81	97	89	99	104
Uzbekistan	65	62	59	57	79	75	71	68

Source: UNICEF (2006b) *The State of the World's Children 2007* and www.childinfo.org (accessed on June 2007)