Mass privatisation and the post-communist mortality crisis: a cross-national analysis

David Stuckler, Lawrence King, Martin McKee

Summary

Background During the early-1990s, adult mortality rates rose in most post-communist European countries. Substantial differences across countries and over time remain unexplained. Although previous studies have suggested that the pace of economic transition was a key driver of increased mortality rates, to our knowledge no study has empirically assessed the role of specific components of transition policies. We investigated whether mass privatisation can account for differences in adult mortality rates in such countries.

Methods We used multivariate longitudinal regression to analyse age-standardised mortality rates in working-age men (15–59 years) in post-communist countries of eastern Europe and the former Soviet Union from 1989 to 2002. We defined mass privatisation programmes as transferring at least 25% of large state-owned enterprises to the private sector within 2 years with the use of vouchers and give-aways to firm insiders. To isolate the effect of mass privatisation, we used models to control for price and trade liberalisation, income change, initial country conditions, structural predispositions to higher mortality, and other potential confounders.

Findings Mass privatisation programmes were associated with an increase in short-term adult male mortality rates of 12·8% (95% CI 7·9–17·7; p<0·0001), with similar results for the alternative privatisation indices from the European Bank for Reconstruction and Development (7·8% [95% CI 2·8–13·0]). One mediating factor could be male unemployment rates, which were increased substantially by mass privatisation (56·3% [28·3–84·3]; p<0·0001). Each 1% increase in the percentage of population who were members of at least one social organisation decreased the association of privatisation with mortality by 0·27%; when more than 45% of a population was a member of at least one social organisation, privatisation was no longer significantly associated with increased mortality rates (3·4% [95% CI –5·4 to 12·3]; p=0·44).

Interpretation Rapid mass privatisation as an economic transition strategy was a crucial determinant of differences in adult mortality trends in post-communist countries; the effect of privatisation was reduced if social capital was high. These findings might be relevant to other countries in which similar policies are being considered.

Funding None.

University of Cambridge, Department of Sociology, Faculty of Social and Political Sciences, Cambridge, UK (D Stuckler MPH, L King PhD); **and London School of Hygiene and Tropical Medicine, European Centre on Health of Societies in Transition, London, UK** (Prof M McKee MD)

Correspondence to:
David Stuckler, University of Oxford, Department of Sociology, Christ Church, Oxford OX1 1DP, UK
david.stuckler@aya.yale.edu

Introduction

The transition from communism to capitalism in Europe and central Asia during the early to mid-1990s has had devastating consequences for health: UNICEF attributes more than 3 million premature deaths to transition;[1] the UN Development Programme estimates over 10 million missing men because of system change;[2] and more than 15 years after these transitions began, only a little over half of the ex-communist countries have regained their pretransition life-expectancy levels.[3] But were these excess deaths inevitable?

Probably not. Not all countries have fared so poorly: although in Russia, an extreme case, the population lost nearly 5 years of life expectancy between 1991 and 1994, Croatia and Poland recorded steady improvements of almost 1 year of life expectancy during this same period.

What accounts for these differences in the pace of change in mortality rates across countries and over time? Research comparing Russian regions has identified the pace of transition, which was assessed by measures such as job gains and losses, as an important

factor.[4,5] Yet little attempt has been made to assess empirically the effects on health of the underlying policies pursued by governments and, as a result, the wider determinants of the mortality patterns across the post-Soviet world. One possible answer, we suggest, lies in the economic strategies that countries used to build capitalism out of communism.

There were two approaches to capitalism. Radical free-market advisers argued that capitalist transition needed to occur as rapidly as possible.[6–8] The prescribed policy was called shock therapy, with three major elements: liberalisation of prices and trade to allow markets to re-allocate resources, stabilisation programmes to suppress inflation, and mass privatisation of state-owned enterprises to create appropriate incentives. When implemented simultaneously, these elements would cause an irreversible shift to a market-based economy. By contrast, gradualist economists, also known as institutionalists, called for a slow transition, recommending that countries gradually phase in markets and private property while allowing time to develop institutions that are needed to make markets work well.[9,10]

Mass privatisation

Scale: 0 before implementation, 1 thereafter

0: Country did not implement a programme that transferred the ownership of at least 25% of large state-owned enterprises to the private sector through vouchers and give-aways to firm insiders

1: Country implemented a programme that transferred the ownership of at least 25% of large state-owned enterprises to the private sector through vouchers and give-aways to firm insiders

EBRD small-scale privatisation index*

Scale: 1 to 4·3

1: Little progress

2: Substantial share privatised

3: Comprehensive programme almost ready for implementation

4: Complete privatisation of small companies with tradeable ownership rights

4·3: Standards and performance typical of advanced industrial economies; no state ownership of small enterprises; effective tradeability of land

EBRD large-scale privatisation index*

Scale: 1 to 4·3

1: Little private ownership

2: Comprehensive scheme almost ready for implementation; some sales completed

3: More than 25% of large-scale enterprise assets in private hands or in the process of being privatised (with the process having reached a stage at which the state has effectively ceded its ownership rights), but possibly with major unresolved issues regarding corporate governance

4: More than 50% of state-owned enterprise and farm assets in private ownership and significant progress on corporate governance of these enterprises

4·3: Standards and performance typical of advanced industrial economies: more than 75% of enterprise assets in private ownership with effective corporate governance

Mass privatisation codings are from the European Bank for Reconstruction and Development (EBRD) *transition report* series.
*Variable definitions were originally developed in 1994 but were refined and amended in later reports; presented definitions are quoted directly from the EBRD 1999 *Transition Report*. "Transition indicator scores reflect the judgment of the EBRD's Office of the Chief Economist about country-specific progress in transition".[21]

Methods

Data collection

Our data for cross-national mortality rates for working-age men, which cover 25 post-communist countries from 1989 to 2002, were taken from the UNICEF monitoring transition in central and eastern Europe database.[14] The available age-specific mortality rates from 15–19, 20–24, 25–39, and 40–59 years of age were standardised according to the European standard population.[15] Although there have been difficulties with mortality data from some countries in this region, these problems relate mainly to deaths in infancy and childhood,[16] detailed attribution of specific causes of death,[17] and data from periods of civil conflict.[18] The consensus has been that aggregate rates of all-cause adult mortality are sufficiently valid and reliable to allow comparative studies.[19,20]

Statistical analysis

We measured rapid transition policies in two ways: first, with a dummy variable for whether a country implemented a mass privatisation programme (defined as a programme that transferred the ownership of at least 25% of large state-owned enterprises to the private sector in 2 years by selling them with citizen vouchers and giveaways to firm insiders; 0 before mass privatisation, 1 thereafter); and second, with privatisation indices of progress in privatisation from the European Bank for Reconstruction and Development (EBRD) (ranging from 1 for planned to 4·3 for advanced market economy) (panel).[21]

The main policy advisers at the EBRD, who backed the shock therapists, were also responsible for scoring progress in privatisation. Since coding occurred after country performance had been recorded, there might be ideological pressure to code successful countries as being radical reformers. However, our measure of mass privatisation programme implementation overcomes the observer bias and subjectivity in the EBRD indices. The EBRD transition report series describes when countries implemented privatisation programmes, how many firms were privatised under them, and by what method this privatisation was accomplished.[22] We used these data to designate a large jump as a 25% transfer, corresponding to a jump from 1 to 3 on the EBRD large-scale privatisation index. Since the correlations between the EBRD large-scale index and small-scale index were statistically indistinguishable by our analysis ($r=0·97$ in Russia, for example), we proceeded with a mean of the large-scale and small-scale indices, to reduce measurement errors.

We adjusted for log gross domestic product (GDP) per head to control for economic status, which is a robust determinant of health. In view of the known association between democracy and life expectancy,[23] we controlled for political changes with a widely used index of democratisation, devised by Freedom House (a

In most countries, the shock therapy approach was put into practice. Russia fully implemented shock therapy by 1994, and most countries implemented some or all of the programme by the mid-1990s, although the greatest variation was in privatisation.[1,11]

Has rapid privatisation affected mortality rates? Because rapid privatisation of thousands of inefficient firms from the Soviet era would have cut many jobs before new firms would have emerged, the resultant short-term increases in unemployment might have led to short-term increases in adult mortality rates, in view of evidence from other settings of the effects of unemployment on individual health.[12,13] The results would be most severe for employees of large-scale capital-intensive heavy industry and manufacturing enterprises that were least able to offer their employees, few of whom had transferable skills, reasonable chances for success in retraining or finding new jobs.

We tested the hypothesis that the implementation of mass privatisation programmes accounts for differences in mortality increases in post-communist countries.

	Non-former Soviet Union	Former Soviet Union	All countries
Implementation of mass privatisation	−0·0% (−6·5 to 6·5); p=1·0	13·5% (6·7 to 20·3); p<0·0001	12·8% (7·9 to 17·7); p<0·0001
Implementation of one unit of average EBRD privatisation	−1·9% (−4·3 to 0·4); p=0·12	9·1% (5·2 to 12·9); p<0·0001	3·9% (1·4 to 6·5); p=0·0025

The coefficients give the percentage change in the dependent variable (mortality rates) in relation to an absolute change in the independent variable (privatisation). Coefficients calculated as semi-elasticities presented, with 95% CIs in parentheses based on robust panel-corrected standard errors. Models also control for log gross domestic product per head, European Bank for Reconstruction and Development (EBRD) price liberalisation index, EBRD trade liberalisation index, the Freedom House democratisation index, population dependency, the percentage of population living in urban settings, the population education level, country-specific fixed effects, and a dummy for military or ethnic conflict. Number of country-years for the non-former Soviet Union is 112, number of countries is nine. Number of country-years for the former Soviet Union is 177, number of countries is 15.

Table 1: Effect of privatisation on adult male standardised mortality rates, 1989–2002

non-profit organisation that advocates for democracy and publishes surveys of civil liberties, political rights, and measures of economic freedom). To isolate the effect of privatisation, we controlled for price and trade liberalisation, which were the main complementary policies recommended by the shock therapists. We controlled for inflation as a robustness check. Since war affects reporting of mortality, we used a dummy for the occurrence of military or ethnic conflict. The population dependency ratio, which measures the ratio of total working-age adults to elderly people and infants, controls for the proportional size of the workforce and the relative cost of state social welfare systems. We also controlled for demographic characteristics with urbanisation ratios and population tertiary education rates.

Since we were interested mainly in fluctuations in mortality, our regression models also used a set of country dummy variables to hold constant fixed aspects of national surveillance infrastructure, initial country conditions and pre-existing societal characteristics, and predispositions to higher mortality. This process allowed us to devise country-specific slopes, to make the data more comparable. Country dummy variables also effectively hold constant possibly confounding geographic effects, such as proximity to western Europe or membership of the former Soviet Union, and the coding bias between countries in the EBRD privatisation indices.

Thus our model is:

$$AMR_{it} = \alpha + \beta_1 PRIV_{it} + \beta_2 GDP_{it} + \beta_3 LIB_{it} + \beta_4 TRADE_{it} + \beta_5 DEM_{it} + \beta_6 WAR_{it} + \beta_7 DEP_{it} + \beta_8 URBAN_{it} + \beta_9 EDUC_{it} + \mu_i + \varepsilon_{it}$$

where i is country and t is year, AMR is logged adult male standardised mortality rates (working ages of 15–59 years), $PRIV$ is one of the two privatisation measures, GDP is log GDP per head in current US$, LIB is the EBRD price liberalisation index, $TRADE$ is the EBRD foreign exchange and trade liberalisation index, DEM is the democratisation index, WAR is a dummy for military conflict, $EDUC$ is the percentage of population with tertiary education, $URBAN$ is the percentage of the population living in urban settings, DEP is the population dependency ratio, μ is a set of country fixed effects, ε is the error term, α is a constant, and β are the coefficients. Regression models were estimated with stata (version 9.2), and we adjusted standard errors for robustness to heteroskedasticity and serial correlation. The webtable provides a description of the summary statistics, and webappendix 1 shows the correlation matrices for our basic model.

Role of the funding source
There was no funding source for this study. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results
Table 1 shows the results of our basic model covering the transition period from 1989 to 2002. Mass privatisation programmes were associated with increases in adult male mortality by a mean of 12·8% (95% CI 7·9–17·7%; p<0·0001), which is similar to the mean increase for all countries of 15·9% (95% CI 5·5–26·2) between 1991 and the peak of the mortality crisis in 1994. Although mass privatisation might be justified by enhanced economic growth, and thus consequent mortality reductions, even a doubling of GDP per head would not be enough to offset the increase in mortality rates resulting from mass privatisation (β log GDP per head −0·12, p<0·0001; webappendix 2).

A measure of progress in privatisation that is not based on the privatisation method is the EBRD privatisation index (panel). Each additional unit of privatisation was also associated with increased adult mortality rates by 3·9% (95% CI 1·4–6·5) on average in the countries studied. In view of the divergence between mortality trends in the countries of the former Soviet Union, and in the former Soviet satellites in central and eastern Europe, we analysed each block of countries separately to account for potential heterogeneity in the relation between privatisation and mortality, especially because countries of the former Soviet Union were significantly more likely to have implemented rapid mass privatisation programmes than were countries outside the former Soviet Union (unadjusted odds ratio 6·75).

When we restricted the sample to countries of the former Soviet Union, variations in the EBRD privatisation index became even greater determinants

of adult mortality. Every one unit increase, roughly the same as 1 SD, was associated with an increase in mortality of 9·1% (95% CI 5·2–12·9; p<0·0001). Since the average change in the privatisation index over the entire period was around two units, this change amounts

Figure 1: **Mass privatisation and adult male mortality rates in Belarus and Russia**
Age-standardised mortality rates are from the UNICEF TransMonee Database, 2005 edition.[14] Russian state-owned enterprise privatisation data are from the 1997 Russian Economic Trends report version 10(2), and Belarus state-owned enterprise privatisation data are from the World Bank 1997 Belarus Country Economic Memorandum. These data are available at the World Bank statistical yearbook (1998): http://www.worldbank.org/ecspf/PSD-Yearbook/XLS/. See EBRD transition report series for similar estimates.[21]

to roughly the same effect size as that attributed to our measure of mass privatisation implementation, and the net associations of the two become statistically indistinguishable (p=0·31).

Figure 1 compares the trajectories of Russia, which implemented mass privatisation in 1992, with its neighbour Belarus, which adopted a more gradual approach to transition. By 1994, at the peak of Russia's mortality crisis, Russia had privatised more than half of all state-owned enterprises (more than 112 000), whereas Belarus had privatised only 640 firms, or less than 10% of their state-owned sector. Unemployment in both countries started at similar low levels of less than 0·1% of the labour force in the early 1990s, but in Russia the percentage of working-age people who were unemployed rose by over four times as much in Belarus (Russia: 0·8% in 1992 to 7·5% in 1994; Belarus: 0·5% in 1992 to 2·1% in 1994); furthermore, mortality rates in Russia increased four times as much as in Belarus (roughly a 11·3% difference in the average mortality rate increases). Our estimate, using the EBRD index, of an 18·1% (95% CI 10·5–25·8) increase in mortality rates attributable to privatisation in Russia (2-point increase) and a 7·7% (95% CI 4·5–11·0) estimated increase for Belarus (0·85-point increase), closely matches the cumulative mortality differences over time between these countries. Similarly, our measure of a mass privatisation programme estimates a 13·5% increase in adult male mortality rates associated with this policy: this finding is close to the recorded 17·8% average rate of increase in Russia between 1992 and 1994.

Outside the former Soviet Union, only one of nine countries—the Czech Republic—had implemented a mass privatisation programme by 1994; overall, the privatisation process was more gradual than in the former Soviet Union, and handled on a firm-by-firm
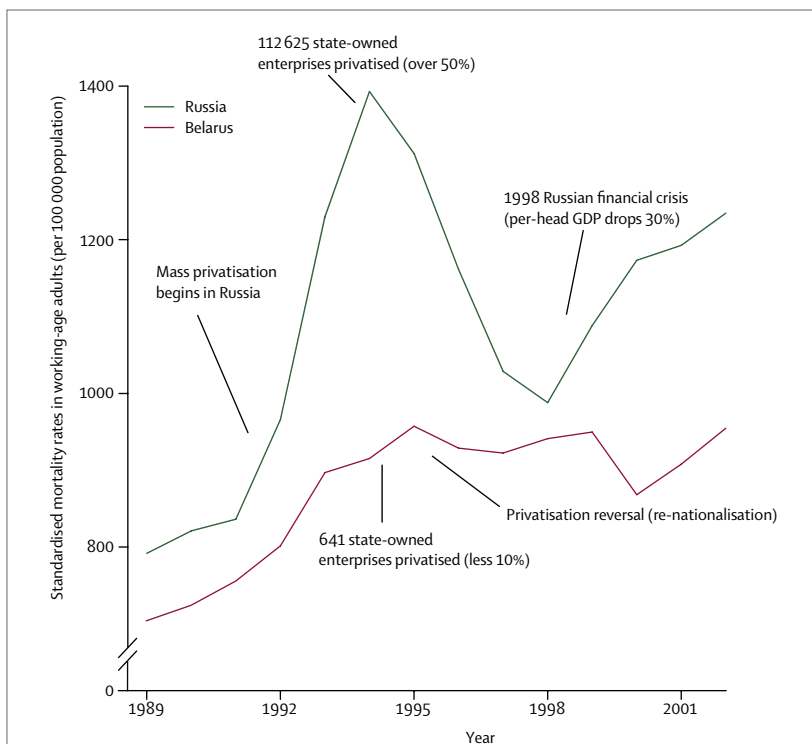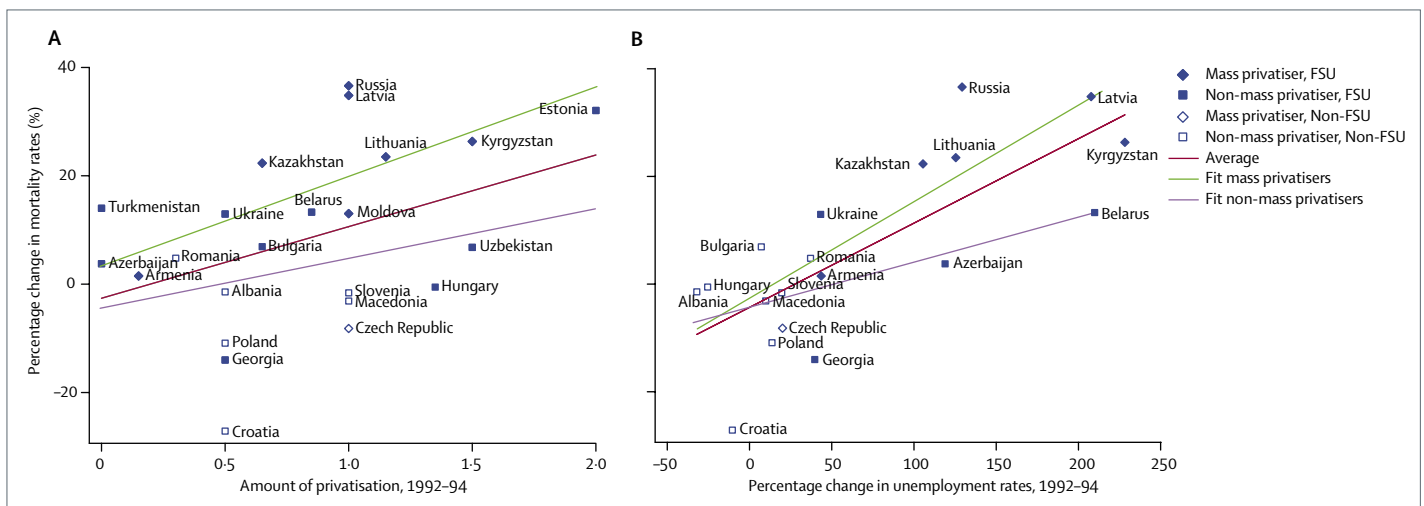

Figure 2: **Relation between privatisation (A) and unemployment (B) and adult male mortality rates in post-communist countries, 1992–94**
Mortality rates are age standardised. FSU=former Soviet Union. Slovakia, Bosnia, and Serbia-Montenegro data are missing for mortality for (A). Tajikistan underwent a major civil war (11 years of lost male life expectancy over this period) and was thus an outlier in the relationships observed. Data for countries specified in (A) and (B) are available from the authors on request.

	Non-former Soviet Union	Former Soviet Union	All countries
Implementation of mass privatisation	–9·6% (–43·9 to 24·7); p=0·58	61·1% (27·1 to 95·2); p=0·0004	56·3% (28·3 to 84·3); p<0·0001
Implementation of one unit of EBRD average privatisation	9·0% (–5·1 to 23·1); p=0·21	58·9% (29·2 to 88·6); p<0·0001	38·5% (20·2 to 56·7); p<0·0001

Coefficients calculated as semi-elasticities presented, with 95% CIs in parentheses based on robust panel-corrected standard errors. Models also control for log gross domestic product per head, EBRD price liberalisation index, EBRD trade liberalisation index, democratisation, education rate, population dependency, the percentage of population living in urban settings, the population education level, country-specific fixed effects, a dummy for military or ethnic conflict. Number of country-years for all countries is 266, number of countries is 24. Number of country-years for the former Soviet Union is 159, number of countries is 15.

Table 2: Effect of privatisation on log male unemployment rates, 1991–2002

basis. When we restricted the sample to countries outside the former Soviet Union, we noted that greater progress in privatisation was associated with a neutral or favourable effect on mortality rates from 1991 to 2002, unlike in countries of the former Soviet Union (table 1).

Figure 2 shows how the relation between privatisation and mortality differed according to whether countries implemented mass privatisation or not during the most intense period of reform from 1992 to 1994. The association between increases in the EBRD privatisation index and mortality was roughly twice as strong in countries that underwent mass privatisation than in those that did not privatise (figure 2).

We attempted to ascertain the pathway by which privatisation affects mortality by testing the relation between privatisation and unemployment. Table 2 shows that in countries of the former Soviet Union from 1991 to 2002, the association between mass privatisation and unemployment was significant and pronounced: implementation of mass privatisation increased unemployment by 61% compared with countries in which privatisation was more gradual. A one unit increase in the EBRD index was associated with a 59% (95% CI 29–89) increase in unemployment in the sample of countries of the former Soviet Union. Outside the former Soviet Union, where the gradual strategy was over three times more prevalent, we did not record a similar relation between privatisation and increased unemployment rates (table 2).

We further characterised the relation between unemployment and mortality rates. In countries of the former Soviet Union, where unemployment rose substantially, every 10% increase in unemployment was associated with increased standardised adult male mortality rates of 0·3% (p=0·009) between 1991 and 2002; however, in countries outside the former Soviet Union, we noted no significant relation (table 3). Figure 2 provides evidence that the population relation between unemployment and mortality differed by the type of privatisation: during the intense period of reform from 1992 to 1994, the relation between unemployment and mortality was almost twice as strong in countries that mass privatised as in those that did not mass privatise.

Taken together with our previous findings that each one unit increase in the EBRD privatisation index was

	Non-former Soviet Union	Former Soviet Union
Log male unemployment rates (10% increase)	–0·17% (–0·66 to 0·32); p=0·51	0·32% (0·08 to 0·56); p=0·0093

Coefficients calculated as semi-elasticities presented, with 95% CIs in parentheses based on robust panel-corrected standard errors. Models also control for log gross domestic product per head, European Bank for Reconstruction and Development (EBRD) price liberalisation index, EBRD trade liberalisation index, democratisation, education rate, population dependency, the percentage of population living in urban settings, the population education level, country-specific fixed effects, and a dummy for military or ethnic conflict. Number of country-years for the non-former Soviet Union is 116, number of countries is ten. Number of country-years for the former Soviet Union is 155, number of countries is 15.

Table 3: Effect of unemployment on age-standardised mortality rates in working-age men, 1991–2002

linked to a 59% increase in unemployment rates in the former Soviet Union (table 2), the unemployment pathway seems to account for a 1·9% increase in privatisation-related mortality (calculated by 58·9% increase in unemployment from privatisation×0·032% increase in mortality from a 1% increase in unemployment), which is close to a quarter of the overall association of 9·1% (95% CI 5·2–12·9) that was recorded in countries of the former Soviet Union (table 1).

If unemployment were an intervening factor linking rapid privatisation and mortality increases, holding constant unemployment would block the pathway and thus attenuate the estimated effect of privatisation in the former Soviet Union. Table 4 presents the results of four regression models of the unadjusted association of privatisation with mortality rates and the association after controlling for unemployment. Adjustment for unemployment attenuated the estimated coefficient of privatisation by 10% (1·3% decrease) to 30% (2·4% decrease) (table 4), providing additional evidence that unemployment was a significant pathway mediating privatisation and mortality.

Figure 3 shows the interaction coefficients from a regression model that compares mass privatisation implementation and the percentage of a country's population who are members of at least one social organisation (such as a trade union, church or other religious group, sports club, or a political organisation) for 18 countries taken from the European World Values Survey 1999–2000 (EWVS).

This analysis shows how the estimated effect of rapid mass privatisation on adult male mortality rates linearly decreases with increasing social capital. In countries in which more than 45% of the population was a member

	Adjusted model		Unadjusted model
	Coefficient of log male unemployment rates*	Coefficient of privatisation measure	Coefficient of privatisation measure
Implementation of mass privatisation	0·2% (–0·2 to 0·5); p=0·079	12·1%† (5·8 to 18·4); p=0·0002	13·4%† (7·0 to 19·8); p<0·0001
Implementation of one unit of EBRD average privatisation	0·2%‡ (–0·0 to 0·4); p=0·062	5·7%† (1·0 to 10·5); p=0·017	7·1%† (2·5 to 11·6); p=0·0025

Coefficients calculated as semi-elasticities presented, with 95% CIs in parentheses based on robust panel-corrected standard errors. *Coefficient calculated on the basis of a 10% increase in log male unemployment rates. Models also control for log gross domestic product per head, European Bank for Reconstruction and Development (EBRD) price liberalisation index, EBRD trade liberalisation index, democratisation, education rate, population dependency, the percentage of population living in urban settings, the population education level, country-specific fixed effects, and a dummy for military or ethnic conflict. Number of country-years for the former Soviet Union is 155, number of countries is 14. †p<0·001. ‡p<0·05.

Table 4: **Path analysis of the effect on log adult male mortality rates in the former Soviet Union, 1991–2002**
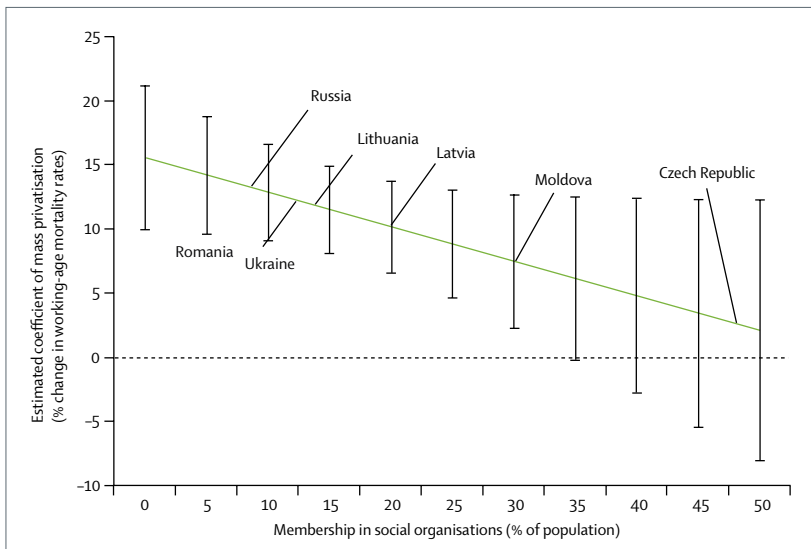

Figure 3: Interaction between mass privatisation and social capital
Estimated effects of the interaction presented from the regression model $AMR_{it}=\alpha+\beta_1PRIV_{it}+[\beta_2SC_i]+\beta_3PRIV_{it}*SC_i+\beta X+\mu_i+\varepsilon_{it}$, with the estimation sample of countries for which social capital data are available (number of countries=18, number of mass privatisers=7). [·] denote that the time-invariant social capital term is captured by the country-specific effect, μ_i; SC is a measure of social capital taken from the European World Values Survey. β_1PRIV_{it} =0·1557698 and $\beta_3PRIV_{it}*SC_i$ =–0·0026852. X represents all the controls in the model. ε is the error term. Clustered standard errors calculated from the robust variance-covariance matrix with the formula: $\sqrt{var(\beta_1)+X_{sc}var(\beta_3)+2X_{sc}cov(\beta_1\beta_3)}$. Error bars show 95% CIs.

of a social organisation, mass privatisation had no significant adverse association with mortality rates. Since research on social capital suggests that it changes only gradually over time,[24] this measure is almost surely acting as an effect modifier rather than as a confounder in our models; however, we note it would be ideal if comparative social capital were available for the countries observed throughout the 12 years under study. This finding might help to explain why, in addition to its effect on unemployment, mass privatisation programmes in the Czech Republic, which had the second highest social membership (48%, which is equal to western Europe's average level) of all the former communist countries, had no significant negative association with mortality, but in the former Soviet countries, where social membership was much lower (about 10%), rapid privatisation had very adverse results. Other measures of

social capital from the EWVS, such as trust, produce similar results (data not shown).

Webappendix 2 shows a broad set of robustness checks that we used in the course of our analysis, including a variety of model diagnostics and outlier tests, sequential inclusion of our controls as well as additional variables, and estimation with alternative functional forms. All our results were consistent with our basic findings.

Discussion

Our study has shown that mass privatisation programmes were associated with a short-term increase in mortality rates in working-aged men. Furthermore, increased unemployment rates during this time were strongly associated with mortality in countries of the former Soviet Union.

Our results accord with other data. Figure 4 compares life expectancy trends for the countries that implemented mass privatisation programmes for large state enterprises versus those that did not. Overall, countries that pursued mass privatisation in the early to mid-1990s had sharp drops in life expectancy; in those that did not, life expectancy dipped modestly, but then steadily improved. Unemployment rates followed a similar trend: increases were pronounced in countries that privatised rapidly but much more modest in countries that privatised more slowly (table 5). Four of the five worst countries, in terms of life expectancy, had implemented mass privatisation, whereas only one of the five best performers had done so.

Any disruption to the established social order creates high levels of social stress.[26] Mass privatisation is a case in point: by rapidly transforming existing enterprises into private property in the absence of a class of owners with a stake in the firm's success, many firms went bankrupt and excess jobs were lost. People were left without jobs and confronted with unfamiliar market conditions.

Although this period was predicted by the shock therapists, who viewed it merely as a time of so-called resource reallocation, it had considerable human costs; even if capital resources could be reconfigured rapidly, people were not able to adapt as quickly. Inclusive social structures during this period seem to have been crucial

in counter-balancing the harms of this dislocation, enabling people to cope with social disruptions—a finding that is consistent with research on the determinants of health in individuals.

The relation that we recorded between EBRD privatisation index and mortality is consistent with our hypothesis that the privatisation strategy, and particularly rapid mass privatisation, modified the effect of privatisation on mortality rates, offering a potential explanation for the remarkable mortality disparity that emerged between countries formerly in the Soviet Union, and other countries, during this period. Clearly, rapid mass privatisation was not the only determinant of the mortality changes in countries in central and eastern Europe and those in the former Soviet Union; however, these results provide a major explanation of the ultimate determinants of cross-national differences, both within the former Soviet Union, and between countries formerly in the Soviet Union and other central and eastern European countries. Our findings also accord with a substantial body of research on mortality in the post-communist period, which has provided evidence for the effects of several factors, including acute psychosocial stress,[27] reduced access to and decreasing quality of medical care (much provided at workplaces),[28] impoverishment,[29] rapid pace of transition,[4] increased unemployment,[30] rising social inequalities,[31] social disorganisation,[5] heightened corruption,[32] and the erosion of social capital.[33] Although a direct cause and effect relation cannot be ascertained and a detailed discussion of their roles is beyond the scope of this Article, all these findings can be linked, in some way, to mass privatisation programmes.[34,35]

Our finding that a one unit increase in the EBRD index was associated with an increase in unemployment in the sample of countries of the former Soviet Union illustrates that rapid mass privatisation was linked to more job losses than was slower privatisation, most probably because it provided fewer opportunities for firms to adapt and stay financially solvent.[36] Outside the former Soviet Union, we recorded no relationship between privatisation and increased unemployment. One plausible explanation is that countries outside the former Soviet Union benefited from foreign direct investment, mainly from western Europe. New foreign direct investments, or so-called greenfield firms, provided employment opportunities that helped to stop the unemployment gap;[37] moreover, unlike in rapid mass privatisation, the case-by-case transfer of state-owned firms, or so-called brownfield firms, to strategic foreign investors often involved explicit agreements not to make employees redundant, for at least the first few years after the takeovers.[38]

However, our study also shows that the effects of rapid mass privatisation on mortality in the former Soviet Union were not mediated merely by unemployment. In view of the wider parts played by firms from the former Soviet Union in provision of housing, education, childcare, and preventive health care, future studies
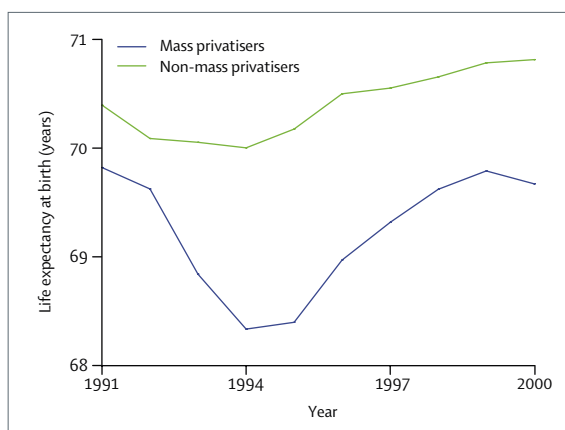

Figure 4: **Relation between mass privatisation and life expectancy in post-communist countries**
Countries that implemented mass privatisation include Armenia, Czech Republic, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Romania, Russia, and Ukraine. Non-mass privatisers include Albania, Azerbaijan, Belarus, Croatia, Estonia, Hungary, Macedonia, Poland, Slovakia, Slovenia, Tajikistan, Turkmenistan, Bulgaria, and Uzbekistan. Country classifications were checked with Ira Lieberman, the World Bank economist in charge of mass privatisation implementation, and other European Bank for Reconstruction and Development economists, who agreed with our definitions.[25]

	Change from 1991 to 1994	
	Best five countries*	Worst five countries†
Change in total adult male mortality rates	−9·5% (13·1)	42·3% (16·7)
Change in EBRD average privatisation index	1·1 (0·55)	2·0 (0·55)
Change in male unemployment numbers	2·2% (22·0)	305·0% (234·4)

Geometric means (SDs) calculated for average percentage changes. Adult male mortality rates are from the UNICEF Monitoring Transition in Central and Eastern Europe Database. European Bank for Reconstruction and Development (EBRD) average privatisation index ranges from 1 (communist) to 4·3 (complete market). *Best five countries: Albania, Croatia, Czech Republic, Poland, Slovenia. † Worst five countries: Kazakhstan, Latvia, Lithuania, Russia, Estonia. Worst five countries exclude Tajikistan, which had a military conflict with heavy casualties (male life expectancy dropped by 9 years from 1992 to 1993). Unemployment rates are registered unemployment rates from the International Labor Organization, and are presented for 1992–94 for all countries except Estonia because of missing comparative data for 1991. All data are available from the authors on request.

Table 5: **Change in total adult male standardised mortality rates and the amount of privatisation and unemployment in post-communist countries from 1991 to 1994**

should examine whether the disruption of these social services as a result of privatisation was an important mechanism of increased mortality. Outside the former Soviet Union, more research is needed to understand how foreign direct investment was able to mitigate unemployment associated with privatisation in the former Soviet Union, and to identify the social policies that might have helped offset the harms associated with unemployment that were observed at the country level.

Although there are now many studies linking unemployment to ill health,[39] the country-level relation between unemployment and mortality has not been studied in the post-communist countries. Our findings are consistent with evidence from social-science studies that, outside the former Soviet Union, countries have been able to put in place more inclusive social policies, that have helped mitigate unemployment's harmful effects.[40]

This study has not examined how privatisation and unemployment led to illness. Given the pace of change in mortality rates, mechanisms are needed involving risk factors for which exposure can change rapidly, and affect outcomes within a few years. One plausible risk factor is hazardous alcohol consumption, which is known to be very common throughout this region[41] (especially consumption of aftershaves and medicinal tinctures[42]). Other research shows how this factor has had a very important role in the mortality fluctuations that were noted in Russia;[20] mounting evidence implicates these substances in neighbouring countries.[43] Another possible risk factor is narcotic poisoning, which has caused localised increases in deaths in some places; however, this factor cannot easily explain the scale and nature of the large fluctuations in mortality. Other risk factors, such as tobacco[17] and nutrition, although undoubtedly contributors to the high background mortality rates in this region, cannot account for the rapid fluctuations.

In a famous essay, and a series of other papers setting out the shock therapy package, Jeffrey Sachs argued that, "The need to accelerate privatization is the paramount economic policy issue facing Eastern Europe. If there is no breakthrough in the privatization of large enterprises in the near future, the entire process could be stalled for years to come. Privatisation is urgent and politically vulnerable."[44] Did slow privatisation hurt the prospects for capitalism? Is Slovenia—one of the more gradual privatisers—any less capitalist than is Ukraine? In fact, by approaching transformation rapidly and radically, prospects for western-style capitalism might have been seriously impaired in countries like Russia. Countries that privatised more slowly managed to reach a capitalist endpoint but did not absorb nearly the same amount of social costs along the way.

The policy implications are clear. Great caution should be taken when macroeconomic policies seek radically to overhaul the economy without considering potential effects on the population's health. As variants of rapid reform policies are being debated in China, India, Egypt, and several other developing and middle-income countries—including Iraq—which are just beginning to privatise their large state-owned sectors, the lessons from the transitions from communism should be kept in mind.

References
1   UNICEF. A decade of transition. Monitoring Central and Eastern Europe Project. Florence, Italy: UNICEF, 2001.
2   UNDP. Transition 1999. Human Development Report for Eastern Europe and the CIS. New York: UNDP REBEC, 1999.
3   World Bank. World Development Indicators (2007 edn). Washington DC: World Bank, 2007.
4   Cornia GA, Paniccia R. The mortality crisis in transitional economies. Oxford: Oxford University Press, 2000.
5   Walberg P, McKee M, Shkolnikov V, Chenet L, Leon DA. Economic change, crime, and mortality crisis in Russia: regional analysis. *BMJ* 1998; **317:** 312–18.
6   Sachs J. Understanding 'shock therapy'. London: Social Market Foundation, 1994.
7   De Melo M, Denizer C, Gelb AH. From plan to market: patterns of transition. Washington DC: World Bank, Policy Research Department, Transition Economics Division, 1996.
8   Fischer S, Gelb A. The processes of socialist economic transformation. *J Econ Perspect* 1991; **4:** 91–106.
9   Murrell P. Can neoclassical economics underpin the reform of centrally planned economics? *J Econ Perspect* 1991; **5:** 59–76.
10   Dewatripont M, Roland, G. The virtues of gradualism and legitimacy in the transition to a market economy. *Econ J* 1992; **2:** 291–300.
11   Murrell P. How far has the transition progressed? *J Econ Perspect* 1996; **10:** 25–44.
12   Mathers CD, Schofield DJ. The health consequences of unemployment: the evidence. *Med J Aust* 1998; **168:** 178–82.
13   Baum A, Fleming, R, Reddy DM. Unemployment stress: loss of control reactance and learned helplessness. *Soc Sci Med* 1986; **22:** 509–16.
14   UNICEF. Data on children in Central and Eastern Europe and the Commonwealth of Independent States. Florence: The TransMONEE database; UNICEF, 2007.
15   van der Wilk EA. European standard population. In: EUPHIX, EUphact. Bilthoven: Rijksinstituut voor Volksgezondheid en Milieu (RIVM), 2008.
16   Rechel B, Shapo L, McKee M. Are the health Millennium Development Goals appropriate for Eastern Europe and Central Asia? *Health Policy* 2005; **73:** 339–51.
17   Shkolnikov V, McKee M, Leon D, Chenet L. Why is the death rate from lung cancer falling in the Russian Federation? *Eur J Epidemiol* 1999; **15:** 203–06.
18   Rechel B, Schwalbe N, McKee M. Health in south-eastern Europe: a troubled past, an uncertain future. *Bull World Health Organ* 2004; **82:** 539–46.
19   Wasserman D, Varnik A. Reliability of statistics on violent death and suicide in the former USSR, 1970–1990. *Acta Psychiatr Scand Suppl* 1998; **394:** 34–41.
20   Leon DA, Chenet L, Shkolnikov VM, et al. Huge variation in Russian mortality rates 1984–94: artefact, alcohol, or what? *Lancet* 1997; **350:** 383–88.
21   European Bank for Reconstruction and Development. Transition Indicators Methodology. London: EBRD, 2007.
22   European Bank for Reconstruction and Development. Transition report 2007: people in transition. London: EBRD, 2007.
23   Franco A, Alvarez-Dardet C, Ruiz MT. Effect of democracy on health: ecological study. *BMJ* 2004; **329:** 1421–23.
24   Putnam R. Making democracy work: civic traditions in modern Italy. Princeton, NJ: Princeton University Press, 1993.
25   Stuckler D, King L, Coutts A. Understanding privatisation's impact on health: lessons from the Soviet experience. *J Epidemiol Community Health* 2008; **62:** 664
26   Durkheim E. Suicide. Glencoe: Free Press, 1951.
27   Leon D, Shkolnikov, VM. Social stress and the mortality crisis. *JAMA* 1998; **279:** 790–91.
28   Balabanova D, McKee M, Pomerleau J, et al. Cross-country comparisons. Health Service Utilization in the Former Soviet Union: Evidence from Eight Countries. *Health Serv Res* 2004; **39:** 1927–50.

29   Ivaschenko O. The patterns and determinants of longevity in Russia's regions: Evidence from panel data. *J Comp Econ* 2005; **33:** 788–813.

30   Brainerd E. Life and death in Eastern Europe: Economic reform and mortality in the former Soviet Union: a study of the suicide epidemic in the 1990s. *Eur Econ Rev* 2001; **45:** 1007–19.

31   Bobak M, Hertzman C, Skodova Z, Marmot M. Socioeconomic status and cardiovascular risk factors in the Czech Republic. *Int J Epidemiol* 1999; **28:** 46–52.

32   Bobak M, Murphy M, Rose R, Marmot M. Societal characteristics and health in the former communist countries of Central and Eastern Europe and the former Soviet Union: a multilevel analysis. *J Epidemiol Community Health* 2007; **61:** 990–96.

33   Kennedy B, Kawachi I, Brainerd E. The role of social capital in the Russian mortality crisis. *World Dev* 1998; **26:** 2029–43.

34   Ellerman D. Lessons from eastern Europe's voucher privatization. *Challenge* 2001; **44:** 14–37.

35   Kogut B, Spicer A. Capital market development and mass privatization are logical contradictions: lessons from Russia and the Czech Republic. *Industrial Corp Change* 2002; **11:** 1–37.

36   King L. Shock privatization: the effects of rapid large scale privatization on enterprise restructuring. *Polit Soc* 2003; **3:** 3–34.

37   King L, Sznajder A. The state-led transition to liberal capitalism: neoliberal, organization, world-systems, and social structural explanations of Poland's economic success. *Am J Soc* 2006; **112:** 751–801.

38   King L. Postcommunist divergence: a comparative analysis of the transition to capitalism in Poland and Russia. *Stud Comp Int Dev* 2001; **37:** 3–34.

39   Bartley M, Ferrie J, Montogomery SM. Health and labour market disadvantage: unemployment, non-employment, and job insecurity. In: Marmot M, Wilkinson RG, eds. Social determinants of health. Oxford: Oxford University Press, 2006: 78–96.

40   Sachs J. Postcommunist parties and the politics of entitlements. Beyond transition. The newsletter about reforming economies. Washington DC: The World Bank, 2001.

41   Pomerleau J, McKee M, Rose R, Haerpfer CW, Rotman D, Tumanov S. Drinking in the Commonwealth of Independent States—evidence from eight countries. *Addiction* 2005; **110:** 1647–68.

42   Leon DA, Saburova L, Tomkins S, et al. Hazardous alcohol drinking and premature mortality in Russia: a population based case-control study. *Lancet* 2007; **369:** 2001–09.

43   Parna K, Lang K, Raju K, Vali K, McKee M. A rapid situation assessment of the market for surrogate and illegal alcohols in Tallinn, Estonia. *Int J Public Health* 2007; **52:** 402–10.

44   Sachs J. "What is to be done?" *Economist* (London), Jan 13, 1990: 19–24.

Societal transition and health

The fall of communism in the 1990s and the ensuing profound societal transition in central and eastern Europe and the former Soviet Union is a unique social experiment. Social, economic, and political changes affected all aspects of people's lives, which resulted in changes in mortality, morbidity, and fertility rates.[1] The experiment offers a rare opportunity to investigate societal factors that drive the health of a population.

Although many studies have described these changes, the mechanisms of how societal change affects health remain grossly under-researched. Explanations pursued so far fall into two categories: biomedical (proximal) and social (upstream). Among proximal factors, alcohol has received most attention. Upstream factors, which arguably are the primary drivers of population health, have been investigated less vigorously, possibly because they are much harder to study than others. Two major issues affect the study of factors at the societal level: measurement and confounding.

We thus welcome the study, in *The Lancet* today, by David Stuckler and colleagues[2] because they focus on upstream factors, particularly mass privatisation, and tackle the difficulties of measurement and confounding. First, the report puts into practice the notion of social transition, which then allowed measurement of factors that can serve as proxies of societal change. And second, by taking advantage of the societal transition in eastern Europe and by pooling within-country time-series analyses, the investigators tried to control for differences both between countries and over time (ie, controlled for confounding).

Stuckler and colleagues argue convincingly that the speed of privatisation was an important determinant of mortality changes in the transition in central and eastern Europe and former Soviet Union. This finding is indirectly supported by evidence that the rise in mortality was highest in individuals with low education and in regions with high social stress.[3-7] In other words, in populations vulnerable to loss of employment. They provide an important clue about what happened in these regions, but for any one study to exclude the effect of other aspects of the transition is difficult. In addition to confounding, there is also the issue of effect modification. As the investigators noted, rapid social changes took place in all countries in these regions but only some of the countries experienced a profound mortality crisis. The effect of rapid social changes, such as mass privatisation, was probably modified by other factors. Several candidates exist for such effect-modifying variables, of which we give four examples.

First, the countries most affected by the transition (in terms of fall in both the gross domestic product and life expectancy) started, economically, from a lower baseline than countries that were less affected. Additionally, the fall in life expectancy was most striking in countries with the steepest increase in income inequality.[8] At low baseline levels of gross domestic product, and at a time of rapid increase of material inequalities, it is easy to fall into poverty (and suffer its consequences).

Second, some populations seem to be more vulnerable to societal changes than others. For example, mortality rates in the former Soviet Union seemed prone to considerable fluctuations even before the transition. This fluctuation might partly indicate the historically poor health status of some populations. For instance,

Unemployed Russians queue for food handouts outside a Moscow railway station (September, 1998)

Russian life expectancy at birth in 1935 (not a year of famine) was 40 years (both sexes combined),[9] compared with 62 years in the UK.

Third, both the poor health status and the apparent vulnerability to mortality shocks in some populations might indicate the accumulation of disadvantage and risk over a lifetime. For example, poor health in Russian men and women reflects not only current social status but is also influenced by disadvantage in childhood and young adulthood.[10]

Fourth, governmental response might also have a role. When faced with rapid rises in mortality due to crises from transition, epidemics, and famines, governments respond differently: some with determination, some with neglect. Arguably, in post-communist countries most affected by transition, both policy response (Popov V, New Economic School, Moscow, Russia, personal communication) and management of transition were poor.[11]

Even with the use of an ingenious design, such as that adopted by Stuckler and colleagues, pre-existing societal characteristics cannot be taken into account. This flaw is not a criticism, but rather an illustration of the difficulties faced by investigators who wish to disentangle the effects of different factors that act at the societal level.

With all the caveats, Stuckler and colleagues' study is relevant beyond eastern Europe. Countries in other regions are, and have been, undergoing economic and social transitions.[12] That the extent and speed of such changes are important is increasingly apparent. Additionally, however, the social and health effect of transition depend on specific historical and political contexts.

*Martin Bobak, Michael Marmot
Department of Epidemiology and Public Health,
University College London, London WC1E 6BT, UK
m.bobak@ucl.ac.uk

1   UNICEF. A decade of transition: regional monitoring report no 8. Florence: IRC, 2001.
2   Stuckler D, King L, McKee M. Mass privatisation and the post-communist mortality crisis: a cross-national analysis. *Lancet* 2009; published online Jan 15. DOI:10.1016/S0140-6736(09)60005-2.
3   Shkolnikov V, Leon DA, Adamets S, Andreev E, Deev A. Educational level and adult mortality in Russia: an analysis of routine data 1979 to 1994. *Soc Sci Med* 1998; **47:** 357–69.
4   Murphy M, Bobak M, Nicholson A, Rose R, Marmot M. The widening gap in mortality by educational level in the Russian Federation, 1980–2001. *Am J Public Health* 2006; **96:** 1293–99.
5   Leinsalu M, Vagero D, Kunst A. Estonia 1989–2000: enormous increase in mortality differences by education. *Int J Epidemiol* 2003; **32:** 1081–87.
6   Jozan P, Forster DP. Social inequalities and health: ecological study of mortality in Budapest, 1980–83 and 1990–93. *BMJ* 1999; **318:** 914–15.
7   Cornia GA. Labour market shocks, psychosocial stress and the transition's mortality crisis: research in progress 4 working paper. Helsinki: UNU/WIDER, 1997.
8   Marmot M, Bobak M. International comparators and poverty and health in Europe. *BMJ* 2000; **321:** 1124–28.
9   Haynes M, Husain R. A century of state murder? Death and policy in twentieth-century Russia. London: Pluto Press, 2003.
10   Nicholson A, Bobak M, Murphy M, Rose R, Marmot M. Socio-economic influences on self-rated health in Russian men and women: a life course approach. *Soc Sci Med* 2005; **61:** 2345–54.
11   Klein LR, Pomer M, eds. The new Russia: transition gone awry. Stanford: Stanford University Press, 2001.
12   Cornia GA, Paniccia R, eds. The mortality crisis in transitional economies. New York: Oxford University Press, 2000.