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ABSTRACT

The Mortality Crisis in East Germany*

A number of studies suggest that mortality rates among East German men increased in the wake of reunification, in particular between 1989 and 1991, in some age groups by up to thirty percent. This study first examines the developments of mortality and cause of death statistics based on detailed regional data. The results indicate that there was indeed an increase in mortality rates which cannot be dismissed as a statistical artefact. Next, the paper discusses various theories explaining mortality crises and their relevance for the case of East Germany. Based on individual-level panel data the relationship between exposure to stress and overall health is shown. Apparently, the increase in mortality can be explained by the increase in individual stress levels after the economic, cultural and political consequences of reunification.

JEL Classification: I12, J11
Keywords: mortality, stress, transition, East Germany

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1. Introduction

By the Fall of 1989 every East German had become aware that the political and social system of the German Democratic Republic was bound to change. The demonstrations against the extant regime had been growing steadily in size and number. The social protest movement reached its peak on November 6, 1989 when 450,000 individuals joined a demonstration in Leipzig. Only three days later the Berlin wall was opened and the events that should lead to the economic, monetary and social union of July 1990 took their course. On October 3, 1990 the East German states joined their western neighbours in the unified Federal Republic of Germany.

The ensuing social, political and economic changes coincided with a number of surprisingly drastic demographic developments. Total fertility rates dropped from 1,517 per 1,000 women in 1990 to 750 in 1994, the number of marriages per 1,000 population declined from 7.9 in 1989 to 3.1 in 1993, and the number of divorces per 10,000 marriages went down from 30.1 in 1989 to 6.6 in 1992. Those numbers describe a society in shock. This study is concerned with one particular aspect of the adjustment and transition shock, its effect on individual health and on the death rates of the population in the former Eastern Germany.

In several studies Nicholas Eberstadt (1990, 1993, 1994a, 1994b) has discussed the deterioration in health and mortality in Eastern Europe. He was the first to point at the changes in East German age-specific mortality rates between 1989 and 1991. However, there are doubts whether the phenomenon is just a statistical artefact caused for instance by a change in measurement concepts or migratory movements during the process of transformation. Hence, there is a need for further statistical analyses of the determinants of health developments in Eastern Germany.

In a first step we attempt to verify and corroborate the health and mortality developments that Eberstadt pointed out by presenting complementary evidence on the developments in

Eastern Germany using aggregate data. Second, we develop an explanation for these developments. Our line of reasoning will focus on the psycho-social determinants of health outcomes and will document the connection between the experience and perception of economic uncertainty and health satisfaction. If there exists a significant negative correlation between economic uncertainty and individual health, this may provide a strong argument in favor of the welfare state, given that its primary objective is to reduce the economic uncertainty of the individuals.

Section 2 summarizes the available evidence for a mortality crisis on a macro level and derives a list of stylized facts. Section 3 reviews the available theories that are able to explain such a crisis and discusses their applicability for the East German development. Section 4 presents newly collected statistical evidence at the level of the East German states ("Länder") and major cities supported by various econometric tests. Section 5 explores cause-of-death statistics to study the factors behind the mortality developments. Additionally, it utilizes a large micro data set connecting individuals' measures of health satisfaction with determinants of their stress-level and economic performance. Section 6 concludes that the different statistical sources examined here provide reliable evidence of a mortality crisis during 1990-1991. The role of psycho-social stress and well-being for its explanation is confirmed by cause-of-death statistics as well as a regression analysis using regional and individual level data.

2. Stylized Facts

Even the briefest inspection of health and mortality statistics reveals that the physical well-being of Eastern and Central European populations has declined significantly since the late eighties. Life-expectancy at birth for men dropped by about one year for Poland, Hungary, and Bulgaria. The most drastic developments are observed in the republics of the former Soviet-Union: Male

life expectancy at birth declined by 2.4 years in Belarus (1987-92), by 3.9 years in Ukraine (1987-92), and by 6.9 years in Russia between 1989 and 1994 (see Figures 1 and 2). Obviously, the Russian development has attracted much attention in the scientific community (cf. Chen et al., 1996, Ellman, 1994, or Andreev et al., 1994, and studies cited there.) While dwarfed relative to these changes the developments in the former German Democratic Republic (GDR) after unification are not negligible and deserve attention.

In several studies Nicholas Eberstadt (1990, 1993, 1994a, 1994b) has discussed the deterioration in the health and mortality situation in Eastern Europe. He was the first to point at the changes in East German age-specific mortality patterns that occurred after 1989. Presenting unpublished data of the German Statistical Office, Eberstadt (1993, 1994a) provided clear evidence of an upward trend in age-specific death rates for young male and female individuals between 1989 and 1990:

	Changes in age group specific mortality rates in East Germany (1989-1990) in percent:										
	0	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Male	-2.1	48.2	11.1	68.1	44.2	36.7	26.0	24.4	24.0	4.2	36.6
Female	-5.7	23.2	62.3	117.4	18.6	12.4	23.5	-2.9	16.6	3.7	18.0
Source: Reproduced from Eberstadt (1993)											

These figures show large mortality increases particularly for teenagers, and young adults, but also for the cohort of the 45 to 49 year olds. In Eberstadt (1994b), the author described drastic changes in age and sex specific death rates for East German men between 1989 and 1991, again citing unpublished data from the German Statistical Office. He reports increases in the mortality rates at the order of 28 to 38 percent for men aged 15 through 44. The patterns of change for East German women are not as pervasive. While increases in mortality are observed for women below age 55, the biannual rate of change peaks at 19 percent for the 35-44 year old.

Referring to insufficient information about the average population structure of East

Germany during the year 1990, the German Statistical Office never published mortality rates for 1990. The information that is available on the years of interest is compiled in Table 1. A comparison of age group specific mortality rates between 1989 and 1991 confirms the findings of Eberstadt: We see a clear increase in the level of mortality for men aged 15-50 by on average 29.7 percent (see Table 1(a), column 6). The developments for women are much different and show a strong increase only for age groups 10-20 and 35-45, again similar to the figures presented by Eberstadt (1994b). The years after 1991 indicate a decline of female mortality, such that the change between 1989 and 1991 appears to be a transitory effect. In the case of male mortality, we find relatively fast declines in the mortality of younger men (age groups 15-20, 25-30) in subsequent years, whereas the mortality of the age groups above age 30 decreases slowly. Only for men aged 40-45 a subsequent decline is not discernible. Thus, we confirm Eberstadt's finding of a large percentage change in mortality rates between 1989 and 1991 particularly for men aged 15 through 50.

A slightly different perspective results from an inspection of absolute changes in mortality rates (see Table 1(b)): Men affected by the most severe absolute increases in mortality rates are in age groups 35 through 55 and again in the group of the 60 to 65 year olds, for whom the mortality rate jumps even by 1.3 percentage points between 1989 and 1991. Relative to the absolute changes observed for male mortality the increases for females are negligible. In fact, for females the major effects point towards decreasing mortality particularly for those above age 65.

Separate figures are gathered by the World Health Organization, which does provide mortality rates for the population of East Germany for the year 1990 (see Table 2). Based on these numbers one can conclude that the increase in mortality between 1989 and 1991 took place already between 1989 and 1990. Similar to the other figures, we see mortality increases mostly for males aged 1 through 55. Again the relative mortality increases are highest for men up to age

35, whereas absolute changes in mortality rates peak for those aged 45 through 65. Also the changes in mortality indicators for women parallel the findings based on data from the German Statistical Office.

A different method of investigating overall mortality developments is to consider life expectancy at different ages. Figure 1 describes the severity of the health developments in the transition economies using life expectancy at birth as an indicator. The line for East Germany shows a clear dent for the year of unification, 1990, and for 1991. An attempt at reproducing the graph based on official data from the German Statistical Office resulted in Figure 2, with an unfortunate missing value for East Germany in 1990 (due to missing information for this year). Independent of this value, the numbers of the German Statistical Office seem to differ from the data on which Figure 1 is based, at least in the case of East Germany: The drop in life expectancy after 1989 is not as severe as suggested by Figure 1.

Table 3 summarizes the developments of life expectancy at birth for East and West Germany since 1970. While both populations had comparable life expectancies up through the 1970s, the numbers deviated during the 1980s. After falling behind, East German women appear to have been catching up to West German life expectancies ever since 1988, whereas the difference in life expectancies for men kept increasing further until after unification. Even these rather aggregated figures indicate the worsening health situation for East German men immediately after unification; we see a small decline in life expectancy from 70.0 to 69.9 years between the measures calculated for the then still German Democratic Republic (1988/89) and the three year average calculated for the years 1991 to 1993 immediately after unification.

Häussler et al. (1995) present own calculations on life expectancy and standardized mortality in Eastern Germany. Their figures (reproduced in Table 3 (b)) indicate a decline in male life expectancy at birth by 0.9 years between 1989 and 1990. Life expectancy increased in the

two consecutive years and reached the 1989 level again in 1992. They find a slight decrease in female life expectancy, since their method weights the loss of years lived for the younger age groups more heavily than the gains that occurred for women above age 50. Häussler et al. (1995) calculated age standardized mortality rates and evaluated the changes after unification relative to the situation in 1989. They find an increase in male mortality by 4.3 percent between 1989 and 1990 and calculated further that relative to the mortality situation in 1989 3,861 men died additionally in 1990, a number that shrank to 2,060 individuals in 1991. Among the females in 1990 and 1991 a smaller number of deaths occurred than was to be expected based on the mortality situation of 1989.

Figures 3 and 4 depict the long-term trends East German (GDR) male and female mortality relative to other Eastern European countries. We compare East German life expectancy at birth with the developments in then Czechoslovakia, Hungary, Poland, and Romania based on five year intervals for 1950-55 to 1985-90. Similar to other socialist countries, there was a fast improvement in East German life expectancy until the early 1970s and stagnation thereafter. While life expectancy of men in the GDR exceeded the levels reached in the other countries, women's life expectancy in the GDR was similar to those attained in Czechoslovakia and Poland since the 1970s.

After this review of aggregate mortality measures it is of interest to inspect East German cause-of-death statistics for the years 1989 and 1990. This information is not available from the German Statistical Office. Brückner (1993) summarizes the difficulties the Office experienced when moving the cause-of-death statistics from the former 'East German' to the 'West German' system after unification. His study reports on a comparison of cause-of-death statistics for East Germany between 1990 and 1991 and recommends to refrain from comparing the 1990 results with those of 1991, particularly when the purpose is to compare East and West German states.

The survey method of the former German Democratic Republic differed from the West German procedures in a variety of ways. For the first nine months of 1990 the former East German rules were applied, before the survey system was started to be adjusted to West German methods in the last three months of 1990.

This circumstance makes it plausible to compare the 1990 cause-of-death figures for East Germany to those gathered in 1989. These figures are available from the World Health Organisation (WHO). While one has to interpret the figures with a grain of salt, they might still be of interest. The figures are compiled in Table 4. The first panel lists the total number of deaths, as well as mortality rates for men by age and for selected causes of death. This table confirms an increase in the absolute number of deaths as well as in mortality rates between 1989 and 1990. The population adjusted mortality rates increased by 7.5 percent between 1989 and 1990. A review of the changes in the cause-of-death statistics indicates that almost one third of the change (30.9 points of 86.0) is accounted for by unknown causes (see Table 4(b), where unknown causes are listed as "Signs, Symptoms and other ill-defined conditions"). Another 22.7 points of the increase in mortality rates is accounted for by diseases of the circulatory system. Among the age group specific changes the increase in accident related deaths for young men aged 15 through 35 is remarkable. For those above age 45 the increase in unknown causes plays a major role. This effect is most likely causally related to the above described changes in data collection during the course of 1990. But in addition, we find large increases in diseases of the circulatory system for mature men. Also interesting is the figure on suicide, since 1989 is the first year for which the WHO lists suicide mortality rates for Eastern Germany.[1] The figure does not increase between 1989 and 1990, but remains above the West German suicide rate of 22.4 for

[1] Eberstadt (1994b, p. 211) reports that in East European cause-of-death statistics the victims of suicide and homicide were frequently hidden in the accident and injury categories.

100,000 men across all ages in 1990.

Häussler et al. (1995) arrive at similar conclusions when they calculate, based on the mortality observations of 1989 by what cause additional male deaths occurred in 1990 and 1991 (pp. 368-369). For the age group of the 15-25 year old nearly the entire excess mortality was due to car accidents. The causes explaining excess mortality of older age groups are mainly ischaemic heart diseases and then in 1991 cirrhosis of the liver. In 1990 fewer suicides occurred than was expected based on 1989 data, in 1991 the figure was above the 1989 level. They summarize that from among all additional deaths in 1990 and 1991 one quarter was due to traffic accidents, ischaemic heart diseases and liver cirrhosis each.

The increased relevance of diseases of the heart and circulatory system parallel the developments in other Eastern European countries. Eberstadt (1990) notes an increasing level of death attributed to cardiovascular diseases in Eastern Europe since the 1960s. He attributes over three-fifths of the difference in standardized death rates for men and almost nine-tenths of the overall difference for women between Eastern and Western Europe to differences in mortality rates from cardiovascular diseases alone. In his study on health in Central and Eastern Europe Eberstadt states (1994b, p. 211) "*The region's recent mortality patterns and trends, rather, are dominated and indeed shaped by deaths attributed to cardiovascular disease (CVD) - afflictions of the heart and the circulatory system, including ischemic heart disease (heart attacks) and cerebrovascular disease (strokes).*" The finding of a large increase in deaths with unknown causes might be an indicator of the limited informational content of the cause-of-death statistics investigated. However, in the aggregate we see already an important role of diseases of the circulatory system and of accidents. It remains for further and more detailed analysis to corroborate or refute these findings.

We can summarize this section with the following list of stylized facts that are derived

from aggregate statistics:

(i) East German mortality rates increased between 1989 and 1991, most likely between 1989 and 1990.

(ii) The increase affected mostly males. The relative change in mortality rates is highest for men aged 15 through 35, whereas absolute changes in mortality rates are highest for middle aged men (ages 35-55) and those in the 60-65 age group.

(iii) The mortality increase disappeared for females after 1991 and slowly decreased for men in subsequent years.

(iv) Life expectancy measures do not show the mortality increase as clearly as mortality rates.

(v) While cause-of-death statistics for East Germany around 1990 are problematic due to transition effects in data collection, WHO data suggest an increase in the number of deaths due to unknown causes, an increase in accident related mortality for younger men, and an overall increase in deaths due to diseases of the circulatory system.

3. Potential Causes of Mortality Developments

3.1 Explanatory Approaches for Short-term Mortality Crises

The literature offers a number of theories and models to explain short-term changes in a population's mortality. This section first lists the theoretical models (following Cornia, 1996) and then discusses in greater detail whether the approaches appear relevant to an explanation of the East German developments described in Section 2 above.

- *Measurement Problems:* One explanation for changes in demographic statistics, such as mortality or cause-of-death measures might simply be connected to the changes in statistical data gathering and methodology. Such changes are likely to occur with a change in political regime when a new administration uses methods that differ from those of a prior administration. This

alone causes changes in statistical measurement over time and confounds any time series of data. Another measurement problem might be related to changes in regional boundaries, when areas falling to regional administrative authorities are reassigned. A final issue connected to a change of political power concerns the authoritative influence of new or old regimes on published statistics ('falsification').

- *Famine / War Models:* Here the explanation for short-term demographic crises rests on the collapse of food production and mortality effects of wars. Examples for these effects are numerous. They are characterized by the short-term nature of excess mortality and by affecting the most vulnerable population groups first. While the effects might resemble the mortality effects observed in Eastern Germany the causations of famine and war are clearly inapplicable.
- *Changes in Long-term Risk Factors:* Several determinants of mortality are combined in this explanatory approach, encompassing changes in health care provision, environmental risk factors as well as factors related to behavior such as alcohol consumption, smoking, nutrition, personal hygiene, or physical activity.
- *Recession Models:* This group of models focuses on measures that are immediately influenced by economic recession or adjustment policies. Examples are household incomes, public transfers and subsidies, public health expenditures, or prices of food and other goods. These models see mortality and health deterioration as a consequence of economic impoverishment.
- *Unemployment Stigma Models:* The stigma models focus on the drop of relative income and social position of the unemployed as opposed to the recession models where absolute impoverishment is crucial. The hypothesis is that the loss of employment is associated with a perceived social stigma, besides the loss of purpose and an uncertain income situation. Social stigma then has a negative health impact which, interestingly, should decline with increasing

aggregate unemployment, since the stigma becomes less intense when unemployment is a more common problem. Thus, in a situation of rising unemployment individual health - reasoned by the unemployment stigma model - may very well improve.

- *Psycho-Social Stress Models:* These models confirm the effects of long-term risk factors, recession and stigma models on individual health and mortality, but argue that it is through the channel of individually experienced stress that changes in the environment affect human biology. The literature defines 'stress' as a condition in which the individual perceives a discrepancy between the demands of the environment and the available resources to meet these demands. Clearly changes in the economic, social, and the health situation itself can thus cause stress. Medical research indicates that stress can be the crucial determinant of certain diseases.

3.2 Relevance to the East German Case

While all of the above models explain increases in mortality not all are immediately relevant to the rapid increase in East German mortality. This section reviews some approaches in light of the specific circumstances in East Germany. It discusses their potential to explain past events and derives testable implications where appropriate.

3.2.1 Measurement Problems

Measurement problems or *Glasnost in Statistics* certainly plays an important role for the correct interpretation of East German statistical information. One has to distinguish two groups of issues. The first concerns purposely misrepresented data, the other refers to methodological problems.

The issue that may come to mind first may be the well known tendency of the former East German administration to 'polish' statistics for political reasons. Eberstadt (1993, p. 505)

states that "the incentive structure in Soviet-type planning rewarded overstatement of results at all levels, including the very highest." This suggests that mortality in the German Democratic Republic might have been misrepresented in the statistics. Misrepresentation might have began at the base levels, where doctors and hospitals wanted to avoid blame for poor health care, and it might have reached to the upper echelons who attempted to provide a positive image of the socialist society. However, we also read that "the GDR mortality data (if not the cause-of-death data) had been reasonably good" (Eberstadt, 1993, p. 513), or "the mortality data for noninfants, and in particular for adults, seem to have been characterized by nearly universal coverage since at least the mid-1960's" (Eberstadt, 1994, p. 209). Thus, by the account of Eberstadt, the mortality figures at least for noninfants seem to be reliable.

An area where misreporting might have been more pervasive are cause-of-death statistics. Höhn and Pollard (1991) present a comparison of mortality trends between East and West Germany for the decade from 1976 to 1986 and report that the GDR had not reported data on several causes to the WHO, among them cirrhosis of the liver, ill-defined signs and symptoms, and complications of medical and surgical care. Eberstadt (1994b, p. 211) reports that in Eastern European statistics victims of suicide and homicide were frequently hidden in the accident and injury categories. This makes political sense when considering the result of Hoffmeister et al. (1990) that the overall life expectancy in East Germany might increase by half a year if the frequency of suicide dropped only to West German levels. A 1990 study of the German Statistical Office in the East German states found that in about 40 percent of a sample of 2,500 cases the cause-of-death coded by personnel of the statistical office differed from that indicated by the physician, with severe errors for 15 percent of the 2,500 cases (Brückner, 1993). Yet, similar findings are known for the United States (Rosenberg, 1989 cited by Eberstadt, 1994b), and we know of different coding practices between countries of the European Community

(Brzezinski, 1986). Therefore one might want to keep in mind that even imperfect statistics may provide insights into the developments of public health.

Among the methodological problems five issues should be considered that might influence the measurement of mortality. (i) In the former German Democratic Republic (GDR) the definition of mortality rates differed from the West German definition. The number of deceased individuals was divided by a different measure of the 'average population.' While in the West the average of 12 monthly figures is used, the GDR office annually calculated an average of the midyear and end of year populations (Brückner, 1993). Except for years with unusual population movements (e.g. 1990, with vast outmigration from East Germany) this is unlikely to cause grave differences in mortality rates. (ii) The boundaries of administrative units may have changed. This may well affect time-series of mortality rates for disaggregated areas (i.e. cities or states), but should not be visible on the national, aggregated level that was described in Section 2. Therefore, this effect can be neglected as an explanation for the nationally observed development. (iii) Definitions for certain measures might have changed with the political system (e.g. the definition of a life birth). However, we are not aware of such problems that might affect the mortality of noninfants and the problem appears to be negligible. (iv) DIW (1994) indicates that young and highly qualified individuals have migration probabilities that are respectively 200 and 50 percent above that of the average population. This suggests that out-migration from East to West Germany is likely to be selective to good health conditions which may affect mortality rates. While this is certainly a valid argument, nobody so far has provided empirical evidence for it. It cannot be the dominant reason for the mortality increase anyway since total numbers of death have risen. (v) The remaining issue concerns the change in personnel and training methods for data collection, that might stand in the way of a reliable time-series of East German mortality statistics. Brückner (1993) describes the procedural changes in cause-of-death coding, which was

performed by physicians in the GDR and is now carried out by specially trained individuals in the regional statistical offices. This might cause a structural change in the cause-of-death statistics, and it might generate learning effects, such as a declining number of 'unknown' cases, but it should not be relevant to mortality rates.

Two main conclusions follow from this discussion. First, it is unlikely that the increase in mortality rates can be explained by *Glasnost in Statistics*. The quality of East European data has been discussed in the literature, but the quality of mortality rate information is generally considered to be reliable. Thus the increase in overall mortality in 1990 and 1991 can hardly be explained by measurement errors.

Second, generally caution must be exercised when using East European aggregate cause-of-death statistics to determine the reasons of the mortality development due to possible misreportings. With this in mind a careful review of East German cause-of-death statistics should not be foregone. Thus, we make an attempt at addressing the problem of misrepresented aggregate information by evaluating regionally disaggregated measures from different statistical sources in addition to the data presented in Section 2. Clearly, the figures may not be free from measurement errors and misrepresentation; however, one might reasonably expect that issues like political data 'polishing' may be less relevant on the disaggregated level. The only issue to be kept in mind when looking at regional data is the question of changed boundaries for the administrative units. We will discuss it when evaluating the regional cause-of-death statistics in the sections below.

3.2.2 Changes in Long-term Risk Factors

We observed a short-term increase in the mortality of East German men between 1989 and 1991 with a slow reversal of the increase in subsequent periods. Most of the factors combined in the

long-term risk factors model, exemplified by environmental degradation, or by components of individual behaviors such as diet structure, smoking, physical activity, and alcohol consumption, are likely to have strong effects on individual health. However, they are unlikely causes for short-term, crisis-like developments such as that observed in East Germany. As an example, the increase of alcohol consumption may cause an increase in violence and accidents in the short run; medical consequences of alcohol overconsumption, such as alcoholic liver cirrhosis, will follow with a delay. If an increase in alcohol consumption is prompted by a change in the social and economic environment (for which German unification may be a proper example), we would expect to see alcohol related mortality with a different lag structure for different causes of death. While little information is available on East German alcohol consumption, the figures indicate a clear decline in the consumption of spirits since 1990. Breitenacher (1992, 1994, 1996) describes a decline from 15.5 liters of spirits per capita in 1989, to 12 in 1993, and 9 liters in 1995. Representative surveys on beer and wine consumption in East Germany indicate an about constant propensity to consume beer and a decline in wine consumption (Simon et al., 1997). Thus, in general it is unlikely that the effects of changes in long-term risk factors can explain the mortality increase for East Germany in 1990 and 1991.

3.2.3 Recession Models

The central hypothesis of recession models is that declines in income, standard of living, increasing price levels and falling public health expenditures explain the deterioration of the health and mortality situation. It is very difficult to compare the real incomes of the East German population before and after unification, since a new currency and a new pricing system were introduced 'over night' with the so-called Economic and Monetary Union that was established in July of 1990. In comparison to West Germans and adjusted for purchase power parity East

Germans were clearly economically worse off (DIW, 1995). A comparison of subjective income satisfaction between East and West Germans supports this conclusion (Wagner et al., 1992), even though the East German income distribution is characterized by less inequality than the West German one. While it is possible that households with unemployed individuals suffered a loss of real income (the only existing evidence on this describes changes in relative income, see Müller et al., 1994) it is not clear whether this loss generated the level of impoverishment that is typically addressed by recession based mortality explanations.

The adjustments in the public health sector upon unification are difficult to evaluate, too. We know that the East German health care provision suffered from a lack of resources (e.g. structural problems with hospital buildings) and medical supplies (see e.g. the discussion in Mielck, 1991, and sources cited there). It is known that the first migration waves from East to West Germany contained disproportionately many workers from the medical system leaving the East German health sector strapped for personnel in the immediate transition period. However, it is not plausible that such short-term bottlenecks would affect mortality in 1990 and 1991.

Table 5(a) provides other figures indicating an increasing number of physicians per head of the East German population over time (for comparison the figures for the best and worst equipped West German state are provided as well). While it is difficult to compare the quality of care we observe that particularly in the early years after unification the number of hospital beds per head in East Germany exceeded that number in West German states (see Table 5(b)). Finally, we examine the development of expenditures by the public health insurance. Table 5(c) exhibits a significant difference between per capita expenditures in East and West Germany. However, these figures are nominal and not adjusted for purchasing power which was much higher in the East German states. In addition we notice an increase in per capita expenditures between 1991 and 1995 that far exceeds the West German development. None of these figures permit clear

statements on significant improvements or deteriorations in the health care situation in East Germany right around the time of unification. The observable increase in health care expenditures leaves the deterioration of the health care system an unlikely cause of the mortality increase. Thus, the impoverishment related arguments of recession models may not be central to the explanation of the East German mortality crisis.

3.2.4 Unemployment Stigma Models

While rising unemployment was an immediate consequence of unification (see Table 6 (a)), it is uncertain whether the unemployment stigma hypothesis is able to explain the sudden increase in male mortality after 1989. Björklund and Eriksson (1995) summarize the evidence on health and mortality effects of unemployment in Nordic countries and find evidence for strong impacts particularly of long-term unemployment on a variety of mental health measures. With respect to mortality effects they state (p. 26) "If there really were strong effects of unemployment on mortality, the effects ought to show up also in the time-series data. However, the time-series evidence on this issue is very fragile and does not allow any strong conclusions." Björklund and Eriksson (1995) critically review Brenner's (1987) findings of a two to three year lag between a change in the unemployment rate and a response in mortality due to cardiovascular diseases. This would suggest a delay in the mortality effects of unemployment stigma.

While the figures in Table 6 are incomplete in that they do not show the vast amount of unemployment 'hidden' by measures of labor market policies and out-migration[2], they show the different unemployment risks experienced by men and women (Table 6(b)). If the unemployment stigma theory were applicable to the East German situation we should find gender differences in

[2] Zimmermann (1993, pp. 198-201) provides corrected unemployment measures which suggest that East German unemployment rose from 4.9% in the second quarter of 1990 to 16% in the third quarter, and reached more than 40% in 1992.

health responses to unemployment which are contrary to actual observations. However, we do not find the differential increase in female mortality that would be parallel to the stronger increase in female unemployment. Perhaps this is because leaving market work is less of a stigma for females than for males in western societies or because the male-female unemployment differential is much misrepresented due to active labor market policies favoring males. Thus, while stigma models may be very useful to explain the long-run health developments in East German states after unification they may have less to contribute to the search for an explanation of the 1990/91 mortality crisis.

3.2.5 Psycho-Social Stress

The psycho-social stress models focus on the health effects of stress as the crucial determinant of the mortality crisis in East Germany. Individual stress arises from a discrepancy between the demands of the environment and the resources available to meet these demands. The psycho-social stress models rely on the empirical observation that the environment of East Germans changed radically with unification: Individuals had to cope with the loss of established working and living conditions. Not only did the social, economic, legal, and political system of East Germany change, also the economic basis of existence reached an hitherto unknown degree of uncertainty. East Germans were subjected to a culture shock and to an ‘over night’ change from a centrally planned, socialist state to a market economy. To the degree that the demands on the individual posed by the new environment exceeded individually available resources stress was unavoidable. It is important to remember that the learned behavior of East Germans, the methods that they had applied for problem-solving in the past, may have turned obsolete by the same mechanisms that posed the challenges to begin with. This enhances the subjectively experienced degree of discrepancy between demands and resources. In more practical terms individuals

experienced the prolonged threat of job losses and for many it realized. With it typically comes the loss of a social role, the loss of prestige, and for many the loss of a purpose in life. Particularly those who had been well established in the prior system may have suffered from the sudden obsolescence of their previously valued human capital. Many East Germans might have experienced severe and previously unknown degrees of economic uncertainty brought about by the market economy that they were not prepared for. Stresses at work might have been caused by restructurings of activities, changes in the environment and in hierarchies. These changes may have affected families and social networks, which had to balance new demands on all their members (Badura and Pfaff, 1989).

The medical literature describes potentially fatal physiological reactions to stress. A strong link has been established between stress and cardiovascular problems such as diseases of the heart and circulatory system, including ischaemic heart disease, and cerebrovascular diseases (for an overview see e.g. Sterling and Eyer, 1981, or Henry, 1982). Given information on the causes of deaths we can investigate the relevance of stress. This analysis will be undertaken in Section 5 of this study.

4. Change in Mortality: The Case of Regional Statistics

This section uses regional data from East Germany to examine the working hypothesis outlined in section 2 that there was a temporary increase in mortality in the years 1990 and 1991. While the aggregate data may suffer from aggregation bias and from a potential change of statistical concepts during unification, data derived separately from sources at the level of states and major cities may strengthen our confidence in the derived macro phenomenon. First, we explain the available regional information. Second, we provide a descriptive picture of mortality change, and third, we present some econometric tests of our working hypothesis.

4.1 The Data at State and City Levels

Figure 5 provides a map of Europe that visualizes the size of East Germany in relationship to West Germany. After unification in 1990, the federal political system was re-established in East Germany by separating the states ("Länder") Mecklenburg-Vorpommern, Sachsen-Anhalt, Berlin (merging West Berlin to East Berlin, the former East German capital), Brandenburg, Thüringen (Thuringia) and Sachsen (Saxony). Figure 6 details this breakdown of the former German Democratic Republic, the GDR. These re-established pre-war states do not cover exactly the more detailed political districts from the communist regime. Also included in Figure 5 are the major East German cities.

We have collected data from the statistical offices of the states and the cities. Unfortunately, only an incomplete set of states and cities were willing or able to provide us with the relevant statistics. At the level of the states, Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt and East Berlin (West Berlin is excluded for the obvious reason of belonging previously to West Germany) provided a complete picture. From Thüringen, we obtained incomplete but still usable data series. Unfortunately, Sachsen is completely missing. At the level of the cities, nine of the larger places (Dresden, Leipzig, Erfurt, Jena, Zwickau, Weimar, Rostock, Potsdam and Gera) were responding. Dresden, Erfurt and Jena provided us fully with the proper information. The data from Gera, Leipzig and Weimar are incomplete, but still usable for males, and only usable for females in case of Leipzig. The state capitals are all marked in Figure 6. In total, this provides us with a very rich picture.

Table 7 contains socio-geographic information which describes our units of observation, states (Table 7(a)) and major cities (Table 7(b)) in East Germany. Berlin (West and East), the capital of united Germany, is the largest among the cities (population 3.5 million) and has by far the highest population density (population/km^2) of 3,905. The largest state in terms of population

size is Sachsen with about 4.6 million inhabitants, and with a population density of 246. Least populated among the states and characterized by a very rural structure is Mecklenburg-Vorpommern.

We first examined all data sets at various levels of disaggregation. It is very difficult to visualize the information contained in this rich material. Hence, we concentrate on a selection of trends and individual results. Table 8 first summarizes whether there was a temporary rise in mortality after 1989 for males and females separately. "+" is given if the temporary rise was observed for a specific cell defined at the level of states, cities, gender and age. To qualify for "+", a rise had to be observed in 1990, and mortality had to fall again in 1992 or later. In some cases (Thüringen, Gera, Leipzig or Weimar) there were not enough recent years available to observe the fall, but the observations could be still consistent with the hypothesis. In other cases mortality was not increasing or was even declining, or the rise occurred, but was permanent. We then marked this by a "-" sign. Finally, there were cases with inconclusive ups and downs ("0"). In general, five year age groups were available with the exception of Sachsen-Anhalt, where we only had age groups covering ten years. To limit the amount of information in the table, we also excluded age groups below 25 and above 65, although these age groups are contained in the total statistics we report.

The general picture is telling: there are many "+"-es, at least for males. A major city with conflicting evidence is Gera for males and Dresden for females. For females, the states of Bandenburg and Thüringen and the city of Leipzig are inconclusive. Hence, a first general conclusion is that the temporary rise in mortality has mainly affected males, at least in the particular age groups listed in Table 8.

The evidence is documented in detail for males only in Table 9. As discussed in section 2, the rise in mortality can be studied using percentage changes (as in the study by Eberstadt,

1993) or in first differences of the mortality rate. Among the states and cities and for absolute changes of mortality, the rise in male mortality was particularly strong for age groups 40-60. It was, however, also visible for older age groups in most cases, and also present between ages 30-40 in Brandenburg, Dresden and Weimar. Therefore, to be more precise, the effect at this level of analysis took place largely for men in middle ages. However, as in the analysis in section 2, we find that the percentage changes of the mortality rates were often also large for younger age cohorts. This implies that although small, these rates increased strongly.

To understand the difference, consider the results for East Berlin (a large city with a very relevant share of the overall East German population). Between 1989 and 1991, the largest absolute changes in age groups above age 20 and below age 65 have been in age groups 50-55 (2.0 points) and 60-65 (2.2 points), while the respective percentage changes were quite modest (21.1% and 10.0%). By contrast, in age groups 20-25 and 25-30 absolute changes were minor with 0.45 and 0.46, but percentage changes were very large with 55.3% and 47.3%, respectively. Hence, the middle ages are largely responsible for the increase in mortality during this period, although the behavioral changes in the twenties is very noticeable.

4.2 A Regression Analysis

We now turn to a multivariate regression analysis using the regional (state and city level) mortality rates differentiated by gender for the 1985-1995 time period. This covers a reasonable amount of information before and after unification. At first, we examined the fully pooled sample ignoring all differences according to gender and regional level. Mortality rates (in natural logs) were regressed on a constant, a linear time trend and a dummy variable that takes on value one for 1990 and 1991, and is zero otherwise. This model is expected to capture the long-run decline in mortality that is observed in Germany, but allows for a temporary increase in 1990-1991 that

has been found in the macro statistics. As we have seen, the mortality increase has been more persistent in some cases, but we treat the period short to obtain a sharper criterion.

The first column of Table 10 reports the basic regression explained, which suggests that while there is the expected decline in mortality over time, the period dummy for 1990-1991 is statistically significant. (Note that the reported t-ratios in this and all following regression tables are the heteroscedastic-consistent Huber-White t-ratios.) From the previous descriptive analysis of the data we know that the phenomenon of a temporary increase in mortality rates was largely observable for males only. Hence, we have replicated the analysis for males and females separately. The respective findings support the conjecture that the issue is related to males only. The dummy is statistically insignificant for females, but remains less significant for males. In addition, the time trend for males becomes insignificant.

However, this simple descriptive excercise ignores differences at the regional level (city versus state) and does not include other relevant determinants of transformation such as the unemployment rate. Hence, we investigated a modified regression for the full sample, where a gender dummy (1 if female, 0 otherwise), a state dummy (1 if state, 0 if city or East Berlin) and the unemployment rates at the regional levels are added as covariates. Note that the unemployment rates prior to unification in 1990 were set to zero since there was no unemployment (by definition or ideology) in the former GDR. The result is that the female dummy is insignificant, but that the state dummy variable and the unemployment rate have positive and highly significant coefficients. The time trend variable is now even more significant and much more negative. The period dummy for 1990-1991 has now a larger coefficient and a higher t-ratio.

This finding prevails for men if we separate the sample with respect to gender and replicate the analysis (also given in Table 10). The 1990-1991 period dummy and the state

dummy are, however, not significant for females while the time trend variable has a more negative size for females than for males. Hence, there is confirmation that there was a temporary increase in mortality in East Germany after unification, but this increase was linked to male mortality only. Also, unemployment has contributed to an increase in mortality for both males and females.

A problem with the previous analysis is that the data is aggregated across all age groups. It is, however, most likely that the effects differ according to age. Hence, we have re-investigated the issue using age-specific mortality rates. Since our major interest is in the period-specific effect for 1990-1991, and the issue is only present in the male data, we have examined the age-specific data for men only. Table 11 contains the research findings using the 'final' equation where the logged mortality rates were regressed on the time trend, the 1990-1991 period dummy, the state dummy and the unemployment rate. Column 1 presents the full sample using all age-specific information in 5-year intervals starting with age group 25-30 and ending with age group 60-65. To be able to separate out age-specific effects, we have included dummies for all age groups (and restricting the constant to zero). The result supports the view that the period effect in 1990-1991 is important, and as before indicates an increase in mortality in the first years of transformation. State and unemployment rate have the expected sign and are statistically significant as before. Only the time trend is not significant, also the sign is still negative.

This is, of course, a first and more descriptive way of data analysis. It is likely that the age-specific components of mortality cannot be captured by age dummies alone, but will also result in differences of the effect parameters of the other variables. Hence, Table 11 also contains the regressions by age cohort which provides a more differentiated picture. Here, the 1990-1991 period indicator is the variable with the most stable coefficient estimate. It is interesting to see that across all age groups we find a strictly positive deviation from the mortality trend in the

years 1990 and 1991. This effect is not precisely estimated for all age groups, but significantly different from zero for men aged 35 to 40 and 45 through 60. This supports the conjecture that the first years of the post unification transition had indeed significant effects on male mortality. The (negative) time trend is significant only for the 25-30 and 60-65 age groups, and it is only for these groups that the unemployment rate seems to matter.

4.3 Summary of the Findings

This section used disaggregated data at the state and city level to provide independent information about the East German mortality crisis. The material was first explored on a descriptive level, and then analyzed using econometric techniques. We obtain the following major findings:

(i) At the level of contingency tables, the temporary increase can be documented largely for males, while the crisis appeared also in some cases for females. This finding was confirmed in the regression analysis that also took care of various control variables.

(ii) The male mortality crisis was a case of the middle ages (age groups 40-60), if one studies absolute changes of mortality rates. In terms of percentage changes, the age groups in the twenties had the largest increases. In the multivariate regressions for the age cohorts, we are able to identify a significant temporary increase in mortality for age groups 25-30, 35-40, 45-50, 50-55, and 55-60.

(iii) Increases in unemployment are correlated with increases in mortality for both males and females, but affect male mortality only for age cohorts 25-30 (the young) and 60-65 (the old).

(iv) There is an overall negative time trend in mortality rates, which is stronger for females than for males. In male age-specific mortality rates, the trend is present for the youngest (25-30) and oldest cohort (60-65) only.

5. Analysis of Mortality Determinants

In Section 2 we evaluated the change in cause specific mortality between 1989 and 1990 based on aggregate figures for the former German Democratic Republic and arrived at three major conclusions:

(i) One third of the mortality increase is due to an increasing number of unknown causes.

(ii) The incidence of diseases of the circulatory system increased particularly for older men.

(iii) The central reason for the increased mortality of younger men are accidents.

In Section 3 we discussed several causal mechanisms as well as potential problems with the available data. Among the possible explanations for the East German mortality crisis - the existence and extent of which was shown in Section 4 - we ruled out war and famine models, approaches using a stigma effect of unemployment, as well as economic impoverishment and the drop in public health expenditures, as argued in the recession models. Possible reasons for the increased mortality rates are the short-run effects of alcohol overconsumption, medium term health effects following unemployment, and the health consequences of psycho-social stress. The latter are to be found among afflictions such as ischaemic heart and cerebrovascular diseases.

This section makes an attempt at evaluating the competing hypotheses. First we examine cause-of-death statistics which are disaggregated by age group, sex, and region in order to investigate whether the aggregate cause-of-death findings from Section 2 can be confirmed. Additionally, these statistics provide a means to determine the relevance of the different theoretical approaches to the mortality crisis. The second part of this section continues on the path of disaggregation and uses individual level panel data to explore whether the explanation of aggregate mortality events can at all be addressed by models of individually experienced psychological stress. Using data of the German Socioeconomic Panel we determine the empirical correlation between the level of stress and individual health satisfaction.

5.1 Cause-of-death Sstatistics

One way to address the well documented problem of misreported data at the national level is to analyse the cause-of-death statistics of smaller regional units, such as states or larger cities. For this purpose we compiled time-series of age group, sex, and cause specific information on mortality in the cities of Berlin (East) and Dresden as well as in the state of Mecklenburg-Vorpommern (see Tables 12-13). In stark contrast to Berlin and Dresden, Mecklenburg-Vorpommern is characterized by an agricultural structure, low population density, and high unemployment (see Tables 6 and 7). We will describe the cause-of-death developments across these three regions following up on the hypotheses derived from the various models in Section 3 and investigate whether the findings on mortality developments at the national level hold at regionally more disaggregated levels as well.

5.1.1 Measurement Problems

Measurement problems relevant to cause-of-death statistics have been discussed in detail above. Such problems may have two visible effects on cause-of-death statistics. Since coding procedures changed in late 1990 one could expect one term structural shifts in the frequency distribution of deaths across causes, as well as possibly a temporary increase in the number of unknown causes of death. While it appears difficult to clearly determine whether a structural shift in cause-of-death frequencies took place, each of the three tables documents a rise in the frequency of deaths due to unknown causes (International Cause-of-death (ICD) Codes 780-799) in 1990. Berlin (East) is a representative case where it jumped from 10.12 to 54.18 per 100,000 population across all ages. Typically the effect is stronger for older than for young men. However, it is unclear to what degree this increase is due to coding problems that are correlated with administrative and methodological changes in the statistical office, or to the behavior or

physicians who are unfamiliar with the deceased and simply note 'unknown cause' on the death certificate (Senatsverwaltung, 1996, p. 48).

5.1.2 Alcohol Related Deaths

Heavy alcohol consumption can be a valid reason for mortality changes and has been much discussed to explain the mortality trends in Russia (see e.g. Cornia, 1996, p. 19, on the debate about Russian alcohol consumption). As Chen et al. (1996) point out, the health effects of alcohol are of several types. Consumption of large quantities can damage internal organ systems leading to heart and liver diseases, while binge drinking increases the risk of accident and violence. Before alcohol can cause fatal damage to internal organs it has to be overconsumed over a period of time.

An investigation of the cause-of-death statistics provides clear evidence of an increase in alcohol related deaths. In all three regions chronic liver disease and cirrhosis (ICD 571) did increase between 1990 and 1991 in the tables for all age groups. The same effect is observed for alcohol addiction which is listed as a psychiatric cause-of-death (ICD 303). The increase in alcohol mortality is highest in rural Mecklenburg-Vorpommern reaching about 100 alcohol related deaths per 100,000 men across all ages in 1993. The fact that alcohol mortality does take until 1991 to increase suggests that the extent of drinking surged around the time of unification, or that the deaths were incorrectly coded in 1990. Sudden rises in alcohol mortality could also be plausible, when individuals have been overconsuming prior to the unification but then increased consumption again after the disappearance of the former GDR (see the discussion in Häussler et al., 1995). For all regions we find strong increases in the alcohol mortality already for young men but generally alcoholism appears to be a more widespread phenomenon among older males. The drastic increase in the liver cirrhosis death rate from 59 to 138 between 1990 and 1991 for Berlin

is hard to explain and might be a case of measurement problem, even though Senatsverwaltung (1995, p. 48) points out that for men aged 45 through 55 alcoholic liver cirrhosis is the single one diagnosis which accumulates the most deaths in East Berlin. Overall we conclude that East German alcohol mortality was probably higher after unification than before and continued to increase for the case of Dresden and Mecklenburg-Vorpommern (Tables 13 and 14), as well as for East Germany in the aggregate (Brückner, 1993; Gräb, 1994).

5.1.3 Circulatory and Heart Problems

Much has been written on the medical relationship between stress and mortality (Sterling and Eyer, 1981; Henry, 1982), which are linked by cardiovascular (CVD) diseases (ICD 290-458), and in particular coronary heart disease. Another literature keenly points to the large difference in mortality due to CVD between East and West European countries (see e.g. Höhn and Pollard, 1991; Barth et al., 1996).

Evaluating the figures on ischaemic heart diseases (ICD 410-414), and diseases of the cerebrovascular system (ICD 430-438) we find drastic increases in the incidence of these problems across all ages in all three regions. When separating by age group it is obvious that only older men are really affected by these problems. In the large cities Berlin (East) and Dresden ischaemic heart disease deaths rates increased vastly between 1990 and 1991. In Dresden it doubled for older men, while in Berlin it went up by one third. Since increases of this level were also observed in the aggregate of all of East Germany after 1990, the German Statistical Office concluded (Brückner, 1993; Gräb, 1994) that much of this change is probably due to structural differences in the coding practices of the former GDR and the current German administrators.

The effect of different coding behaviors is particularly influential for cases of multiple morbidity when the person signing the death certificate has to determine the "disease or injury

which initiated the train of morbid events leading directly to the death" (WHO, 1993, p. xi). Since victims of cardiovascular diseases are frequently in higher age groups the probability of multiple morbidity is particularly high in these cases, which renders CVD coding sensitive to individual judgement. Nevertheless, while it might be difficult to interpret the change in CVD between 1990 and 1991 there is evidence that (i) CVD mortality was much higher in East than in West Germany (see Brückner, 1993; Gräb, 1994; Höhn and Pollard, 1991, for a review of past trends), (ii) that older persons are relatively more affected than younger individuals, and (iii) that CVD mortality in general continued to rise after 1991 (see e.g. figures on ischaemic heart disease, all ages for Mecklenburg-Vorpommern and Dresden). In conclusion, we agree with Häusler et al. (1995) who find that while the shifts from hypertonia and artherosclerosis to ischaemic heart diseases and cerebrovascular diseases might present statistical artefacts, overall mortality due to CVD among East German men increased since 1991, if not since 1989.

5.1.4 Traffic Accidents

The sudden availability of fast cars had fatal implications for a large share of the young male East German population. The increase in mortality by motor vehicle traffic accidents (ICD E810-E819) is noticable already for the year 1990 in the cause-of-death tables. The effects are strongest for the younger age groups but still visible for older men. Häussler et al. (1995) find that about one third of the calculated decline in male life expectancy was due to traffic accidents (see Table 3(b)). Different driving behavior for men and women is one of the reasons why the mortality crisis did not affect East German women. Traffic accidents are the explanation for most of younger men's mortality in the early 1990s. Fortunately, these numbers are on decline: Aggregate mortality rates due to accidents dropped from 68.88 in 1991 to 53.3. in 1992 and 49.9 in 1993 (Brückner, 1993 and Gräb, 1994), a trend that is visible in the disaggregated cause-

of-death tables as well. It is clear, however, that a large fraction of the observed mortality increase for young men is due to accidents.

5.1.5 Suicide

It would be difficult to formulate a hypothesis on the behavior of suicide mortality in the wake of unification. On the one hand suicide frequency in East Germany was high and one could expect that some of its determinants might disappear with unification. On the other hand the uncertain economic situation and the threat of unemployment (if not the end of socialism for some true believers) might have presented new psychic burdens on the population that reasonably could lead to an increase in the suicide rate.

The aggregate cause-of-death statistics presented in Table 4 indicate a decrease in the frequency of suicides in the East German population at least for 1990. This is roughly confirmed as a long-term trend in regional statistics aggregated across all ages (see Dresden and Mecklenburg-Vorpommern). However, when disaggregating into age groups the trend is not as clear. For the case of East Berlin we see a clearcut increase in suicides among older men between 1990 and 1992. The figures for Dresden are rather irregular and it is difficult to discern a trend. The rates for young men in Dresden and Mecklenburg-Vorpommern suggest a plausible interaction between the frequeny of suicides and of vehicle accidents. In the case of Dresden we see an unusually high suicide rate in 1991 but at the same time a low fatality rate for accidents. This might represent more of a coding problem than an actual epidemic of suicides. In sum, one cannot explain the mortality crisis by suicides and it is well possible that the overall decreasing suicide rate hides quite distinct age-specific developments.

5.1.6 Summary of Disaggregated Evidence on Causes of Death

We reviewed the developments for a few particular causes of death on the basis of regionally and demographically disaggregated cause-of-death statistics. Our four central conclusions generally confirm findings based on aggregate statistics:

(i) Alcohol consumption increased in East Germany after unification and the number of alcohol related deaths is still rising.

(ii) The most important causes of death in Germany are circulatory and heart problems. The incidence of these potentially stress driven diseases in East Germany has been increasing.

(iii) Fatal traffic accidents presented an important transitory phenomenon responsible for the deaths of young men.

(iv) While overall suicide rates are decreasing, their development differs strongly by age group.

These conclusions present evidence for the theoretical models which rely on psycho-social stress and changes in long-term risk factors (i.e. alcohol consumption) as determinants of the mortality crisis. We cannot rule out indirect health effects of the unemployment experience, however, since these cannot be tested using cause-of-death statistics.

5.2 A Micro-econometric Analysis of Health Satisfaction

In this part of the paper we examine the basic hypothesis that social and economic stress affects health negatively, and hence may lead to an increase in mortality. Here, we use large-scale micro data for East Germany and subjective evaluations about health satisfaction, individual background information and perceived worries about the personal effects of economic change during the period of transformation. Since our data starts with 1990, this exercise is no further attempt to document the mortality crisis in transition, but to test whether social and economic

stress might have had an important role in it. We first explain the data set and the variables used. We then present the regression analysis, and finally discuss the relevance of the findings.

5.2.1 The GSOEP as a Data Source for the East German Transition

We utilize the data provided by the German Socioeconomic Panel (GSOEP).[3] The GSOEP is a nationally representative household panel study conducted by the German Institute for Economic Research (Deutsches Institut für Wirtschaftsforschung, DIW) in Berlin. Approximately 6,000 West German households have been interviewed each year since 1984. A supplementary sample of just under 2,000 East German households was added to the panel in 1990. Since June of 1990 (a few months before unification) the GSOEP has surveyed over 4,000 East German respondents on a yearly basis. Among other topics the survey covers labor force participation, family events, attitudes and opinions regarding current developments and future trends, including health satisfaction as well as fears or worries about the economic situation.

We use the measures of health satisfaction and worries about the current economic situation and future employment conditions to execute an empirical test of the correlation between health and the perception of economic uncertainty. In our analysis we pool the observations on East Germans from 1990 through 1994 and investigate a few distinct subsamples of the East German population. The base sample are all East German males and females in age groups 25-65, who responded to all questions used in this analysis. This full sample has 14,841 observations, 7,304 males and 7,537 females. Since the mortality crisis was largely observed for males, we further study the male age goups 25-34 (2,130), 35-44 (2,107), 45-54 (1,734) and 55-64 (1,333) in more detail (sample sizes in parentheses). The sub-sample of those men who are unemployed at the time of the annual surveys contains 702 observations, while the sub-sample of

[3] See Wagner et al. (1993) for a more detailed description of the data.

those men who were in full-time employment contains 2,826 annual observations. The difference between these two sub-samples and the total number of male observations stems from losses in observations due to missing values for additional questions used for these two groups and from the fact that a large number of workers was employed in part-time work and public programs. To explore whether there are large differences in behavior between all groups of men it is sufficient to examine the extreme cases of employed and unemployed males.

The central measure is a 10-digit scale of health satisfaction of the individuals, which is coded increasingly from 0 through 10. For simplification, we treat this as a continuous response. Averages of these responses for the full sample (including also individuals below age 25 and above 65 for comparative purposes) and differentiated by gender and age are given in Table 15(a). Health satisfaction is larger for men than for women, and it declines over time (with the exception of 1991 for males and 1992 for females). As has to be expected, health satisfaction also clearly declines with age.

Table 15(b) studies health satisfaction by year, gender and the level of economic worries. The respondents were asked to express their worries at levels "none", "somewhat" and "very much". Again, at all levels of worries and across time, health satisfaction of females is lower than for males. Also, all age and gender specific averages of health satisfaction clearly increase with a decline in economic worries. Hence, there is an association between worries about economic conditions and health satisfaction. This question was also explored using other measures of worries provided in the data, but these findings did not lead to different conclusions and are not reported due to lack of space. In the sequel, we wish to detail and confirm this correlation between worries and health satisfaction in an econometric analysis.

An interesting phenonmenon is which is apparent in Tables 15(a) and 15(b) is that average health satisfaction declines over time. This contradicts the observation that the mortality

peak which we observe in 1990 and 1991 evens out in subsequent years. The explanation for this paradoxon of declining mortality and worsening health might be related to the panel nature of the data: Landua (1993) found that the response behavior of individuals answering satisfaction questions changes with repeated questioning in two ways. The variance of answers declines and so does mean satisfaction. Individuals become increasingly hesitant to indicate high levels of satisfaction, while low satisfaction is reported consistently over time. Therefore, average satisfaction declines across the waves of a panel survey, an effect that our descriptive statistics confirm. Below we will argue that in a regression analysis, these effects can be separated from other causes by employing a common time trend.

5.2.2 A Regression Analysis of Health Satisfaction

The information on general economic worries is available for all sub-groups. The three levels were categorized in two dummy variables for "strong worries" and "some worries" leaving "no worries" as the reference case. In the case of employed individuals responses on other worries and expectations are provided: Worries about job uncertainty were coded as "1" if they were strong ("job worries: strong"; "0" otherwise). If the individual considers it likely to lose the job or to experience a lower position in the current firm, the respective dummy takes value "1" and "0" otherwise.

A number of control variables were employed. These covariates are age, male, married, household net income, children in household age 16 and younger, handicapped status, a sequence of educational indicators (schooling at the level of 8, 10 and 12 years with different degrees; apprenticeship training; master of crafts; college degree), and a time trend. In the sample for employed men, we were able to use gross income instead of household income. In the sample of unemployed men we also employed a variable measuring unemployment duration (in years). The

regressions for the full sample and its male and female parts also contain dummies for full-time and part-time employment and for out of the labor force leaving the unemployed as reference group.

Table 16(a) contains the results of a multivariate regression analysis of health satisfaction explained by economic worries and these individual characteristics. We also provide an F-test of the joint significance of economic worries and problematic job expectations. Judging from the findings for the total sample (see the first column in Table 16(a)), age and the handicapped status both have a strong and negative effect on health satisfaction. Males are significantly more satisfied with their health than females; married individuals and those with children have positive effect parameters, but they are not statistically different from zero. The income effect is positive and significant, while the education variables exhibit a differentiated picture: in comparison to no schooling degree, 8 and 10 years schooling are associated with a decline in health satisfaction while 12 years of schooling is not. Apprenticeship and master of crafts have no significant contribution while the effect of a college degree is positive and statistically significant. Certainly, household income and education are correlated. They, however, measure different aspects of health production. While the income effect measures the potential for investments in health production, education is a valuable indicator for knowledge about methods of health prevention. It is reasonable that the education effect can be non-linear. Full-time and part-time workers are not different from the unemployed and those out of the labor market; for lack of space, the corresponding effect parameters and their t-values are not reported in Table 16(a).

As could be expected based on Tables 15(a) and 15(b) and the discussion provided above, the time trend is negative. The falling time trend in mortality is not replicated by a positive time trend for health satisfaction, which may be explained by the mechanisms inherent in a repeated survey of satisfaction questions (see Landua, 1993). However, the time trend covers

these effects contained in the panel survey data.

The most interesting effect to be observed in the regression analysis is that of the proxy measure for individually suffered stress and uncertainty, the variables indicating economic worries. Tables 16 indicate consistently significant and sizeable effects of 'strong economic worries' on individual health satisfaction. This suggests that indeed there is a correlation between uncertainty and health, or in other words between psycho-social stress – here measured by means of economic worries – and health. "Strong" worries have a negative effect that is twice as large as that of of "some" worries, which is quite plausible. Finally, the F-test of the joint effects is highly significant. This implies that even after controlling for many individual effects and general trends, we obtain a very strong effect of economic worries on health satisfaction.

The second and third column of Table 16(a) explores whether there are notable differences between males and females. The age and time trend effect is somewhat more negative for females than for males. Female health satisfaction is positively affected by income but insignificant for males, and the reverse is true for children in the household. Obviously, income affects health production for females only, and children contribute to the health satisfaction of males. The negative schooling effects apply for females only.

All other effects are very similar for both males and females. This might be surprising especially in the case of the variables measuring worries, since the mortality crisis was not present for females in the regional data analysis of Section 4. First, we should stress that we have only established a strong relationship between worries and health satisfaction, and not with health. Health satisfaction might be differently related to mortality for males than for females. Unfortunately, we have no data to investigate this important relationship. However, as was also argued by Häussler et. al (1995) in their analysis of mortality in East Germany, females have more socially accepted options than males to respond to a crisis in their labor force participation.

In contrast to men, they can retire from the labor market and concentrate on family activities. In addition, it is possible that females are more robust to health shocks besides their lower levels of health satisfaction, which could explain the difference in their health satisfaction and mortality responses to worries.

Since the mortality crisis in transition was largely observed for males only, we concentrate our further analysis on men. Table 16(b) contains separate regressions for age groups 25-34, 35-44, 45-54, and 55-64. Most notable are the findings for the time trend and the effects of the economic worries. The corresponding variables explain most of the variations in health satisfaction.The time trend effect parameters become less negative with rising average age of the cohort; for age 55-64, the effect parameter is even positive and significant. The negative effects of “strong” and “some” worries are largest in both middle age cohorts, but all estimates suggest strong and significant effects.

Finally, Table 16(a) examines the samples of full-time employed men and of unemployed men. Results are largely consistent with the findings for men in column 2. However, there are some important differences. The effects of economic worries of unemployed men are nearly the same as those for the total sample of males. Worries of full-time employed men are somewhat less negative, which is quite intuitive. For the employed, we also have other indicators of economic worries now explicitly related to the uncertainties resulting from the present job. It seems that most of these worries are already covered by the general question about economic worries with the exception of job loss expectations, which have a negative and significant impact. This result may explain the differences in the effects of economic worries between employed and unemployed males reported above.

The time trend in health satisfaction of the unemployed is more negative than for the employed, which points at the increased stress derived from the status of being unemployed. Not

surprisingly, unemployment duration exhibits no significant effect parameter; since it is measured in years, it highly interacts with the included time trend variable. Finally, unemployed men with a college degree exhibit a higher health satisfaction than those with no such degree.

5.2.3 Summary of the Findings from Individual Data

In this part of the paper we have used large-scale micro panel data of East German households measuring their health satisfaction and economic worries. The major results are:

(i) Economic worries have a strong and negative impact on health satisfaction for both males and females, although the effects are somewhat stronger for males. For males, these effects are strongest in middle ages (age groups 35-44 and 45-54), and they are very stable for the sub-samples of male employed and unemployed. Hence, we have clearly established a channel through which worries affect health.

(ii) Health satisfaction is declining over time, and this trend is strongest for unemployed men. This may have to do with the rising dissatisfaction with the market economy that can be observed in East Germany.

(iii) Surprisingly, individual characteristics play a minor role in the regressions. Income has a positive effect only on the health satisfaction of women, while the presence of dependent children in the household has a positive and significant effect on males only. This points at different channels in the home production of health.

6. Summary and Conclusions

The objective of this study was to first review the evidence on the alleged mortality crisis in East Germany in the wake of unification, and second to discuss and evaluate several explanatory approaches. We started out by describing the empirical basis of recent contributions in the

literature (Eberstadt 1993a, 1994a, 1994b, Häussler et al., 1995) on mortality in East Germany as 'stylized facts' in Section 2. As such we documented that East German mortality increased between 1989 and 1991. This increase affected mostly males. While the relative change in mortality rates is highest for men aged 15 through 35, absolute changes in mortality rates peak for middle aged men (ages 35-55) and those in the 60-65 age group. The mortality increase disappeared for females after 1991 and slowly decreased for men in subsequent years. Concerning causes of death, data from the World Health Organisation suggest an increase in deaths due to unknown causes, an increase in accident related mortality for younger men, and an overall increase in deaths due to diseases of the circulatory system.

Several models have been advanced in the literature to explain population mortality increases (for a survey see Cornia, 1996). Section 3 reviewed these explanatory approaches and discussed their relevance for the case of East Germany. While we cannot exclude the possibility of longer term unemployment effects on health and mortality, prima facie the psycho-social stress model appeared to provide the most convincing rationale for the observed developments. This explanatory approach argues, in line with findings of medical research, that individually experienced stress affects the health status. The drastic social, political, and economic changes that took place during the transition from the socialist to the market economy might well be the reason for much individually experienced stress. It therefore appears plausible to expect an increase in stress-related morbidity and ultimately in mortality.

Whether such developments occurred in East Germany at all, or whether prior information was simply due to statistical artefacts was subject of the analysis in Section 4 of the paper. At the level of contingency tables that were disaggregated by year, age group, region and gender the temporary mortality increase could be documented for males and in some cases for females. The finding was confirmed in the multivariate regression analysis. The male mortality

crisis occurred particularly at middle ages (age groups 40-60), if one studies absolute changes of mortality rates. In terms of percentage changes, the age groups in the twenties had the largest increases. The multivariate regressions for the age cohorts resulted in a significant temporary increase in mortality for age groups 25-30, 35-40, 45-50, 50-55, and 55-60 and confirmed that increases in unemployment are correlated with increases in mortality.

The next step then was to evaluate the determinants of the increase in mortality. This issue was addressed by two levels of analysis in Section 5. As a first step we tabulated highly disaggregated cause-of-death statistics. From an analysis of age group and region specific trends we concluded first, that alcohol related deaths increased in East Germany after unification and are still rising. Second, circulatory and heart problems are a major cause of increasing mortality rates. Third, fatal traffic accidents presented an important transitory phenomenon responsible for the deaths of young men, and finally while overall suicide rates are decreasing, their development differs strongly by age group.

The finding on the relevance of circulatory and heart problems supports the hypotheses advanced by the psycho-social stress theory of mortality developments. In order to investigate the validity of this model on an even more disaggregated level we provided a multivariate analysis of the determinants of individual health as the second step of the analysis. The evidence from multivariate statistical analyses on the basis of the German Socioeconomic Panel (1990-1994) allows us to strongly support the theory that stress and uncertainty influences individual health: The effect of economic worries on health satisfaction was strong and negative for both males and females, although the effects are somewhat stronger for males. For males, these effects are strongest in middle ages (age groups 35-44 and 45-54), and they are very stable for both the employed and unemployed sub-samples. In addition, we found health satisfaction to be declining over time and a surprisingly small relevance of individual characteristics in the determination of

health satisfaction.

These findings suggest a critical review of the East German transition process. The events brought with them significant human loss. The employment consequences are well known and the low relative income position of East Germans in the new Republic is sometimes lamented. It is the contribution of this study to point to the health and mortality effects that can now be claimed to be causally related to the transition. It remains open to discussion whether different political and economic decisions would have allowed for more preferable outcomes. One important lesson from these findings relates to the current discussion about the relevance of the welfare state and its deplored disincentive effects. The findings presented here serve to emphasize the beneficial effects of an uncertainty-reducing set of policy measures as the one represented by the welfare state. Dismantling the protective measures of social welfare and insurance would not just affect economic variables like work-incentives, income distribution, and fiscal deficits. It would also affect the health, and physical well-being of the population. There is other evidence (see Björklund and Eriksson, 1995, for instance) suggesting that poor economic conditions may have negative health consequences even outside periods of transition. This points to a much more general conclusion which deserves further attention.

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Table 1(a): Mortality Rates and Relative Changes

Age-Sex-Specific Mortality Rates in Former East Germany per 1,000 Population

Age 1988		1989	*Changee*	1991	*Change*	1992	*Change*	1993	*Change*	1994	*Change*
Source:	(2)	(1),(2)	*88-89 (in %)*	(1)	*89-91 (in %)*	(1)	*91-92 (in %)*	(1)	*92-93 (in %)*	(1)	*93-94 (in %)*
Men											
0-1	9.0	8.5	*-5.6*	7.0	*-17.6*	7.2	*2.9*	6.5	*-9.7*	7.1	*9.2*
1-5	0.6	0.4	*-33.3*	0.5	*25.0*	0.4	*-20.0*	0.4	*0.0*	0.4	*0.0*
5-10	0.3	0.3	*0.0*	0.3	*0.0*	0.2	*-33.3*	0.2	*0.0*	0.2	*0.0*
10-15	0.3	0.3	*0.0*	0.3	*0.0*	0.2	*-33.3*	0.2	*0.0*	0.2	*0.0*
15-20	0.8	0.9	*12.5*	1.2	*33.3*	1.0	*-16.7*	0.9	*-10.0*	1.1	*22.2*
20-25	1.1	1.1	*0.0*	1.5	*36.4*	1.4	*-6.7*	1.4	*0.0*	1.3	*-7.1*
25-30	1.3	1.2	*-7.7*	1.7	*41.7*	1.5	*-11.8*	1.3	*-13.3*	1.3	*0.0*
30-35	1.8	1.7	*-5.6*	2.2	*29.4*	2.1	*-4.5*	2.0	*-4.8*	1.9	*-5.0*
35-40	2.3	2.5	*8.7*	3.2	*28.0*	3.2	*0.0*	3.1	*-3.1*	2.9	*-6.5*
40-45	3.5	3.5	*0.0*	4.3	*22.9*	4.4	*2.3*	4.1	*-6.8*	4.4	*7.3*
45-50	5.9	5.6	*-5.1*	6.5	*16.1*	6.2	*-4.6*	6.0	*-3.2*	6.0	*0.0*
50-55	9.6	9.3	*-3.1*	9.9	*6.5*	9.4	*-5.1*	9.3	*-1.1*	8.9	*-4.3*
55-60	15.8	15.4	*-2.5*	15.7	*1.9*	15.4	*-1.9*	14.6	*-5.2*	13.9	*-4.8*
60-65	22.9	22.6	*-1.3*	23.9	*5.8*	23.6	*-1.3*	23.6	*0.0*	22.3	*-5.5*
65-70	36.6	36.8	*0.5*	35.9	*-2.4*	33.3	*-7.2*	33.6	*0.9*	32.9	*-2.1*
70-75	63.0	57.8	*-8.3*	55.3	*-4.3*	51.9	*-6.1*	54.1	*4.2*	52.0	*-3.9*
75-80	97.9	93.7	*-4.3*	94.0	*0.3*	89.0	*-5.3*	85.2	*-4.3*	80.3	*-5.8*
Total	**11.9**	**11.4**	***-4.2***	**12.2**	***7.0***	**11.6**	***-4.9***	**11.5**	***-0.9***	**11.2**	***-2.6***
Women											
0-1	6.7	5.9	*-11.9*	4.9	*-16.9*	5.9	*20.4*	5.7	*-3.4*	5.1	*-10.5*
1-5	0.5	0.4	*-20.0*	0.4	*0.0*	0.3	*-25.0*	0.3	*0.0*	0.3	*0.0*
5-10	0.2	0.2	*0.0*	0.2	*0.0*	0.2	*0.0*	0.1	*-50.0*	0.1	*0.0*
10-15	0.2	0.1	*-50.0*	0.2	*100.0*	0.2	*0.0*	0.2	*0.0*	0.2	*0.0*
15-20	0.3	0.4	*33.3*	0.5	*25.0*	0.4	*-20.0*	0.4	*0.0*	0.4	*0.0*
20-25	0.4	0.4	*0.0*	0.4	*0.0*	0.4	*0.0*	0.4	*0.0*	0.4	*0.0*
25-30	0.5	0.5	*0.0*	0.5	*0.0*	0.5	*0.0*	0.5	*0.0*	0.4	*-20.0*
30-35	0.7	0.8	*14.3*	0.8	*0.0*	0.8	*0.0*	0.8	*0.0*	0.7	*-12.5*
35-40	1.1	1.1	*0.0*	1.3	*18.2*	1.1	*-15.4*	1.0	*-9.1*	1.1	*10.0*
40-45	1.8	1.6	*-11.1*	1.9	*18.8*	1.7	*-10.5*	1.8	*5.9*	1.6	*-11.1*
45-50	2.8	2.8	*0.0*	2.9	*3.6*	2.8	*-3.4*	2.5	*-10.7*	2.5	*0.0*
50-55	4.6	4.3	*-6.5*	4.2	*-2.3*	3.8	*-9.5*	3.9	*2.6*	3.8	*-2.6*
55-60	7.2	7.0	*-2.8*	6.9	*-1.4*	6.6	*-4.3*	6.1	*-7.6*	5.8	*-4.9*
60-65	11.3	11.4	*0.9*	11.2	*-1.8*	10.6	*-5.4*	10.2	*-3.8*	9.7	*-4.9*
65-70	20.1	20.0	*-0.5*	18.9	*-5.5*	17.5	*-7.4*	16.4	*-6.3*	15.8	*-3.7*
70-75	38.1	35.3	*-7.3*	32.1	*-9.1*	29.6	*-7.8*	29.4	*-0.7*	29.1	*-1.0*
75-80	64.3	62.3	*-3.1*	60.0	*-3.7*	56.5	*-5.8*	53.9	*-4.6*	50.6	*-6.1*
Total	**13.6**	**13.2**	*-2.9*	**13.2**	*0.0*	**12.5**	*-5.3*	**12.2**	*-2.4*	**12.1**	*-0.8*

Source: (1) German Statistical Yearbook 1994, 1995.
(2) Demographic Yearbook of the United Nations 1988, 1991, 1992.

Table 1(b): Mortality Rates and Absolute Changes

Age-Sex-Specific Mortality Rates in Former East Germany per 1,000 Population

Age Source:	1988 (2)	1989 (1,2)	*Abs. Change 88-89*	1991 (1)	*Abs. Change 89-91*	1992 (1)	*Abs. Change 91-92*	1993 (1)	*Abs. Change 92-93*	1994 (1)	*Abs. Change 93-94*
Men											
0-1	9.0	8.5	*-0.5*	7.0	*-0.5*	7.2	*0.2*	6.5	*-0.7*	7.1	*0.6*
1-5	0.6	0.4	*-0.2*	0.5	*0.1*	0.4	*0.1*	0.4	-	0.4	-
5-10	0.3	0.3	-	0.3	-	0.2	*0.1*	0.2	-	0.2	-
10-15	0.3	0.3	-	0.3	-	0.2	*0.1*	0.2	-	0.2	-
15-20	0.8	0.9	*0.1*	1.2	*0.3*	1.0	*0.2*	0.9	*-0.1*	1.1	*0.2*
20-25	1.1	1.1	-	1.5	*0.4*	1.4	*0.1*	1.4	-	1.3	*-0.1*
25-30	1.3	1.2	*-0.1*	1.7	*0.5*	1.5	*0.2*	1.3	*-0.2*	1.3	-
30-35	1.8	1.7	*-0.1*	2.2	*0.5*	2.1	*0.1*	2.0	*-0.1*	1.9	*-0.1*
35-40	2.3	2.5	*0.2*	3.2	*0.7*	3.2	-	3.1	*-0.1*	2.9	*-0.2*
40-45	3.5	3.5	-	4.3	*0.8*	4.4	*0.1*	4.1	*-0.3*	4.4	*0.3*
45-50	5.9	5.6	*-0.3*	6.5	*0.9*	6.2	*0.3*	6.0	*-0.2*	6.0	-
50-55	9.6	9.3	*-0.3*	9.9	*0.6*	9.4	*-0.5*	9.3	*-0.1*	8.9	*-0.4*
55-60	15.8	15.4	*-0.4*	15.7	*0.3*	15.4	*0.3*	14.6	*-0.8*	13.9	*-0.7*
60-65	22.9	22.6	*-0.3*	23.9	*1.3*	23.6	*0.3*	23.6	-	22.3	*-1.3*
65-70	36.6	36.8	*0.2*	35.9	*-0.9*	33.3	*-2.6*	33.6	*0.3*	32.9	*-0.7*
70-75	63.0	57.8	*-5.2*	55.3	*-2.5*	51.9	*-3.4*	54.1	*2.2*	52.0	*-2.1*
75-80	97.9	93.7	*-4.2*	94.0	*0.3*	89.0	*-5.0*	85.2	*-3.8*	80.3	*-4.9*
Total	**11.9**	**11.4**	***-0.5***	**12.2**	***0.8***	**11.6**	***-0.6***	**11.5**	***-0.1***	**11.2**	***0.3***
Women											
0-1	6.7	5.9	*-0.8*	4.9	*-1.0*	5.9	*1.0*	5.7	*-0.2*	5.1	*0.1*
1-5	0.5	0.4	*-0.1*	0.4	-	0.3	*-0.1*	0.3	-	0.3	-
5-10	0.2	0.2	-	0.2	-	0.2	-	0.1	*-0.1*	0.1	-
10-15	0.2	0.1	*-0.1*	0.2	*0.1*	0.2	-	0.2	-	0.2	-
15-20	0.3	0.4	*0.1*	0.5	*0.1*	0.4	*-0.1*	0.4	-	0.4	-
20-25	0.4	0.4	-	0.4	-	0.4	-	0.4	-	0.4	-
25-30	0.5	0.5	-	0.5	-	0.5	-	0.5	-	0.4	*0.1*
30-35	0.7	0.8	*0.1*	0.8	-	0.8	-	0.8	-	0.7	*0.1*
35-40	1.1	1.1	-	1.3	*0.2*	1.1	*-0.2*	1.0	*-0.1*	1.1	*0.1*
40-45	1.8	1.6	*-0.2*	1.9	*0.3*	1.7	*-0.2*	1.8	*0.1*	1.6	*0.2*
45-50	2.8	2.8	-	2.9	*0.1*	2.8	*-0.1*	2.5	*-0.3*	2.5	-
50-55	4.6	4.3	*-0.3*	4.2	*-0.1*	3.8	*-0.4*	3.9	*0.1*	3.8	*0.1*
55-60	7.2	7.0	*-0.2*	6.9	*-0.1*	6.6	*-0.3*	6.1	*-0.5*	5.8	*0.3*
60-65	11.3	11.4	*0.1*	11.2	*-0.2*	10.6	*-0.6*	10.2	*-0.4*	9.7	*0.5*
65-70	20.1	20.0	*-0.1*	18.9	*-1.1*	17.5	*-1.4*	16.4	*-0.1*	15.8	*0.6*
70-75	38.1	35.3	*-2.8*	32.1	*-3.2*	29.6	*-2.5*	29.4	*-0.2*	29.1	*0.3*
75-80	64.3	62.3	*-2.0*	60.0	*-2.3*	56.5	*-3.5*	53.9	*-2.6*	50.6	*3.3*
Total	**13.6**	**13.2**	***-0.4***	**13.2**	**-**	**12.5**	***-0.7***	**12.2**	***-0.3***	**12.1**	***0.1***

Source: (1) German Statistical Yearbook 1994, 1995.
(2) Demographic Yearbook of the United Nations 1988, 1991, 1992.

Table 2: Mortality Trends World Health Organization Data

Age-Sex Specific Mortality Rates per 100,000 Population

Age	1988	1989	Change (in %)	1990	Change (1989-90) (in %)	(absolute)
Men						
0	919.6	889.6	*-3.3*	835.8	*-6.1*	*-53.8*
1 - 5	56.4	42.5	*-24.7*	60.9	*43.3*	*18.4*
5 - 15	28.9	28.2	*-2.4*	38.3	*35.8*	*10.1*
15 - 25	100.8	100.7	*-0.1*	137.0	*36.1*	*36.3*
25 - 35	151.5	142.4	*-6.0*	178.8	*25.6*	*36.4*
35 - 45	283.7	288.5	*1.7*	339.3	*17.6*	*50.8*
45 - 55	763.3	744.0	*-2.5*	863.1	*16.0*	*119.1*
55 - 65	1,870.6	1,845.2	*-1.4*	1,936.0	*4.9*	*90.8*
65 - 75	4,660.3	4,396.4	*-5.7*	4,420.1	*0.5*	*23.7*
75 +	13,962.2	13,578.0	*-2.8*	13,860.0	*2.1*	*282.0*
Total	1,188.3	1,144.3	*-3.7*	1,230.3	*7.5*	*86.0*
Women						
0	689.0	618.6	*-10.2*	625.4	*1.1*	*6.8*
1 - 5	50.2	38.5	*-23.3*	45.8	*19.0*	*7.3*
5 - 15	20.1	15.1	*-24.9*	27.7	*83.4*	*12.6*
15 - 25	39.8	42.2	*6.0*	47.2	*11.9*	*5.0*
25 - 35	58.6	63.3	*8.0*	67.6	*6.8*	*4.3*
35 - 45	141.7	129.6	*-8.5*	143.1	*10.4*	*13.5*
45 - 55	367.6	353.2	*-3.9*	369.8	*4.7*	*16.6*
55 - 65	924.3	917.2	*-0.8*	949.7	*3.5*	*32.5*
65 - 75	2,739.9	2,561.7	*-6.5*	2,459.4	*-4.0*	*-102.3*
75 +	10,754.4	10,471.1	*-2.6*	10,384.0	*-0.8*	*-87.1*
Total	1,361.2	1,322.0	*-2.9*	1,347.0	*1.9*	*25.0*

Source: WHO, World Health Statistics Annual, 1987-1992.

Table 3: Life Expectancy at Birth in Germany

(a) German Statistical Office Data

West			East			Difference	
Base Years	Men	Women	Base Years	Men	Women	Men	Women
1969/71	67.3	73.6	1970	68.1	73.3	-0.8	0.3
1975/77	68.6	75.2	1976	68.8	74.4	-0.2	0.8
1980/82	70.2	76.9	1981	69.0	74.8	1.2	2.1
1985/87	71.8	78.4	1986/87	69.8	75.8	2.0	2.6
1988/90	72.6	79.0	1988/89	70.0	76.2	2.6	2.8
1991/93	73.1	79.5	1991/93	69.9	77.2	3.2	2.3
1993/95	73.5	79.8	1993/95	70.7	78.2	2.8	1.6

Sources: German Statistical Yearbook, and for the East prior to 1991 Statistical Yearbook of the GDR, various issues.

(b) Calculations by Häussler et al. (1995)

	Life Expectancy at Birth		Mortality relative to 1989	
Year	Men	Women	Men	Women
1989	70.10	76.34	100.0%	100.0%
1990	69.21	76.24	104.3%	98.7%
1991	69.44	76.63	102.3%	95.7%
1992	70.03	77.28	96.8%	88.5%

Source: Häussler et al. (1995, Table 1, p. 367).

Table 4: Cause of Death Statistics for East German Men by Age (1989 and 1990)

(a) Age-Sex-Specific Mortality Rates (DR) per 100,000 Men for Selected Causes

		# Cases All Ages		MR All Ages		MR Ages 15-25		MR Ages 25-35		MR Ages 35-45		MR Ages 45-55		MR Ages 55-65	
Cause	ICD (9) #	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990
All Causes		91,091	94,654	1144.3	1230.3	100.7	137.0	142.4	178.8	288.5	339.3	744.0	863.1	1845.2	1936.0
Diseases of the Circulatory System	25-30	46,797	46,980	587.9	610.6	5.3	5.7	13.8	20.2	62.7	70.4	224.2	254.8	751.4	787.4
Acute Myocardial Infarction	270	5,660	7,008	71.1	91.9	0.3	0.4	3.6	4.9	18.2	22.4	65.9	75.5	188.6	215.5
Dis. of Pulmonary Circ. and Other Forms of Heart Disease	28	6,880	8,786	86.4	114.2	3.0	3.9	4.8	7.7	16.1	21.1	40.6	55.2	106.4	140.3
Atherosclerosis	300	10,533	8,222	132.3	106.9	0.1	0	0.4	-	1.6	1.2	9.3	10.6	70.9	57.6
Pneumonia	321	1,604	2,205	20.1	28.7	0.9	1.2	1.7	2.7	4.3	5.6	8.8	14.6	23.3	34.7
Chronic Liver Disease and Cirrhosis	347	2,109	2,606	26.5	33.9	0.5	0.6	4.8	9.5	20.6	30.4	54.9	69.0	79.7	95.6
Signs, Symptoms, and other ill-defined conditions	460-464, 466,467,469	757	3,107	9.5	40.4	1.3	11.2	4.0	16.5	8.3	24.9	13.6	46.9	17.6	65.5
Accidents and Adverse Effects	E47-E53	4,055	4,891	50.9	63.6	51.6	84.0	42.4	54.9	44.9	565	54.0	70.7	59.2	67.5
Motor Vehicle Traffic Accidents	E471	1,332	2,197	16.7	28.6	31.7	62.9	16.4	31.5	12.3	23.7	14.6	25.5	19.9	27.6
Suicide and Self-Inflicted Injury	E54	2,873	2,681	36.1	34.8	15.5	11.8	27.3	25.7	39.1	37.5	52.2	57.0	55.0	54.6

(b) Changes in Age-Sex-Specific Mortality Rates (MR) per 100,000 Men between 1989 and 1990 for Selected Causes

Cause	ICD (9) #	# Cases All Ages 1990 - 1989	MR All Ages 1990 - 1989	MR Ages 15-25 1990 - 1989	MR Ages 25-35 1990 - 1989	MR Ages 35-45 1990 - 1989	MR Ages 45-55 1990 - 1989	MR Ages 55-65 1990 - 1989
All Causes		3,563	86.0	36.3	36.4	50.8	119.1	90.8
Diseases of the Circulatory System	25-30	183	22.7	0.4	6.4	7.7	30.6	36.0
Acute Myocardial Infarction	270	1.348	20.8	0.1	1.3	4.2	9.6	26.9
Dis. of Pulmonary Circ. and Other Forms of Heart Disease	28	1.906	27.8	0.9	2.9	5.0	14.6	33.9
Atherosclerosis	300	-2,311	-25.4	-0.1	-0.4	0.4	1.3	-13.3
Pneumonia	321	601	8.6	0.3	1.0	1.3	5.8	11.4
Chronic Liver Disease and Cirrhosis	347	497	7.4	0.1	4.7	9.8	14.1	15.9
Signs, Symptoms, and other ill-defined conditions	460-464, 466,467,469	2,350	30.9	9.9	12.5	16.6	33.3	47.9
Accidents and Adverse Effects	E47-E53	836	12.7	32.4	12.5	11.6	16.7	8.3
Motor Vehicle Traffic Accidents	E471	865	11.9	31.2	15.1	11.4	10.9	7.7
Suicide and Self-Inflicted Injury	E54	-192	-1.3	-3.7	-1.6	1.6	4.8	-0.4

Source: WHO, World Health Statistics Annual, 1990, 1992

Table 5: Public Health Characteristics

(a) Number of Physicians per 10,000 Population by State

	1991	1992	1993	1994
Brandenburg	22.2	23.2	24.0	25.0
Mecklenburg-Vorpommern	27.5	28.0	28.7	29.8
Sachsen	25.9	26.4	26.4	27.6
Sachsen-Anhalt	23.8	24.4	25.4	26.5
Thüringen	24.7	25.4	26.6	27.9
Bayern	32.3	33.0	34.1	35.1
Niedersachsen	26.9	27.6	28.4	29.1

Source: German Statistical Yearbook (various issues).

(b) Number of Beds in Public Hospitals per 100,000 Population by State

	1991	1992	1993	1994
Brandenburg	701.4	659.0	504.8	417.5
Mecklenburg-Vorpommern	780.6	605.7	510.2	443.0
Sachsen	707.2	646.6	603.6	550.7
Sachsen-Anhalt	697.4	720.3	647.7	589.0
Thüringen	689.0	647.3	643.3	575.3
Bayern	531.7	534.1	525.2	519.9
Niedersachsen	369.2	375.0	346.3	340.9

Source: German Statistical Yearbook (various issues).

(c) Expenditures of Public Health Insurances per Member (in 1,000 DM)

	1991	1992	1993	1994	1995
West Germany					
retirees	5.61	6.21	6.13	6.59	6.67
other members	3.21	3.48	3.43	3.64	3.83
all	3.90	4.26	4.21	4.49	4.68
East Germany					
retirees	2.82	4.12	4.57	5.24	5.39
other members	1.52	2.24	2.46	2.80	3.04
all	1.86	2.73	3.04	3.51	3.77

Source: Bundesminister für Arbeit und Sozialordnung (various issues).

Table 6: Unemployment Situation in East Germany

(a) Official Unemployment Rates by State

	1991	1992	1993	1994	1995
Brandenburg	10.3	14.8	15.3	15.3	14.2
Mecklenburg-Vorpommern	12.5	16.8	17.5	17.0	16.1
Sachsen	9.1	13.6	14.9	15.7	14.4
Sachsen-Anhalt	10.3	15.3	17.2	17.6	16.5
Thüringen	10.2	15.4	16.3	16.5	15.0
All East German States	10.3	14.8	15.8	16.0	14.9

Source: Bundesanstalt für Arbeit, ANBA (various issues).

(b) Official Unemployment Rates for Males and Females

	1991	1992	1993	1994	1995
East Germany					
Men	8.5	10.5	11.0	10.9	10.7
Women	12.3	19.6	21.0	21.5	19.3
West Germany					
Men	5.8	6.2	8.0	9.2	9.3
Women	7.0	7.2	8.4	9.2	9.2

Source: Bundesanstalt für Arbeit, ANBA (various issues).

Table 7: Sociogeographic Information

(a) East German States

STATES	Area (in km^2)	Population [1] (in Million)	Percentage Female	Population Density (Population / km^2)	Capital
Berlin	889	3.472	51.93	3,905	Berlin
Brandenburg	29,481	2.537	51.01	86	Potsdam
Mecklenburg-Vorpommern	23,170	1.832	50.93	79	Schwerin
Sachsen	18,412	4.584	52.18	246	Dresden
Sachsen-Anhalt	20,446	2.759	51.72	135	Magdeburg
Thüringen	16,171	2.518	51.63	156	Erfurt

(b) East German Cities

CITIES	Area (in km^2)	Population [2] (in Million)	Percentage Female	Population Density (Population / km^2)
Dresden	225.75	0.4776	52.47	2,115
Erfurt	107.62	0.2015	52.36	1,873
Gera	77.64	0.1256	52.07	1,618
Jena	58.63	0.1002	52.10	1,710
Leipzig	148.58	0.4877	52.63	3,282
Potsdam	109.37	0.1392	51.58	1,272
Rostock	180.68	0.2361	51.08	1,307
Weimar	51.31	0.0605	52.56	1,179
Zwickau	59.86	0.1068	52.72	1,783

Note: 1) As of 31.12.1994.
2) As of 30.6.1994.

Source: German Statistical Yearbook, 1996.

Table 8: Temporary Rise of Mortality Rates after 1989 [1]

	Total [2]	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65
Males									
States									
Berlin-East	+	+	+	+	+	+	+	+	+
Brandenburg	+	+	+	+	+	+	+	+	+
Mecklenburg-Vorpommern	+	+	+	+	+	+	+	+	+
Sachsen-Anhalt [3]	+	+	+	+	+	+	+	+	+
Thüringen [4]	+	+	+	+	-	+	+	+	+
Cities									
Dresden	+	+	0	+	+	+	+	+	+
Erfurt	+	+	+	-	-	+	+	+	-
Gera [4]	+	-	-	-	-	-	+	+	-
Jena	+	+	+	+	0	+	+	-	+
Leipzig [4]	+	0	0	+	+	+	+	+	+
Weimar [4]	+	+	-	+	+	+	+	-	-
Females									
States									
Berlin-East	+	+	-	+	+	+	+	-	+
Brandenburg	0	+	-	+	-	+	+	+	+
Mecklenburg-Vorpommern	+	0	+	+	+	+	+	+	+
Sachsen-Anhalt [3]	+	+	+	+	-	+	-	+	+
Thüringen [4]	0	+	-	+	-	-	-	+	-
Cities									
Dresden	-	-	-	-	+	+	-	+	-
Erfurt	+	+	+	+	+	-	-	-	+
Jena	+	+	+	+	-	-	-	-	-
Leipzig [4]	0	-	+	-	-	+	+	0	+

Notes: 1) "+": increase, "-": decrease, "0": no clear effect.
2) Refers to all age groups (also below 25 and above 65).
3) Figures for Sachsen-Anhalt represent age groups 20-30, 30-40, etc.
4) Only partial information.

Table 9: Male Mortality Rates [1,2]

(a) East Berlin

Age	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0-5	2.53	2.51	2.48	2.05	1.50	1.32	1.06	1.26	1.14	1.13
5-10	0.24	0.23	0.26	0.43	0.13	0.31	0.28	0.28	0.20	0.11
10-15	0.25	0.15	0.14	0.16	0.35	0.27	0.44	0.32	0.16	0.16
15-20	0.69	0.47	0.83	0.67	0.91	0.81	0.71	0.69	0.54	0.73
20-25	0.77	0.87	0.85	0.61	1.07	1.06	1.08	0.98	0.66	0.92
25-30	1.22	0.96	0.87	0.76	0.85	1.22	1.11	0.99	0.95	0.83
30-35	1.20	1.23	1.11	1.01	1.24	1.52	1.91	1.76	1.45	1.09
35-40	1.53	1.64	1.69	1.73	2.13	2.42	2.40	2.52	2.15	1.95
40-45	2.58	3.06	2.85	2.98	3.52	3.62	4.22	3.30	4.19	2.75
45-50	4.60	4.47	4.60	5.21	5.77	5.68	5.59	5.28	5.40	5.50
50-55	9.06	7.88	8.32	8.41	8.58	10.38	8.84	8.46	8.01	7.16
55-60	13.06	14.81	13.42	13.36	14.10	14.15	14.30	13.75	12.67	11.79
60-65	23.83	20.28	22.65	21.05	21.39	23.27	20.89	20.41	19.69	18.20
65-70	38.87	38.93	38.58	35.34	37.07	35.14	29.59	29.52	29.44	28.23
70-75	63.95	61.81	64.03	60.82	54.26	55.94	53.35	52.95	54.31	42.80
75-80	101.26	97.10	90.87	95.81	97.33	95.30	89.44	81.00	75.56	70.01
Total	10.41	9.71	9.45	9.20	9.65	9.74	9.26	8.85	8.51	7.94

(b) Brandenburg

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0-1	11.77	10.41	10.43	9.53	9.84	9.17	8.93	8.85	7.67	6.87	4.76
1-5	0.88	0.57	0.70	0.52	0.44	0.57	0.57	0.47	0.51	0.42	0.37
5-10	0.29	0.28	0.37	0.37	0.36	0.53	0.33	0.23	0.17	0.19	0.24
10-15	0.37	0.34	0.23	0.24	0.15	0.46	0.29	0.26	0.23	0.25	0.12
15-20	0.92	0.90	1.15	1.00	1.04	1.33	1.49	1.33	1.02	1.11	1.13
20-25	1.40	1.34	1.17	1.23	1.28	1.51	1.98	1.53	1.75	1.83	1.49
25-30	1.48	1.46	1.50	1.44	1.54	1.63	2.15	1.72	1.66	1.57	1.35
30-35	1.75	1.76	1.86	2.00	1.88	2.47	2.36	2.35	2.29	2.16	1.90
35-40	2.03	2.16	2.52	2.57	2.61	3.24	3.57	3.28	3.78	3.56	3.14
40-45	3.99	4.34	4.44	3.78	3.62	3.81	4.37	4.76	5.00	4.68	4.09
45-50	5.68	6.14	6.16	6.45	6.67	7.54	8.13	7.52	6.75	6.49	5.70
50-55	9.45	9.12	9.96	10.05	10.00	11.04	11.18	11.00	9.89	10.06	9.12
55-60	13.66	14.65	15.28	16.35	15.65	16.66	15.89	16.67	15.63	14.60	13.71
60-65	23.46	22.42	23.25	23.99	22.95	24.67	23.08	24.72	23.87	22.13	21.92
65-70	36.87	35.57	34.57	37.84	38.20	39.38	35.96	31.87	33.27	33.30	30.34
70-75	66.40	67.24	67.08	69.12	62.59	54.90	51.21	50.91	55.60	52.16	49.50
75-80	105.6	102.8	98.87	101.4	98.07	102.5	102.8	100.0	96.39	84.57	73.12
Total	8.53	8.27	8.20	8.31	8.12	8.77	8.67	8.48	8.41	8.17	7.79

(c) Mecklenburg-Vorpommern

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0-1	9.30	11.10	8.80	9.40	7.10	9.40	6.70	7.60	5.70	9.90	4.50
1-5	0.80	0.80	0.50	0.40	0.40	0.70	0.70	0.40	0.30	0.50	0.60
5-10	0.40	0.40	0.30	0.30	0.20	0.40	0.20	0.30	0.20	0.40	0.30
10-15	0.30	0.30	0.30	0.30	0.20	0.40	0.20	0.30	0.40	0.40	0.30
15-20	1.20	1.10	1.10	0.80	1.10	1.50	1.50	1.10	1.20	1.50	1.30
20-25	1.30	1.40	1.50	1.30	1.50	1.90	2.00	2.20	2.20	1.60	1.80
25-30	1.50	1.30	1.40	1.50	1.30	2.10	1.90	1.90	2.00	1.90	1.50
30-35	2.00	2.30	2.00	2.20	2.10	3.00	2.80	2.90	2.50	2.50	2.50
35-40	2.90	2.40	2.40	2.80	2.60	4.00	4.00	4.80	4.50	4.00	3.70
40-45	4.90	5.00	3.90	4.30	4.00	5.40	5.60	5.80	5.20	5.50	5.80
45-50	7.30	6.60	7.50	7.90	7.40	8.50	8.10	7.30	8.20	7.50	7.20
50-55	10.40	10.70	10.90	10.60	10.80	13.10	12.00	11.60	11.20	10.50	10.00
55-60	15.00	16.80	16.40	17.20	17.20	18.70	18.40	17.00	17.70	15.80	16.00
60-65	25.70	25.10	22.70	23.10	22.30	23.90	26.70	25.90	25.10	24.20	23.80
65-70	39.30	55.50	37.70	36.70	38.50	38.90	38.10	34.70	35.10	35.10	36.00
70-75	69.80	74.60	72.30	75.50	65.30	61.50	59.40	56.00	56.70	56.40	50.20
75-80	111.5	106.7	101.4	107.1	102.7	107.7	97.20	93.60	89.00	86.60	78.00
Total	8.40	8.30	7.90	8.00	7.70	11.60	11.10	10.80	10.80	10.80	10.60

(d) Sachsen-Anhalt

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993
0-1	11.41	12.27	10.31	9.53	9.61	9.89	8.12	8.45	5.41
1-5	0.62	0.68	0.57	0.68	0.49	0.71	0.54	0.26	0.37
5-10	0.39	0.38	0.26	0.23	0.33	0.29	0.29	0.18	0.27
10-15	0.35	0.33	0.30	0.23	0.31	0.39	0.23	0.20	0.26
15-20	0.92	1.00	0.94	0.90	0.91	1.25	1.23	1.04	1.02
20-30	1.30	1.28	1.27	1.32	1.03	1.67	1.55	1.47	1.34
30-40	1.70	1.73	2.13	2.00	2.19	2.69	2.88	2.69	2.53
40-50	4.72	4.70	4.93	5.31	4.81	6.07	6.01	5.50	5.13
50-60	12.07	12.88	12.33	13.11	12.22	13.44	12.90	12.80	12.33
60-70	28.29	29.04	28.34	28.36	29.21	30.72	30.68	29.20	30.00
70-80	86.97	87.06	85.66	86.62	81.59	78.68	77.57	69.20	66.03
Total	13.25	12.98	12.48	12.55	12.07	13.14	13.13	12.43	12.34

(e) Thüringen

Age	1985	1986	1987	1988	1989	1990
0-1	10.90	9.30	10.30	8.80	10.70	8.80
1-5	0.70	0.80	0.40	0.60	0.40	0.60
5-10	0.30	0.30	0.10	0.50	0.30	0.30
10-15	0.30	0.20	0.30	0.20	0.30	0.50
15-20	1.00	0.80	0.80	0.80	0.80	1.20
20-25	1.20	1.30	1.10	1.10	1.20	1.40
25-30	1.30	1.10	1.40	1.30	1.20	1.40
30-35	1.60	1.60	1.60	1.40	1.60	1.80
35-40	1.90	2.10	2.30	2.30	2.40	2.50
40-45	3.10	3.30	2.90	3.50	3.50	3.40
45-50	5.30	5.20	5.30	5.50	5.10	6.30
50-55	9.40	9.20	9.20	9.00	8.80	9.30
55-60	14.70	14.80	16.00	14.80	14.50	15.20
60-65	22.90	23.00	22.20	21.70	22.60	23.40
65-70	36.60	37.20	35.70	35.80	35.40	37.70
70-75	64.20	63.00	60.40	63.30	56.30	56.10
75-80	107.00	100.90	95.30	98.30	95.80	97.80
Total	12.70	12.20	11.90	11.80	11.50	12.20

(f) Dresden

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0-1	9.29	13.26	9.67	10.93	9.14	7.01	11.16	7.51	25.24	3.04	0.79
1-5	0.42	0.35	0.43	0.73	0.30	0.56	0.43	0.39	0.35	0.85	1.12
5-10	0.22	0.38	0.16	0.50	0.36	0.37	0.25	0.06	0.32	0.00	0.14
10-15	0.20	0.27	0.26	0.26	0.38	0.25	0.30	0.18	0.18	0.06	0.06
15-20	0.49	0.88	0.91	0.54	0.66	0.65	0.37	1.09	0.51	1.04	0.80
20-25	1.14	0.99	0.94	0.77	0.96	1.75	1.57	1.22	0.79	1.19	0.59
25-30	0.75	0.98	1.27	0.94	0.83	1.52	1.13	1.04	0.73	0.73	0.85
30-35	1.29	1.86	1.31	1.59	1.64	1.04	1.64	1.29	1.83	1.28	1.36
35-40	0.90	1.69	2.16	1.48	1.75	2.48	2.50	1.96	1.97	2.31	2.58
40-45	3.15	2.80	2.65	2.89	2.51	3.05	3.19	3.80	3.04	2.99	2.88
45-50	3.94	4.17	4.28	4.39	4.54	5.01	5.30	5.49	5.42	5.50	4.95
50-55	7.86	6.50	5.25	6.84	6.43	7.73	7.17	6.91	5.97	5.06	6.06
55-60	10.26	12.54	12.75	11.60	10.46	11.06	12.33	11.67	10.33	9.78	10.02
60-65	21.87	20.21	18.31	14.88	18.63	19.86	17.79	17.57	18.35	17.44	14.62
65-70	28.12	30.22	28.07	35.48	29.68	33.81	31.18	23.43	27.10	28.16	28.69
70-75	57.72	58.91	61.12	64.31	51.76	41.42	41.25	38.80	49.31	44.32	41.33
75-80	99.34	88.65	83.15	85.59	87.37	82.44	82.57	89.77	67.56	71.38	66.01
Total	8.05	7.79	7.26	7.27	7.04	7.35	7.20	6.81	6.92	6.46	6.37

(g) Erfurt

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0-1	8.27	5.36	5.44	3.72	7.31	8.38	6.19	6.90	3.25	5.41	7.09
1-5	0.00	0.60	0.60	0.20	0.20	0.65	0.23	0.73	0.29	0.00	1.01
5-10	0.12	0.12	0.23	0.59	0.87	0.64	0.40	0.26	0.14	0.42	0.15
10-15	0.42	0.30	0.44	0.00	0.13	0.65	0.00	0.26	0.26	0.41	0.00
15-20	0.46	0.69	0.47	0.25	0.54	1.38	0.98	1.62	1.08	0.73	0.83
20-25	1.63	1.66	1.46	1.05	1.22	0.65	0.94	2.02	0.85	0.44	1.41
25-30	1.30	0.84	1.01	1.64	0.77	1.37	1.45	1.61	1.20	1.34	0.74
30-35	2.00	1.60	1.39	1.82	1.08	2.87	1.57	2.07	0.52	1.34	1.88
35-40	1.50	1.49	1.41	2.45	3.65	2.75	2.92	2.44	2.14	1.30	2.11
40-45	2.97	1.14	2.65	4.41	4.79	3.39	3.81	3.62	3.09	3.65	2.29
45-50	4.45	4.28	3.96	4.42	4.58	5.47	5.50	4.60	5.63	5.69	4.95
50-55	7.96	8.59	7.74	7.40	8.01	9.67	7.98	6.23	8.55	7.80	6.18
55-60	11.54	13.27	14.90	14.34	10.73	12.62	14.24	14.26	12.12	12.48	10.48
60-65	19.49	27.75	23.68	19.03	24.42	23.01	24.23	23.32	25.68	19.59	15.08
65-70	35.26	36.97	35.28	37.84	32.20	32.46	36.36	35.74	32.50	31.55	28.40
70-75	69.52	64.81	58.82	65.15	57.47	55.41	52.33	46.13	49.98	47.30	56.66
75-80	108.0	107.9	101.1	98.70	94.97	98.99	99.83	97.56	101.4	75.16	75.39
Total	8.03	7.95	7.41	7.46	7.39	8.09	8.03	7.74	7.57	7.01	6.87

(h) Gera

Age	1985	1986	1987	1988	1989	1990
0-1	8.00	5.10	5.10	9.40	10.20	11.10
1-5	1.20	0.70	-	1.00	0.50	-
5-10	0.20	0.60	-	0.20	0.20	0.20
10-15	0.50	-	0.30	-	-	0.60
15-20	1.20	0.20	0.90	0.70	1.20	0.50
20-25	1.20	1.90	1.20	0.40	1.10	1.00
25-30	2.10	2.00	1.60	0.80	2.00	1.70
30-35	1.90	2.00	2.00	1.50	1.20	0.50
35-40	2.50	1.10	2.80	2.80	2.00	1.30
40-45	2.80	1.90	2.00	4.60	5.30	2.90
45-50	4.30	4.50	3.70	6.10	7.10	5.10
50-55	9.50	9.10	9.50	8.10	7.80	8.80
55-60	14.90	13.40	14.80	11.60	12.50	12.80
60-65	21.70	21.80	24.70	24.00	24.50	23.80
65-70	31.60	38.90	33.90	32.90	29.00	34.90
70-75	65.30	57.60	61.30	60.10	46.20	50.10
75-80	92.00	82.40	88.30	93.70	75.40	86.60
Total	11.10	10.30	10.10	10.10	9.60	10.60

(i) Jena

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993
0-1	11.7	9.0	15.6	4.2	7.5	7.9	14.0	2.9	9.6
1-5	0.9	0.9	-	0.3	0.7	-	0.4	-	-
5-10	0.2	1.2	-	0.7	0.2	0.5	0.3	-	0.6
10-15	-	0.6	-	-	-	1.1	0.5	0.3	0.3
15-20	0.5	0.2	1.0	0.3	0.8	1.2	0.3	-	0.3
20-25	0.7	0.9	1.6	0.9	1.4	1.4	1.4	0.5	0.3
25-30	1.0	1.2	1.2	0.9	0.2	0.9	0.9	1.4	0.5
30-35	1.3	0.2	0.5	0.5	1.0	2.3	1.3	1.5	1.5
35-40	1.1	1.6	1.5	1.4	2.4	2.5	2.3	2.1	1.8
40-45	2.3	3.3	2.5	2.6	2.1	0.6	3.5	3.6	3.7
45-50	4.4	4.6	2.7	3.9	3.6	6.1	4.4	3.0	4.1
50-55	7.6	8.6	8.0	7.1	6.3	6.5	9.5	9.2	7.8
55-60	9.1	12.9	14.3	10.3	12.5	12.4	9.6	10.3	9.2
60-65	31.3	16.3	19.3	13.7	14.5	21.3	19.8	23.3	19.3
65-70	28.0	39.5	31.6	39.7	26.9	26.4	32.8	25.6	33.5
70-75	52.0	54.0	46.6	47.6	46.3	48.0	56.6	41.6	42.1
75-80	83.4	81.8	94.5	83.6	89.3	73.4	89.2	74.4	82.1
Total	9.6	9.4	9.4	8.7	8.7	9.5	10.3	9.3	9.0

(j) Leipzig

Age	1988	1989	1990	1991
<1	7.72	5.35	10.61	5.96
1-5	0.67	0.40	0.00	0.00
5-10	0.18	0.19	0.00	0.00
10-15	0.37	0.28	0.00	0.00
15-20	0.51	0.74	0.00	0.00
20-25	1.33	0.67	0.00	0.00
25-30	1.11	1.24	0.88	1.70
30-35	1.60	1.90	1.77	2.17
35-40	2.17	2.38	3.05	2.91
40-45	3.46	3.24	3.80	4.00
45-50	5.31	5.59	6.32	6.15
50-55	8.66	7.51	9.70	9.40
55-60	15.27	14.97	15.80	15.44
60-65	23.58	19.78	24.95	21.40
65-70	35.41	34.61	38.34	31.72
70-75	55.64	53.94	56.90	56.23
75-80	94.64	81.19	86.40	95.42
Total	12.33	11.62	8.75	8.57

(k) Weimar

Age	1985	1986	1987	1988	1989	1990
0-1	10.40	4.20	12.60	4.30	7.20	5.20
1-5	1.60	3.20	0.50	1.10	-	-
5-10	-	0.40	-	-	-	0.50
10-15	0.50	-	1.10	0.50	-	-
15-20	0.40	-	0.40	0.40	0.90	2.10
20-25	1.70	1.00	0.30	1.00	1.10	0.80
25-30	1.50	0.70	1.00	0.70	0.30	1.10
30-35	0.80	1.20	1.90	1.90	3.30	2.60
35-40	-	2.40	1.70	2.50	0.80	2.50
40-45	2.20	3.40	2.10	4.30	2.20	4.30
45-50	3.00	5.40	8.10	4.10	2.10	7.50
50-55	9.70	5.80	11.60	8.70	10.10	12.80
55-60	16.90	19.10	13.10	13.30	18.50	13.80
60-65	24.00	20.80	21.20	15.30	21.80	21.10
65-70	40.20	36.50	32.10	27.40	32.80	27.40
70-75	69.90	48.40	56.10	51.50	48.80	42.40
75-80	94.40	90.80	74.60	85.20	87.10	82.90
Total	12.30	11.30	11.30	9.90	10.40	10.70

Notes:
1) Mortality rates are defined as the number of deceased men per 1,000 men of the corresponding agegroup in the population.
2) For details on data sources please see data appendix.
3) Mortality rates labelled “Total” represent figures for ages 0-80 for Brandenburg, Mecklenburg-Vorpommern, Dresden and Erfurt.

Table 10: Multivariate Analysis of Regional Mortality Rates by Gender (1985-1995)

	Full Sample		Men		Women	
	(1)	(2)	(1)	(2)	(1)	(3)
Year	-0.014**	-0.054**	-0.010	-0.042**	-0.019*	-0.068**
	(2.17)	(3.95)	(1.37)	(3.08)	(1.68)	(2.76)
Years 90,91	0.082*	0.102**	0.079*	0.098**	0.086	0.105
	(1.87)	(2.41)	(1.74)	(2.31)	(1.11)	(1.40)
Female	--	-0.038	--	--	--	--
		(1.04)				
State	--	0.085**	--	0.108**	--	0.059
		(2.25)		(2.89)		(0.88)
Unemployment Rate	--	0.020**	--	0.017**	--	0.025**
		(3.56)		(2.87)		(2.40)
Constant	3.508**	6.916**	3.090**	5.844**	3.924**	8.089**
	(5.92)	(5.78)	(4.95)	(4.91)	(3.84)	(3.78)
Adj. R^2	2.83	10.06	2.26	15.22	1.91	6.09
N.Obs.	201	201	106	106	95	95

Notes: 1. Huber / White adjusted absolute t-values in parentheses. * and ** indicate significance of the coefficients at the 90 and 95 percent level, respectively.
2. For years prior to 1990 the unemployment rate is set to a value of zero.

Table 11: Multivariate Analysis of Regional Mortality Rates by Agegroup for Men (1985-1995)

	Full Sample	Age-group 25-30	Age-group 30-35	Age-group 35-40	Age-group 40-45	Age-group 45-50	Age-group 50-55	Age-group 55-60	Age-group 60-65
Year	-0.011	-0.071**	0.049	0.019	0.023	0.009	-0.019	-0.015	-0.036**
	(1.45)	(2.59)	(0.21)	(0.89)	(1.02)	(0.58)	(-1.13)	(-1.28)	(-2.43)
Years 90,91	0.128**	0.226**	0.113	0.195**	0.032	0.191**	0.125**	0.078**	0.067
	(5.75)	(3.69)	(1.34)	(3.33)	(0.38)	(4.21)	(2.49)	(2.37)	(1.56)
State	0.182**	0.308**	0.273**	0.257**	0.210**	0.242**	0.077	0.143**	-0.045
	(9.69)	(5.96)	(4.42)	(5.54)	(3.43)	(6.07)	(1.461)	(5.18)	(-0.93)
Unem-ployment Rate	0.014**	0.038**	0.008	0.019	0.005	0.010	0.009	0.004	0.154**
	(3.92)	(2.85)	(0.72)	(0.10)	(0.51)	(1.24)	(1.15)	(0.84)	(2.29)
Ages 25-30	0.989	--	--	--	--	--	--	--	--
	(1.52)								
Ages 30-35	1.258*	--	--	--	--	--	--	--	--
	(1.92)								
Ages 35-40	1.659**	--	--	--	--	--	--	--	--
	(2.52)								
Ages 40-45	1.975**	--	--	--	--	--	--	--	--
	(3.02)								
Ages 45-50	2.498**	--	--	--	--	--	--	--	--
	(3.81)								
Ages 50-55	2.914**	--	--	--	--	--	--	--	--
	(4.45)								
Ages 55-60	3.416**	--	--	--	--	--	--	--	--
	(5.22)								
Ages 60-65	3.834**	--	--	--	--	--	--	--	--
	(5.84)								
Constant	--	6.148**	-0.152	-1.079	-1.010	0.677	3.671**	3.860**	6.171**
		(2.59)	(-0.08)	(-0.58)	(-0.51)	(0.49)	(2.56)	(3.76)	(4.77)
	97.65	27.11	12.75	40.95	12.96	33.61	4.52	20.77	Adj. R^2
N.Obs.	847	106	106	105	106	106	106	106	106

Notes: 1) Huber / White adjusted absolute t-values in parentheses. * and ** indicate significance of the coefficients at the 90 and 95 percent level, respectively.

2) For years prior to 1990 the unemployment rate is set to a value of zero.

Table 12: Cause of Death Indicators 1985-1995 for Men in Berlin-East (Deaths per 100,000 male population of corresponding age)

(a) All Ages

ICD #	Cause	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	1,041.00	971.00	945.00	920.00	965.00	974.00	926.00	885.00	851.00	794.00
140-239	Neoplasms	214.94	208.27	201.76	210.45	190.13	197.10	199.36	193.15	206.45	197.17
303	Alcohol addiction	5.38	5.61	6.32	9.47	10.90	16.23	21.45	25.28	25.21	23.04
410-414	Ischaemic heart disease	211.64	204.19	211.40	202.94	212.10	240.06	219.04	215.73	195.73	192.78
410	Acute myocardial infarction	72.92	83.75	85.43	79.35	99.77	139.54	122.42	116.05	107.32	92.63
420-429	Other heart diseases	33.86	37.88	35.90	36.24	55.01	47.55	46.13	45.15	46.81	40.59
430-438	Diseases of the cerebrovascular system	57.29	60.81	60.66	62.20	69.54	100.02	90.00	76.47	78.80	65.20
531	Ulcer of the stomach	5.56	4.59	5.98	3.59	2.97	2.13	1.94	2.54	2.52	2.82
571	Chronic liver disease and cirrhosis	26.56	21.06	21.61	27.10	25.60	40.67	37.90	41.33	38.61	33.23
780-799	Unknown	11.63	13.59	15.29	10.12	54.18	87.07	82.26	80.44	70.92	58.46
E810-E819	Motor Vehicle Traffic Accidents	13.37	10.36	11.30	10.94	15.03	23.78	20.16	13.04	11.50	10.81
E950-E959	Suicide and Self-inflicted Injury	22.22	22.59	18.78	15.84	18.50	20.99	20.65	23.05	19.07	25.23

Table 12: continued

(b) Age group 30-35

ICD #	Cause	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	120.00	123.00	111.00	101.00	124.00	152.00	191.00	176.00	145.00	109.00
140-239	Neoplasms	10.17	21.82	34.45	1.87	11.27	12.52	18.11	10.71	14.50	13.97
303	Alcohol addiction	2.03	1.98	0.00	1.87	1.88	12.52	18.11	13.77	5.80	9.78
410-414	Ischaemic heart disease	6.10	9.92	3.83	9.35	13.15	7.15	6.59	7.65	4.35	2.79
410	Acute myocardial infarction	2.03	9.92	3.83	5.61	11.27	7.15	6.59	6.12	2.90	1.40
420-429	Other heart diseases	6.10	3.97	1.91	1.87	3.76	1.79	0.00	6.12	5.80	2.79
430-438	Diseases of the cerebrovascular system	0.00	0.00	3.83	1.87	5.64	1.79	3.29	1.53	2.90	0.00
531	Ulcer of the stomach	0.00	0.00	0.00	1.87	0.00	0.00	0.00	0.00	0.00	0.00
571	Chronic liver disease and cirrhosis	8.14	3.97	1.91	5.61	5.64	8.94	9.88	21.43	11.60	4.19
780-799	Unknown	4.07	3.97	9.57	13.09	15.03	14.31	26.34	12.24	13.05	6.99
E810-E819	Motor Vehicle Traffic Accidents	14.24	13.89	5.74	5.61	11.27	37.55	21.41	15.30	17.40	12.58
E950-E959	Suicide and Self-inflicted Injury	28.47	17.85	19.14	9.35	16.91	16.09	24.70	36.73	26.10	25.15

Table 12: continued

(c) Age group 50-55

ICD #	Cause	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	906.00	788.00	832.00	841.00	858.00	1,038.00	884.00	846.00	801.00	716.00
140-239	Neoplasms	247.79	220.64	265.97	253.60	206.59	236.38	219.99	226.68	231.22	184.56
303	Alcohol addiction	10.32	16.97	18.19	32.51	31.62	47.28	60.55	91.08	68.13	53.37
410-414	Ischaemic heart disease	188.43	162.45	177.31	143.06	158.11	201.43	131.19	109.29	146.57	117.85
410	Acute myocardial infarction	116.15	106.68	93.20	78.03	107.51	170.60	106.97	78.93	119.74	80.05
420-429	Other heart diseases	28.39	31.52	11.37	28.18	35.84	47.28	34.31	54.65	43.35	40.02
430-438	Diseases of the cerebrovascular system	12.91	21.82	20.46	39.02	16.86	39.05	48.44	20.24	35.10	28.91
531	Ulcer of the stomach	5.16	0.00	13.64	6.50	0.00	4.11	0.00	0.00	2.06	2.22
571	Chronic liver disease and cirrhosis	54.21	46.07	52.28	67.19	59.03	137.71	74.68	85.00	59.87	51.14
780-799	Unknown	25.81	24.25	20.46	6.50	94.86	121.27	119.08	123.46	72.26	62.26
E810-E819	Motor Vehicle Traffic Accidents	15.49	2.42	4.55	2.17	14.76	22.61	26.24	6.07	10.32	13.34
E950-E959	Suicide and Self-inflicted Injury	54.21	29.10	25.01	19.51	35.84	41.11	44.40	24.29	28.90	35.58

Table 13: Cause of Death Indicators 1985-1995 for Men in Dresden
(Deaths per 100,000 male population of corresponding age)

(a) All Ages

ICD #	Cause	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	1,224.99	1,178.76	1,133.89	1,137.11	1,131.93	1,132.41	1,145.81	1,057.54	1,053.01	1,002.51	987.89
140-239	Neoplasms	220.91	188.15	198.69	194.76	215.97	209.62	268.21	241.71	239.68	228.47	224.78
410-414	Ischaemic heart disease	217.99	186.08	183.82	227.42	207.43	220.11	253.26	250.96	281.10	307.41	295.70
410	Acute myocardial infarction	69.19	55.24	49.57	63.68	51.22	62.89	94.53	107.43	120.28	142.02	120.42
430-438	Diseases of the cerebrovascular system	108.79	100.51	86.75	98.00	100.73	84.29	136.74	128.56	104.42	96.59	83.85
531	Ulcer of the stomach	10.00	6.65	10.74	7.86	10.24	6.55	5.28	4.84	6.17	7.06	4.46
571	Chronic liver disease and cirrhosis	13.75	16.61	15.70	18.19	23.05	22.71	37.37	37.42	37.01	43.66	44.60
780-799	Unknown diseases	12.92	15.37	15.28	14.89	12.80	49.79	22.42	18.05	7.49	10.14	14.72
E810-E819	Motor Vehicle Traffic Accidents	10.42	13.71	13.22	10.75	11.52	22.71	18.91	23.33	10.57	16.76	12.49
E950-E959	Suicide and Self-inflicted Injury	30.01	34.47	45.44	35.56	28.60	30.13	39.13	23.77	25.99	26.02	28.54

Table 13: continued

(b) Age group 25-30

ICD #	Cause	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	75.10	97.61	127.48	94.36	83.21	152.42	113.18	104.03	72.94	73.45	84.80
140-239	Neoplasms	10.73	5.14	14.71	9.44	19.58	15.24	10.29	5.20	5.21	0.00	10.60
410-414	Ischaemic heart disease	5.36	0.00	0.00	4.72	0.00	0.00	0.00	0.00	0.00	0.00	10.60
410	Acute myocardial infarction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.30
430-438	Diseases of the cerebrovascular system	5.36	5.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	0.00
531	Ulcer of the stomach	0.00	0.00	4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
571	Chronic liver disease and cirrhosis	0.00	0.00	0.00	0.00	0.00	5.08	0.00	0.00	5.21	5.25	5.30
780-799	Unknown diseases	5.36	5.14	4.90	4.72	0.00	20.32	0.00	0.00	0.00	0.00	0.00
E810-E819	Motor Vehicle Traffic Accidents	0.00	15.41	14.71	9.44	24.47	30.48	10.29	41.61	20.84	10.49	10.60
E950-E959	Suicide and Self-inflicted Injury	10.73	15.41	44.13	28.31	19.58	20.32	61.73	20.81	10.42	31.48	15.90

Table 13: continued

(c) Age group 50-55

ICD #	Cause	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	786.01	649.98	625.19	684.16	642.91	772.59	717.22	691.06	596.95	506.06	606.26
140-239	Neoplasms	243.94	193.06	174.33	218.71	207.04	213.13	233.88	162.30	157.09	131.79	136.54
410-414	Ischaemic heart disease	250.71	102.97	72.14	72.90	70.83	90.58	135.13	130.88	109.96	94.89	147.47
410	Acute myocardial infarction	121.97	45.05	42.08	22.43	32.69	47.95	93.55	104.71	94.26	73.80	81.93
430-438	Diseases of the cerebrovascular system	13.55	6.44	12.02	16.82	27.24	21.31	15.59	20.94	36.65	5.27	10.92
531	Ulcer of the stomach	0.00	0.00	6.01	0.00	5.45	10.66	5.20	0.00	5.24	5.27	5.46
571	Chronic liver disease and cirrhosis	33.88	32.18	18.03	56.08	54.48	53.28	57.17	83.77	47.13	52.71	92.85
780-799	Unknown diseases	13.55	25.74	12.02	16.82	10.90	58.61	41.58	15.71	15.71	21.09	16.39
E810-E819	Motor Vehicle Traffic Accidents	13.55	19.31	0.00	11.22	0.00	21.31	10.39	10.47	10.47	15.81	0.00
E950-E959	Suicide and Self-inflicted Injury	40.66	19.31	66.13	56.08	27.24	69.27	51.97	52.35	36.65	36.90	38.23

Table 14: Cause of Death Indicators 1985-1995 for Men in Mecklenburg-Vorpommern (Deaths per 100,000 male population of corresponding age)

(a) All Ages

ICD #	Cause	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	1,146.55	1,132.00	1,064.16	1,078.41	1,054.48	1,178.54	1,136.32	1,097.61	1,102.37	1,080.00	1,060.00
140-239	Neoplasms	204.81	197.98	206.70	203.65	204.33	207.42	240.54	245.13	246.23	246.49	259.77
303	Alcohol addiction	n.a.	n.a.	n.a.	n.a.	n.a.	26.48	29.54	34.32	37.46	36.09	34.99
410-414	Ischaemic heart disease	163.50	157.74	148.73	149.79	165.14	204.60	237.67	226.18	261.87	253.71	261.56
410	Acute myocardial infarction	52.46	51.47	47.60	49.12	56.67	84.34	114.98	106.85	121.82	121.80	122.96
426-428	Other heart diseases	35.83	37.99	33.64	35.34	35.48	57.42	35.72	31.42	24.41	24.76	25.60
430-438	Diseases of the cerebrovascular system	73.81	74.27	67.07	71.53	78.28	83.69	125.78	105.29	104.05	100.71	81.71
531	Ulcer of the stomach	n.a.	n.a.	n.a.	n.a.	n.a.	3.58	3.64	5.35	3.49	3.44	3.47
571	Chronic liver disease and cirrhosis	18.99	20.12	22.43	26.19	25.42	39.40	56.00	61.73	63.22	60.29	62.37
780-799	Unknown diseases	13.63	13.06	11.11	10.41	12.82	44.18	18.52	16.71	17.10	14.21	9.72
E810-E819	Motor Vehicle Traffic Accidents	18.88	18.83	20.42	16.83	21.40	40.16	48.72	47.24	36.90	35.86	33.76
E950-E959	Suicide and Self-inflicted Injury	44.42	37.56	39.77	38.71	37.18	31.69	32.85	31.09	29.58	28.42	25.26

Table 14: continued

(b) Age group 25-30

ICD #	Cause	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	153.15	139.90	142.45	146.48	132.74	213.77	199.89	193.51	204.05	190.00	150.00
140-239	Neoplasms	18.29	13.04	10.87	13.80	17.27	10.40	9.75	6.41	12.24	12.57	7.43
303	Alcohol addiction	n.a.	n.a.	n.a.	n.a.	n.a.	11.56	8.53	11.53	16.32	6.99	7.43
410-414	Ischaemic heart disease	3.43	1.19	2.17	4.25	4.32	2.31	1.22	0.00	4.08	2.79	1.49
410	Acute myocardial infarction	1.14	0.00	1.09	3.18	3.24	2.31	1.22	0.00	4.08	1.40	0.00
426-428	Other heart diseases	0.00	0.00	2.17	3.18	1.08	1.16	3.66	1.28	2.72	1.40	2.97
430-438	Diseases of the cerebrovascular system	1.14	2.37	0.00	2.12	0.00	1.16	3.66	3.84	1.36	0.00	1.49
531	Ulcer of the stomach	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00	0.00	1.36	0.00	0.00
571	Chronic liver disease and cirrhosis	3.43	2.37	3.26	2.12	3.24	8.09	14.63	11.53	8.16	11.18	4.46
780-799	Unknown diseases	6.86	4.74	0.00	1.06	6.48	18.49	4.88	5.13	6.80	4.19	8.91
E810-E819	Motor Vehicle Traffic Accidents	19.43	18.97	35.88	15.92	19.43	56.62	81.66	75.61	65.30	62.87	44.55
E950-E959	Suicide and Self-inflicted Injury	40.00	27.27	39.15	37.15	19.43	35.82	15.85	23.07	19.04	22.35	20.79

Table 14: continued

(c) Age group 50-55

ICD #	Cause	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
001-999	All	1,035.81	1,385.11	1,105.02	1,059.03	1,084.69	1,317.04	1,192.16	1,183.95	1,156.44	1,050.00	1,000.00
140-239	Neoplasms	285.91	345.26	316.38	304.02	304.67	289.11	336.25	317.86	282.93	281.39	288.53
303	Alcohol addiction	n.a.	n.a.	n.a.	n.a.	n.a.	68.44	84.76	104.98	109.77	94.87	82.44
410-414	Ischaemic heart disease	153.57	194.97	155.88	132.56	139.64	185.75	170.90	185.17	199.44	168.84	172.04
410	Acute myocardial infarction	81.69	81.24	74.08	61.96	77.58	104.75	104.21	137.06	122.14	125.42	107.53
426-428	Other heart diseases	16.34	20.31	12.35	17.29	16.93	43.30	22.23	24.79	18.55	27.34	19.71
430-438	Diseases of the cerebrovascular system	22.87	20.31	32.41	23.05	40.90	39.11	44.46	23.33	51.02	40.20	26.88
531	Ulcer of the stomach	n.a.	n.a.	n.a.	n.a.	n.a.	8.38	1.39	4.37	1.55	4.82	3.58
571	Chronic liver disease and cirrhosis	45.75	67.02	69.45	80.69	66.77	101.96	130.61	134.14	143.78	114.17	125.45
780-799	Unknown diseases	19.61	22.34	20.06	15.85	25.39	74.02	37.52	27.70	21.64	24.12	12.54
E810-E819	Motor Vehicle Traffic Accidents	21.24	24.37	10.08	18.73	16.93	37.71	26.40	34.99	29.37	17.69	23.30
E950-E959	Suicide and Self-inflicted Injury	80.05	91.39	69.45	61.96	64.88	62.85	68.08	62.70	57.20	33.77	35.84

Table 15(a): Mean of Age Group Specific Health Satisfaction
(coded 0 to 10, indicating low and high satisfaction respectively)

Full Sample

Subsample	1990	1991	1992	1993	1994
Age 0-24	7.86	7.96	7.86	7.78	7.68
Age 25-34	7.68	7.70	7.62	7.44	7.18
Age 35-44	6.89	6.93	6.92	6.69	6.52
Age 45-54	6.24	6.24	6.31	6.06	5.98
Age 55-64	5.51	5.41	5.76	5.72	5.62
Age 65 and older	5.24	5.05	4.89	4.98	5.15
Full Sample	6.75	6.73	6.72	6.58	6.44

Men only

Subsample	1990	1991	1992	1993	1994
Age 0-24	7.94	8.12	8.09	8.01	7.83
Age 25-34	7.74	7.75	7.70	7.45	7.23
Age 35-44	7.06	7.14	7.10	6.87	6.68
Age 45-54	6.32	6.42	6.45	6.16	5.99
Age 55-64	5.62	5.62	6.02	5.90	5.76
Age 65 and older	5.34	5.13	4.61	4.86	5.28
Full Sample	6.91	6.93	6.90	6.74	6.58

Women only

Subsample	1990	1991	1992	1993	1994
Age 0-24	7.78	7.80	7.65	7.55	7.55
Age 25-34	7.61	7.65	7.54	7.44	7.13
Age 35-44	6.72	6.73	6.75	6.53	6.37
Age 45-54	6.16	6.04	6.16	5.96	5.97
Age 55-64	5.41	5.21	5.49	5.54	5.47
Age 65 and older	5.21	5.01	5.04	5.05	5.09
Full Sample	6.61	6.54	6.55	6.43	6.31

Table 15(b): Mean of Health Satisfaction by Year, Gender, and Level of Worries
(coded 0 to 10, indicating low and high satisfaction respectively)

Worries about Personal Economic Situation: Very Much

	1990	1991	1992	1993	1994
Men	6.63	6.66	6.63	6.25	6.01
Women	6.39	6.38	6.34	6.08	5.96
All	6.50	6.51	6.47	6.16	5.98

Worries about Personal Economic Situation: Somewhat

	1990	1991	1992	1993	1994
Men	6.96	7.09	6.94	6.79	6.68
Women	6.74	6.65	6.65	6.50	6.45
All	6.85	6.86	6.79	6.64	6.56

Worries about Personal Economic Situation: None

	1990	1991	1992	1993	1994
Men	7.37	7.15	7.32	7.30	7.14
Women	6.58	6.62	6.72	6.78	6.43
All	6.96	6.89	7.02	7.04	6.78

Source: Own calculations based on GSOEP (German Socioeconomic Panel).

Table 16(a): Determinants of Individual Health Satisfaction [1]

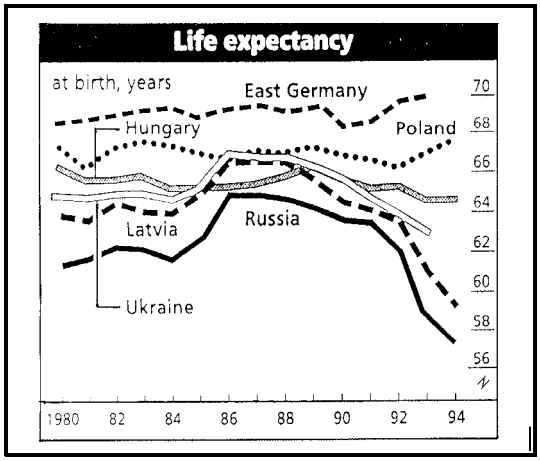
	Full Sample	Men	Women	Full-time Employed Men	Unemployed Men
Age	-0.059** (-27.45)	-0.056** (-19.86)	-0.061** (-18.20)	-0.049** (-11.182)	-0.054** (-6.23)
Male	0.216** (6.17)	--	--	--	--
Married	0.264 (0.52)	0.024 (0.33)	0.016 (0.22)	-0.019 (-0.193)	-0.301 (-1.50)
Income[2]	0.314* (1.82)	0.183 (0.79)	0.45* (1.75)	-0.753* (1.90)	-2.345** (-2.80)
Children in household	0.065 (1.35)	0.108* (1.67)	0.010 (0.14)	0.148 (1.62)	0.240 (1.15)
Handicapped	-1.003** (-9.26)	-1.163** (-7.45)	-0.836** (-5.61)	-1.547** (-5.56)	-1.253** (-3.01)
Schooling: 8 years	-0.153* (-1.75)	-0.055 (-0.45)	-0.246** (-1.97)	-0.320 (-1.15)	0.066 (0.22)
Schooling: 10 years	-0.140* (-1.76)	-0.059 (-0.53)	-0.216* (-1.91)	-0.443 (-1.62)	-0.399 (-1.21)
Schooling: 12 years	0.015 (0.17)	0.175 (1.49)	-0.142 (-1.13)	-0.283 (-1.05)	0.084 (0.23)
Apprenticeship	0.047 (0.77)	0.057 (0.67)	0.040 (0.45)	0.041 (0.31)	0.280 (1.17)
Master of crafts	0.034 (0.33)	0.116 (0.83)	-0.44 (-0.30)	0.355* (1.93)	-0.069 (0.17)
College degree	0.247** (3.30)	0.268** (2.60)	0.231** (2.14)	0.210 (1.44)	0.777** (2.32)
Time trend	-0.078** (-5.22)	-0.077** (-3.69)	-0.081** (-3.74)	-0.108** (-3.24)	-0.169* (-1.83)
Economic worries: strong	-0.895** (-14.58)	-0.970** (-11.74)	-0.827** (-8.89)	-0.807** (-5.70)	-0.972** (-2.55)
Economic worries: some	-0.458** (-8.32)	-0.482** (-6.74)	-0.434** (5.08)	-0.375** (-3.49)	-0.430 (-1.14)
Job worries: strong	--	--	--	0.016 (-0.01)	--
Expects job loss	--	--	--	-0.232** (-2.09)	--
Expects worse employment	--	--	--	0.003 (-0.02)	--
Unemployment duration	--	--	--	--	-0.108 (-0.84)
Constant	9.772** (76.25)	9.876** (59.14)	9.897** (49.22)	9.940** (28.16)	10.821** (17.16)
Adjusted R^2	0.126	0.123	0.124	0.098	0.126
Number of observations	14,841	7,304	7,537	2,826	702
F-test [3)]	115.31	71.66	45.59	10.65	6.45

Table 16(b): Determinants of Individual Health Satisfaction by Agegroup

	Men aged			
	25-34	35-44	45-54	55-64
Married	0.143 (1.10)	0.061 (0.39)	-0.252* (-1.84)	0.125 (0.64)
Household net income *10 $^{-4}$	-0.354 (-0.86)	0.232 (0.57)	0.524 (1.13)	0.645 (0.86)
Children in household	0.021 (0.17)	0.119 (0.94)	0.101 (0.82)	0.326 (1.17)
Handicapped	-0.551 (-1.33)	-1.320** (-3.43)	-1.477** (-5.01)	-1.014** (-4.48)
Schooling: 8 years	-0.051 (-0.20)	-0.042 (-0.18)	0.004 (-0.02)	-0.479 (-1.39)
Schooling: 10 years	-0.024 (-0.11)	0.168 (0.86)	-0.066 (-0.30)	-0.659* (-1.87)
Schooling: 12 years	0.294 (1.45)	0.378* (1.84)	0.035 (0.15)	-0.252 (-0.68)
Apprenticeship	0.065 (0.38)	0.062 (0.37)	-0.000 (-0.00)	0.149 (0.78)
Master of crafts	0.131 (0.46)	0.424 (1.55)	0.079 (0.29)	-0.084 (-0.30)
College degree	0.221 (1.10)	0.185 (1.00)	0.390* (1.95)	0.377 (1.49)
Full-time	-0.180 (-1.12)	-0.286 (-1.59)	0.096 (0.51)	0.504* (1.78)
Part-time	-0.329 (-1.12)	-0.317 (-1.04)	-0.145 (-0.50)	0.716* (1.83)
Out of the labor force	-0.003 (-0.02)	-0.007 (-0.03)	-0.108 (-0.55)	0.075 (0.26)
Time trend	-0.123** (-3.33)	-0.118** (-3.21)	-0.100** (-2.27)	0.100* (1.80)
Economic worries: strong	-0.828** (-5.62)	-1.217** (-8.49)	-1.115** (-6.46)	-0.754** (-3.45)
Economic worries: some	-0.425** (-3.39)	-0.521** (-4.45)	-0.783** (-5.01)	-0.255 (-1.30)
Constant	8.468** (42.19)	7.806** (37.50)	7.354** (28.52)	5.738** (15.726)
Adjusted R^2	0.021	0.050	0.044	0.038
Number of observations	2,130	2,107	1,734	1,333
F-test [3)]	16.08	37.11	20.90	7.98

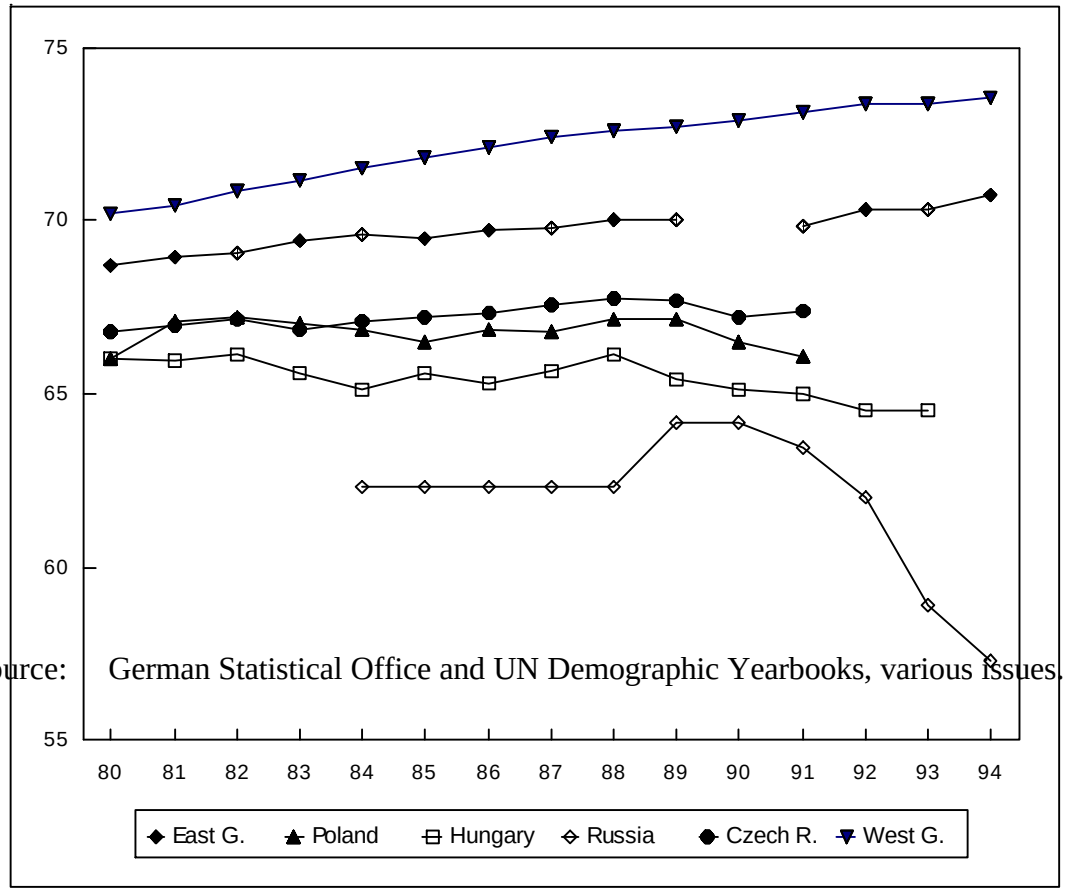
Notes:
1) The first three regressions in Table (a) also contain dummies for full-time and part-time employment, and for out of the labor force. Coefficients are all small and insignificant and left out for lack of space.
2) Income represents household net income ($*10^{-4}$) for all regressions; the only exception is the equation for full-time employed men, where income represents gross monthly earnings.
3) Test for joint significance of variables indicating level of worries.
4) * (**) represents significance at the 90 (95) percent level.
5) Heteroscedasticity consistent Huber-White corrected t-values in parentheses.

Figure 1: Life Expectancy at Birth (Men)



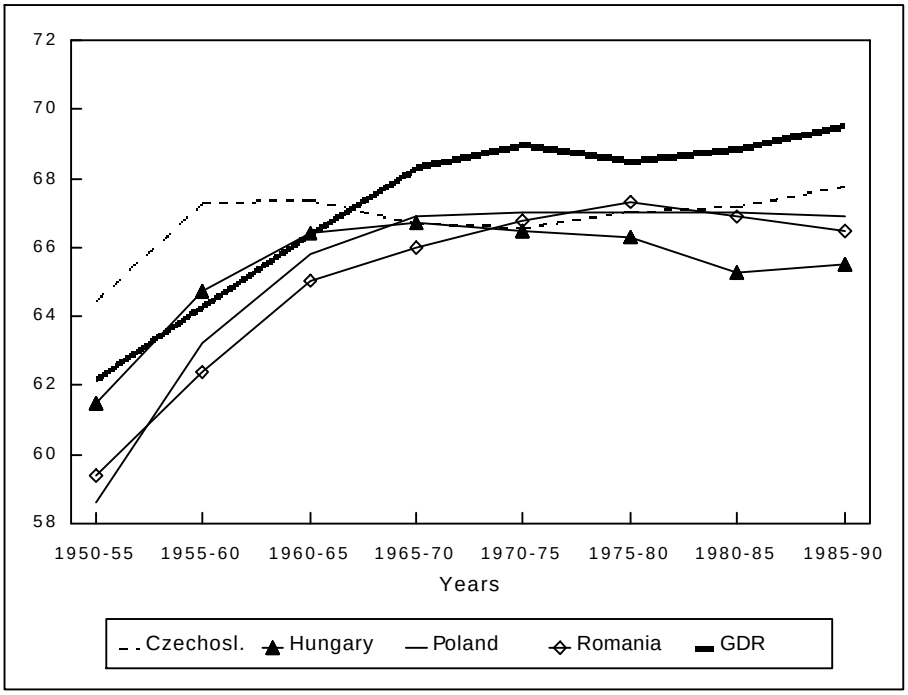
Source: The Economist, 9/21/96, p.38 (Source cited there: Vladimir Shkolnikov, Russian Centre of Demography and Human Ecology).

Figure 2: Life Expectancy at Birth (Men)



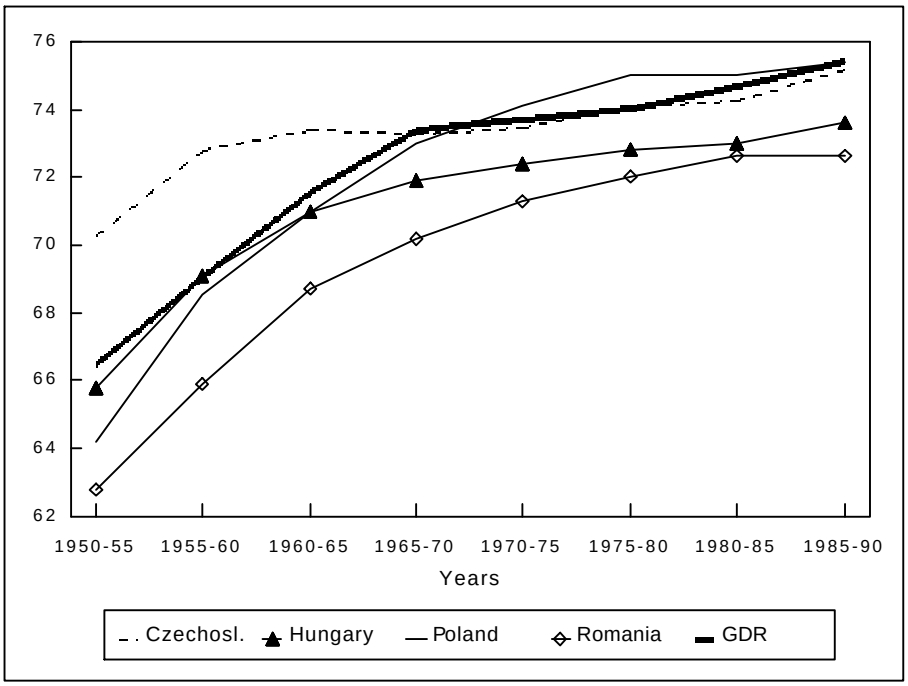
Source: German Statistical Office and UN Demographic Yearbooks, various issues.

Figure 3: Life Expectancy at Birth for Males in Selected East European Countries



Source: For GDR Schott et al. (1995), DIW (1995), Eberstadt (1994b), for other nations United Nations (1995).

Figure 4: Life Expectancy at Birth for Females in Selected East European Countries



Source: see Figure 3.

Figure 5: Political Map of Europe

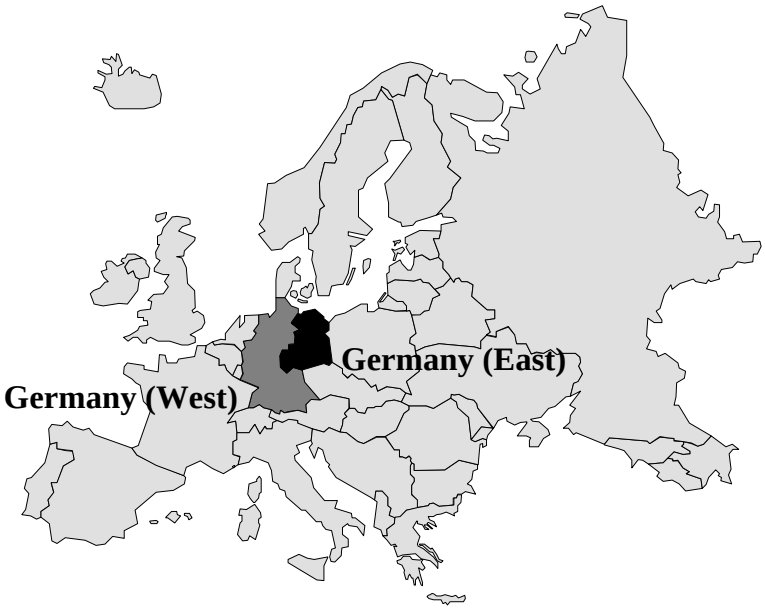


Figure 6: Map of the former GDR