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Research Paper No. 2008/74

## **Globalization and Health**

Impact Pathways and Recent Evidence

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and Luca Tiberti<sup>3</sup>

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### **Abstract**

The last two decades of the twentieth century recorded a slowdown in health gains and widespread increases in health inequality across and within countries. The paper explores the causes of such trends on the basis of five main mortality models. To do so, it regresses IMR/LEB on 15 determinants of health. The results underscore the negative health effects of the trends observed between 1980-2000, such as rising inequality, greater income volatility, declining health expenditure, increasing migration and so on. Finally, the paper simulates the level of LEB that would have been achieved in ten regions of the world if the determinants of health had continued developing over these decades as they did over 1960-80. The results indicate that in seven of such regions (including China and India) LEB would have been higher than actually observed. In this regard, the paper raises doubts about the way globalization has taken place and the way public policy oriented it.

Keywords: health status, health inequalities, globalization

JEL classification: D63, I18, O15

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**Acronyms** (listed at the end of the paper)

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## 1 Introduction, background and purpose of analysis

The last quarter century—the years of the current globalization—enjoyed a ‘peace dividend’ produced by the end of the cold war, a ‘democratic dividend’ due to the collapse of communism and spread of democratic institutions, a ‘market dividend’ generated by the introduction of market reforms in dirigiste economies, a ‘demographic dividend’ due to a sharp deceleration in birth rates and a parallel growth of the labourforce and, finally, a ‘technological dividend’ due to the ITC and bio-medical revolution.

These two and a half decades have simultaneously witnessed the spread of an economic paradigm that emphasizes macroeconomic stability, domestic liberalization, privatization of state-owned enterprises and public utilities, the removal of barriers to international trade and finance, and the search for market-based solutions in the production of public goods. Its proponents claim that these measures reduce rent-seeking, increase competition, improve export opportunities and promote convergence of the income per capita of poor countries towards that of the advanced ones. Such claims, however, have seldom been validated and economic and health performance was disappointing in several countries that followed such policies. In this regard, the debate on the pace of improvement in health status and reduction in health differentials acquires considerable relevance. Though health status can be—and indeed has been—affected by non-policy factors such as HIV-AIDS, unsatisfactory health trends could be seen as a negative side-effect of globalization policies, while in contrast, sustained health gains could be interpreted as a sign of their success (Dollar 2001).

This paper tries to shed some light on the relation between globalization policies<sup>1</sup> and health. It first discusses changes in health status and in its social determinants over the last quarter century and then analyses the relation between globalization policies and the social determinants of health. This task faces huge methodological and data problems, and the establishment of a causal nexus between globalization policies and health cannot be but tentative. Be as it may, the literature reviewed and econometric analyses presented in this paper suggest that in spite of the five dividends mentioned above, most social determinants of health improved during the last quarter century at a slower pace than during the two previous decades. The blame for this slowdown should not necessarily be placed on globalization policies, as such slowdown might have been caused by random shocks and endogenous changes in the field of technology and demography. Indeed, it might be argued that where domestic and global markets are complete, competitive and non-exclusionary, regulatory institutions strong, asset concentration moderate, access to health services universal and social safety nets in place, globalization policies may be desirable from an efficiency, equity and health perspective. However, in most cases, such conditions are non-existent and the growth, inequality and health impact of liberalization and globalization that ignore real-life structural rigidities, incomplete markets and institutions, persistent protectionism and the high cost of technology transfer have been negative in many cases.

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<sup>1</sup> This paper focuses on *economic globalization*, i.e., a process of gradual integration of countries and people into the world economy through the liberalization of the markets for goods, services, investments, finance, technology, information, and workers. The paper separates, somewhat arbitrarily, the drivers of globalization as *exogenous* (i.e., dependent, if in part, on the decisions of policymakers), *endogenous* (i.e., resulting from the choices of agents in the field of consumption, health innovation, migration and so on) and *shocks* (wars).

## 2 Mortality trends during the recent globalization

### 2.1 A slowdown in the pace of improvement in health status

Until recently, it was commonly believed that the positive health trend recorded during the 1960s and 1970s continued during the 1980s and 1990s (Fox 1998). However, the most recent literature points to a slowdown in the rate of improvement of the main health indicators (Deaton and Drèze 2002; Deaton 2004; Wagstaff and Cleason 2004). A comprehensive evaluation by Cornia and Menchini (2006) confirms that during the 1980s and 1990s there was a statistically significant slowdown in the global rate of improvement of 100-LEB<sup>2</sup> (Table 1). Such a global slowdown is robust to the removal of HIV-affected Sub-Saharan Africa and hard-hit transitional economies of Eastern Europe from the group of countries analysed. Such a slowdown was most pronounced and widespread in the 1990s, suggesting the presence of systemic problems possibly related to the policies adopted on a massive scale during that decade, or to the influence of other factors (Table 1). The slowdown of the 1980s and 1990s can be juxtaposed to the rapid health gains recorded in the developed and developing countries over the 1960s, 1970s and in some cases 1980s following the gradual development of national health systems and the transfer of modern health technologies to poor countries. Finally, the last five years point to a trend reversal as there was a slight but generally significant improvement in health indicators.

The IMR trends are not too different, except that in East Asia, Eastern Europe, Latin America, India and MENA the fastest decline was recorded in the 1980s rather than in the 1970s. In the 'rest of South Asia' the largest health improvement was observed in the 1990s owing to the rapid decline in infant mortality rates (IMR) recorded by Bangladesh. The reason for the good IMR performance during the 1980s is to be found in the rapid increase in the coverage of vertical health programmes such as child immunization, oral rehydration and spread of primary health care (PHC). In contrast, as confirmed by Ahmad, Lopez and Inoue (2000), the rate of reduction of IMR and U5MR diminished sharply in the 1990s in almost all regions as well as globally. Such a global slowdown—which is robust to the elimination of Sub-Saharan Africa and the European transition economies from the sample (Table 1)—was likely to be caused by three factors. First, the decline or premature levelling off of the coverage of vaccination, oral rehydration and other key health programmes. As Cutler, Deaton and Lleras-Muney (2006) note, internationally-supported immunization campaigns were less well funded in the 1990s than in the past. Second, in the developing regions with IMRs below 30-40

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2 Conclusions about changes in health status based on LEB are biased by the fact that such a variable is upper bounded at around 100 years of age, a fact which forces smaller absolute and relative gains in countries with an already high life expectancy. For this reason, the paper relies on 100-LEB, a variable that measures the life years lost in relation to the maximum attainable. Such measure has the advantage of being scale invariant, i.e., that the rate of change of 100-LEB is independent from its value at the beginning of each period. For instance, a 2-year rise in LEB in a country with an initial LEB of 80 years generates a 10 per cent fall in 100-LEB, which is identical to that generated by a 6-year rise in a country with a LEB of 40. It must be stressed that the selection of an upper bound of 100 years is arbitrary and that replacing it with an upper bound of 90 or 110 years yields different numerical results. Yet, as shown by Cornia and Menchini (2006) conclusions regarding the slowdown in the rate of health improvements would not change. More generally, it can be noted that while none of the approaches proposed so far for measuring changes in LEB over time (LEB itself, Kakwani's transformation, logistic transformation, or 100-LEB) is entirely satisfactory, the one used above is the least dissatisfactory.

per thousand, the slowdown might have been also due to rising difficulties encountered when dealing with complex and costly measures to correct perinatal and neonatal mortality problems. Third, the stagnation or rise of IMR and U5MR in Sub-Saharan Africa was undoubtedly related to the rise in AIDS-related deaths among young children. Regression analysis by Cornia and Zagonari (2002) shows, for instance, that a one per cent rise in HIV prevalence among adults raised IMR by 0.9 points. These explanations, while all relevant, do not tell the whole story and cannot fully explain the observed IMR slowdown recorded in MENA, the economies in transition, China or the high-income countries. A greater number of factors—including a slower growth of household incomes, greater income volatility, changes in health financing and other factors—likely contributed to this outcome.

Table 1  
Average annual population-weighted<sup>a</sup> rates of change<sup>b</sup> of 100-LEB and IMR, 1960-2004

	100-LEB				IMR			
	1960-80	1980-90	1990-2000	2000-04	1960-80	1980-90	1990-2000	2000-04
High-income countries	-0.84	-0.93	-0.97	-0.35***	-4.8	-3.9***	-3.6	-1.3***
China	-3.21 <sup>c</sup>	-0.63***	-0.45***	-1.01***	-5.5 <sup>c</sup>	-2.5***	-1.4***	-5.8***
East Asia & Pacific, excl. China	-1.27	-1.28	-1.03**	-1.00	-2.5	-2.1	-3.3***	-2.6*
Europe & Central Asia	-0.53	-0.70	-0.32***	-0.70***	-2.1	-2.1	-1.9	-3.3***
Latin America & Caribbean	-1.07	-1.04	-1.02	-0.93	-2.5	-3.5***	-3.6	-2.7***
Middle East & North Africa	-1.17	-1.58***	-1.33***	-1.06***	-2.7	-4.4***	-1.9***	-2.9**
India	-0.97	-1.14***	-0.97***	-0.36***	-1.3	-3.4***	-1.6***	-2.4***
South Asia, excl. India	-0.94	-1.07	-1.25	-1.26	-1.2	-1.6	-2.1	-1.8
Sub-Saharan Africa	-0.68	-0.22***	0.64***	-0.05***	-1.7	-0.7***	-0.7	-0.7
World	-1.42 <sup>c</sup>	-0.88***	-0.65***	-0.74*	-2.2 <sup>c</sup>	-2.2	-1.0***	-1.6***
World without SSA	-1.48 <sup>c</sup>	-0.94***	-0.79***	-0.83	-2.4 <sup>c</sup>	-2.9***	-1.6***	-2.5***
World without SSA and EECA	-1.84 <sup>c</sup>	-1.16***	-0.95***	-0.98	-2.6 <sup>c</sup>	-3.2***	-2.1***	-2.8***

Notes: East Asia does not include Japan;

<sup>a</sup> The results of the unweighted rates of change in IMR and 100-LEB confirm the trends identified on weighted data;

<sup>b</sup> The asterisks indicate that the rate of change is different from that of the prior period at the following probability level: \*\*\* <0.01, \*\*between 0.01 and 0.05, \* between 0.05 and 0.1. The variance of the 'universe' used to carry out the test is the population-weighted variance of the decennial rates of change of the countries of each region for the years 1960-2000;

<sup>c</sup> These values are influenced by the Chinese famine of 1958-62 and would be smaller if their long-term trend value were used instead. Regional averages are obtained by weighting country data with the live births in the case of IMR and the population in that of 100-LEB.

Source: Authors' elaboration on World Bank-WDI (2006) and UN (2002).

## 2.2 Changes in the distribution of health wellbeing across and within countries

The last quarter century also witnessed a rise of health inequality across and within countries that conflicts with the objectives of WHO's *Health for All Strategy* which in 1984 argued that '... by the year 2000, the actual differences in health status between countries and between groups within countries, should be reduced by at least 25 per cent' (Gwatkin 2000).

(i) *Evidence of changes in health differentials between countries*

As suggested by the famous Preston concave relation (1976) linking GDP per capita and LEB, economic growth in the long term should lead to a convergence of the life expectancy of developing countries towards that of the developed ones. Part of the empirical research supports such a hypothesis. Wilson (2001) finds that starting from 1950, such a convergence did actually take place. In contrast, Meyer (2001) suggests that over the 1960-97 period, the cross-country distribution of LEB remained twin peaked despite the ‘migration’ of several countries from a low-LEB peak of 45-50 years to a high-LEB peak of 75-80 years. Likewise, Micklewright and Stewart (1999) find that the standard deviation of the U5MR distribution of the 15 European Union (EU) members declined by 90 per cent over 1970-95 as the Southern European countries moved closer to those of northern Europe because, inter alia, of the subsidies provided by the EU Cohesion Fund and the adoption of EU standards in health related areas.

Yet, the most recent analyses point to growing divergence in health status across countries. Goesling and Firebaugh (2004) observe that the Gini coefficient of the country LEB distribution rose between 1992 and 2000 owing to the HIV/AIDS epidemics. In turn, McMichael et al. (2004) find that LEB plateaued in the high-income nations, while in the middle-income ones it converged towards that of the high-income countries. In contrast, in a third group (that included 42 African and four Central American countries, the economies in transition, Fiji, Iraq and North Korea) life expectancy in 2001 was lower than in 1960, 1980 or 1990. In their view, the usual explanation of health convergence (i.e., a rapid fall in deaths due to infectious diseases in poorer countries and a slow decline in mortality due to chronic diseases in the rich ones) has to be broadened so as to take into account new life-threatening challenges.

Table 2  
Trend in the coefficient of variation and Gini coefficient  
of the intra-regional and global distribution of 100-LEB, 1960-2000

100-LEB	Coefficient of variation (population weighted values)					Gini coefficient (population weighted values)				
	1960	1970	1980	1990	2000	1960	1970	1980	1990	2000
East Asia and Pacific (22)	0.18	0.16	0.16	0.15	0.15	7.98	7.23	7.48	6.51	6.17
L. America & Caribbean (32)	0.12	0.12	0.12	0.12	0.13	6.54	6.17	6.4	6.2	6.49
Middle East & N. Africa (20)	0.10	0.10	0.10	0.12	0.14	3.61	4.06	4.99	6.06	6.78
Sub Saharan Africa (45)	0.07	0.08	0.09	0.11	0.09	3.7	4.33	5.1	5.9	4.59
South Asia (7)	0.05	0.06	0.07	0.07	0.08	1.61	1.89	2.11	2.12	1.94
Eastern Europe & C. Asia (29)	0.15	0.13	0.08	0.05	0.10	6.81	5.55	4.18	2.88	5.44
Western Europe (18)	0.05	0.04	0.04	0.04	0.04	2.29	2.12	2.29	2.10	1.92
North America (2)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
World (175)	0.27	0.24	0.24	0.23	0.27	15.2	13.32	13.19	12.86	14.18
World excl. SSA (130)	0.28	0.22	0.22	0.20	0.19	15.63	12.57	11.98	10.87	10.31
World excl. SSA & EECA (101)	0.26	0.22	0.22	0.20	0.20	14.47	12.21	12.32	11.31	10.67
Memo item: unweighted values										
World (175)	0.27	0.27	0.28	0.30	0.35	15.4	15.6	16.0	16.8	19.4
World excluding SSA (130)	0.25	0.24	0.23	0.23	0.24	14.2	13.3	12.5	11.8	12.5

Notes: The regional aggregates include developing countries only; the number of countries in each area is in parenthesis; NA = not applicable.

Source: Cornia and Menchini (2006).

To analyse changes over time in health inequality, Cornia and Menchini (2006) calculate the population weighted and unweighted coefficient of variation and Gini coefficient of the global and regional country distributions of 100-LEB and IMR/U5MR (Table 2). They find that the trend of these inequality indexes followed a U-shaped pattern, declining until 1990 and increasing thereafter (Table 2). However, for the population weighted indexes the rise in health inequality disappeared when Sub-Saharan Africa was dropped from the sample, as the deteriorations registered in the former Soviet Union and nations such as Iraq, North Korea and Haiti were offset by the health gains recorded in India, Bangladesh and parts of Central Europe. Finally, it must be noted that the unweighted variation coefficients point to rising health inequality also after Sub-Saharan Africa has been excluded from the sample (Table 2). This means that, in terms of countries rather than people, the derailment of the long-term convergence in life expectancy predicted by Preston (1976) is due to more than the spread of HIV/AIDS in Africa.

Table 2 shows also that intra-regional inequality (in 100-LEB) followed a U-shaped trend in Eastern Europe but a steadily increasing one in all other regions with the exception of East Asia and Western Europe. Interestingly, between 1990 and 2000 Sub-Saharan Africa experienced a 'downward convergence' in 100-LEB as the nations that suffered the biggest losses (South Africa, Botswana and so on) were those which previously had recorded the largest gains. Except for East Asia, these trends are more pronounced when health inequality is computed without weighing the mortality rates for the population of each country. An analysis of health inequality on the basis of IMR and U5MR (omitted for reasons of space) confirms even more clearly that the recent health gains were distributed in an increasingly less egalitarian way. This conclusion is robust to the choice of the inequality indicator and the weighing of the data by country population.

(ii) *Evidence of within-country divergence in health status*

Advancements in average national health indicators often conceal different rates of improvement for social groups identified on the basis of gender, rural-urban residence, region, income class, education, labour market status and so on. Mortality differentials have been documented in the literature for many years and countries (Wagstaff 2000). A recent analysis by Delamonica and Minujin (2003) based on demographic and health surveys for 24 developing countries finds that during the 1980s and 1990s, the ratio of the U5MR in families belonging to the bottom 20 per cent relative to that of children of families in the top 20 per cent of the income distribution worsened in 11 of the 24 countries considered, remained constant in 10 and improved in three. Similar results are noted by Cornia and Menchini (2006) for the early 1990s-early 2000s, as much of the IMR decline during this period appears to have benefited the children of the urban middle-upper class. Evidence of rising IMR differentials for China is provided by Zhang and Kanbur (2003). Their study shows that the rural/urban IMR ratio rose from 1.5 to 2.1 between 1981 and 1995, that the female/male IMR ratio rose from 0.9 to 1.3 and that the regional variability of health outcomes increased sharply. The authors link these trends to the 1978 fiscal decentralization, dissolution of the communes, diffusion of private medical practices and freedom granted to urban-based state-owned enterprises to lay off workers and cut health subsidies. Finally, mortality differentials by age group, gender, level of education, employment and migrant and marital status have risen sharply in the economies in transition (Cornia and Panicià 2000). For instance, in



Russia the life expectancy ratio of the best and least educated adults rose from 1.63 in 1988-89 to 1.89 in 1993-94.

### 3 Mortality models and pathways of health impact

How can one explain the above changes in health trends? Such a task requires identification of the five main mortality models that explain most of the variation in mortality over time and across countries.

#### 3.1 Material deprivation pathway

In this model, which is particularly suitable for low- and middle-income countries, an increase in material resources or a reduction in environmental contamination reduces mortality due to infectious, parasitic, airborne, waterborne and nutritionally related diseases. For instance, the mortality decline observed in Europe during the nineteenth century, well before the introduction of modern medical technologies, was due to improvements in food intake, water systems, housing and sanitation made possible by a rise in incomes per capita (McKeown 1976).

What are the main health determinants in this model? The first is real *household income/c*, a variable that is particularly relevant in the 100 or so countries with a GDP/c of less than US\$4,000. The second is the *instability of household income*. The ability to secure a steady supply of food, shelter and medicine depends on a household's ability to spread its income over the year, by borrowing during periods of low earnings and by saving during high earning periods. Where financial markets are imperfect, such 'consumption smoothening' is not feasible and therefore families may face a health-threatening fall in consumption during low earnings subperiods. In addition, volatility-induced uncertainty raises risk, pushes upward interest rates, increases precautionary savings and reduces investment (Ramey and Ramey 1995). While the main source of instability in subsistence societies is weather shocks, fluctuations in world commodity markets (Guillaumont, Korachais and Subervie 2008), interest rates and capital flows are the main source of instability in globalized societies.

Third, given an average GDP/c, an egalitarian *distribution* improves health status by ensuring that most households control enough income to satisfy their basic needs, while high inequality limits the access of the poor to basic resources. In addition, high inequality affects future health status because of its negative effect on GDP growth (Alesina and Rodrik 1994; Aghion, Caroli and Garcia Peñalosa 1999; Bourguignon 1998; Birdsall 2000). Fourth, rises in the *relative prices of essential goods* reduce households' real consumption and worsen health status as the prices of food and medicines grow faster than the consumer price index (CPI), i.e., the index used to convert nominal into real incomes. Fifth, the *level of education of family members* and of mothers in particular, is a major determinant of the health status of all family members, particularly of children. Educated parents have been shown to make more rational consumption decisions and better use of public health services. Education also facilitates enhancements in health knowledge and practices, and in avoiding unhealthy lifestyles (Bicego and Boerma 1993). In 1979-82, for instance, death rates for 30-34 year old Czech males with basic education were 5.7 times higher than for those with university education (Hertzman 1995).

Sixth, access to *public or private health services* and the number and quality of health workers are closely associated with health coverage and health outcomes (WHO 2006). In addition, for any given amount of health resources, its allocation to different levels of care and its financing method are equally important. Free public provision of basic health services is the least discriminatory approach, in which such an advantage persists when ‘nominal’ user fees are introduced to reduce service overuse, but disappears when ‘substantial’ user fees are adopted. Private health financing is the most exclusionary, while the impact of health insurance varies but tends to be regressive in economies with a large informal sector. Seventh, the *time* available to women for food preparation and the care of children, elderly and sick is also an important resource for health. Eight, health outcomes also depend in an important way on the *demographic structure of the family*, as families with unfavourable dependency ratios tend to have worse health outcomes. The risk of death of children and mothers is also correlated with the child’s birth order and the age of the mother. Ninth and final, *environmental contamination* affects life expectancy, particularly among the poor who are exposed to air-, water- and vector-borne diseases, pollutants, industrial wastes and pesticides. While vector and viral contamination has been gradually controlled in the course of the last decades, malaria infestation has not declined and new diseases such as hepatitis D, Ebola, AIDS, tularaemia and lassa fever have appeared, the emissions of CO<sub>2</sub> and other pollutants have increased and growing international trade in toxic waste has augmented the health risks of people in marginal areas of low-income countries.

### **3.2 Progress in health technology**

According to this model, medical technology and health knowledge are the most important factors of mortality decline. During the post-Second World War period, progress in this area in low-income countries sharply reduced mortality from infectious, parasitic and communicable diseases through malaria spraying, vaccination, the distribution of antibiotics and similar programmes (Preston 1976). In advanced societies, medical progress made possible a sharp decline in cardiovascular- and cancer-related mortality among the middle age and elderly population. Cutler, Deaton and Lleras-Muney (2006) suggest, for instance, that medical advances in controlling cardiovascular problems explain 70 per cent of the seven-year gain in life expectancy recorded in the US between 1960 and 2000. These authors see no reduction in the flow of new inventions but note that the related health benefits will mainly accrue to high-income countries, widening in this way the mortality differentials among countries.

The measurement of progress in the medical field is quite difficult as there are no synthetic indexes reflecting the myriad of new discoveries. In addition, the health impact of these discoveries depends on their accessibility to the population which, in turn, depends on the existence of non-exclusionary delivery channels. In regression analysis the impact of medical progress can be captured by linear, convex or concave time trends or by period dummies. Such variables, however, may also capture the unobserved effects. In developing countries, progress in health technologies can also be proxied by the coverage rate of vertical programmes such as immunization, control of malaria, AIDS and TBC, oral rehydration, clinic-based delivery and access to fresh water, while in countries with a large share of elderly people it can be proxied by the coverage of the screening of chronic and degenerative diseases.

### 3.3 Acute psychosocial stress

Stress is a key factor in deaths due to heart problems, hypertension, alcohol psychosis, neurosis, suicides and accidents, ulcers and cirrhosis. According to Serafino (1994, cited in Shapiro 1994), 'Stress is the condition that results when person/environment transactions lead the individual to perceive a discrepancy—whether real or not—between the demands of the situation and resources of the person's biological, psychological or social systems'.

In countries hit by social upheavals or experiencing tumultuous globalization, death due to acute stress results from increased pressures to adapt to new situations, the absence of coping strategies and inadequate public policy responses. Epidemiological research has shown that acute stress leads to physiological and psychological arousal, which provokes sudden changes in the heart rate, blood pressure and viscosity, reduction in the ability to maintain emotional balance, pervasive sense of powerlessness, and loss of social role, personal control and purpose in life (Marmot and Bobak 2000). Acute psychosocial stress has been shown to lead to increased consumption of health-damaging 'stress-relievers' such as alcohol and drugs, which further affect mental balance and social behaviour.

It is difficult to provide a universal list of stress-inducing factors, as these may be better managed in some societies than in others. Yet, as suggested by the Social Readjustment Classification of Stress, the stress factors discussed hereafter have been shown to affect health in many places (De Vogli 2004). To start with, stress may arise from *loss of employment*, especially if this is unanticipated and unaddressed by public policy. Follow-up studies found evidence of short-term adverse effects of unemployment on mental health, suicide, ulcer prevalence and circulatory diseases (Cornia and Paniccià 2000). Marmot and Bobak (2000) estimate that jobless workers face, on average, a 20 per cent greater risk of death than the employed. In addition to a loss of income, unemployment causes a loss of skills, cognitive abilities, motivation, sense of control, and promotes feelings of being unwanted, unproductive, dependent and without a role (Sen 1997). Unemployment may also erode the social norms and cause an increase in crime rates and family violence. Other sources of work-related stress include rapid job turnover, unstable employment, firm restructuring, bankruptcy and, for small producers, sudden deteriorations in inputs/output price ratios.

Second, stress may arise from a *sense of frustration* caused by failure to fulfil one's obligations. In patriarchal societies, wage declines do not raise mortality among household heads because of a shortage of basic goods, but because of the perceived inability to provide one's family with the goods considered 'socially necessary'. Third, rapid *changes in social hierarchies* (proxied by changes in social mobility or income inequality) entail for many a loss of role, reputation and influence, as observed, for instance, among former industrial workers and communist cadres of the economies in transition. In addition, if the ascent of new elites is perceived to result from corruption rather than merit, losers experience frustration, envy, loss of purpose and social disorientation as the values, norms and roles of their lifetime are replaced by new ones.

A final source of stress concerns *personal living arrangements*. At all ages, stress-related mortality is significantly higher for the widowed, divorced and single individuals than for those who are married. For instance, Ruzicka (1995) suggests that the increase in suicides observed in the developed countries during the 1970s and 1980s may have

been partly due to a decline in marriage rates and a rise in divorce rates. In addition, distress migration is a source of ill health, as it entails material hardship, loss of control, breakdown of family and social relationships, housing problems, social exclusion and a difficult redefinition of survival strategies.

### **3.4 Unhealthy lifestyles pathway**

According to this model, the promotion of health information and changes in personal behaviour are the more important determinants of health status. Smoking is a main factor in premature deaths due to different types of cancer, emphysema, cardiovascular diseases, cirrhosis and non-medical fatalities. Non-smokers are also affected by cigarette smoke (World Bank 1999), while pregnant women who smoke are more likely to have low birth weight babies. Smoking currently kills one in every ten people and, if the current trend continues, by 2030 smoking will be the leading cause of death in the world (ibid.). Of the 1.1 billion people who smoke, 85 per cent live in the developing countries (Ezzati et al. 2005) where quit-rates are very low (2 per cent in India, 5 per cent in China as opposed to 32 per cent in the UK) (Gaziano 2007). Excessive consumption of salt and saturated fats raises the incidence of cardiovascular problems, especially when associated with the lack of physical exercise, while a low intake of antioxidants is associated with a high risk of myocardial infarction (Bobak and Marmot 1996). In turn, excessive alcohol consumption is related to deaths due to cirrhosis of the liver, psychosis, accidents and injury. The incidence of these risks correlates weakly with the level of income but is inversely related to the level of education.

For years, the unhealthy lifestyles model has guided mortality analyses in developed countries but the recent literature on the ‘nutritional transition’ and ‘communicability of smoking to developing countries’ suggests that it applies also to the urban population of middle- and some low-income countries. While there are numerous clinical studies on the health impact of unhealthy lifestyles, few analyses focus on their overall impact due to the lack of nationwide statistics in this area. Aggregate data on alcohol consumption are notoriously deficient, data on physical activity and diet composition are difficult to obtain in broad surveys and data on aggregate smoking prevalence in developing countries are scant.

### **3.5 Income inequality, hierarchy and social disintegration**

High inequality may also affect health status by raising social stratification and eroding social cohesion (Wilkinson 1996; 2000).<sup>3</sup> Highly stratified societies generally feature a high degree of heterogeneity, divergent social objectives, limited capacity to undertake collective action, low taxation and provision of public health services, residential segregation and restricted political participation. These phenomena are not the prerogative of the US and UK (where they have been the object of many studies) but

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<sup>3</sup> This approach remains controversial and some authors (Deaton 2001) suggest that the findings of these studies should be treated with caution because of theoretical problems (e.g., due to the impact of omitted variables that correlate with inequality) and the weakness of the evidence provided. Deaton emphasizes also the limited reliability of the inequality measures used in international comparisons. He does not exclude the possibility that inequality is one of the factors affecting health, but rejects the view that it is its main determinant.

have also been observed in poor rural settings as in the study by Godoy et al. (2006) on 13 Bolivian villages.

Second, high inequality erodes social cohesion and control, i.e., essential factors for the diffusion of health information, control over deviant health behaviour and criminal activity and promotion of interpersonal help among community members (Kawachi, Kennedy and Wilkinson 1999). According to House, Landis and Umberdson (1988), the health risks associated with low social integration in unequal societies are comparable in magnitude to the risks associated with smoking, high blood pressure and obesity. Third, according to Wilkinson and Pickett (2006), who review 168 analyses on the relation between inequality and health in developed countries, chronic stress associated to inequality has a large impact on health. One particular source of such stress arises from a hierarchal organization of work in which most decisionmaking is concentrated in the hands of a few people, while the rest are engaged in simple tasks, have little control over work-related decisions and thus may suffer from 'learned helplessness'. Table 3 summarizes the main determinants of health by type of mortality pathway.

Table 3  
Summary of variables affecting mortality by main pathway

	Material deprivation	Technical progress	Psycho-social stress	Unhealthy lifestyles	Inequality and social cohesion
1. Income/c	XX	—	—	—	—
Large changes in wage	—	—	XX	—	—
Income instability	XX	—	XX	—	—
2. Gini income	XX	—	XX	—	XX
Rise in Gini income >4	—	—	XX	—	—
3. Unemployment rate	XX	—	XX	—	XX
Δ employment rate	—	—	XX	—	—
Invol. employment turnover	—	—	XX	—	XX
Bankruptcies	—	—	XX	—	—
4. Inflation rate	—	—	XX	—	—
Relative price of food	XX	—	XX	—	—
5. Female illiteracy	XX	—	—	XX	—
Women w. primary education	XX	—	—	XX	—
Women w. secondary education	XX	—	—	XX	—
6. Health expenditure/c	XX	XX	—	—	—
Doctors/1000	XX	XX	—	—	—
Out-of-pocket expenditures	XX	—	—	—	XX
7. Technical progress in health	—	XX	—	—	—
Coverage of PHC programmes	—	XX	—	—	—
Screening of degenerative diseases	—	XX	—	—	—
8. Time use	XX	—	—	XX	—
Dependency ratio	XX	—	—	XX	—
9. % incomplete families	XX	—	—	XX	—
Migrants/population ratio	XX	—	XX	—	—
10. Environmental contamination	XX	—	XX	—	—
11. Alcohol consumption	—	—	XX	XX	—
Smoking incidence	—	—	—	XX	—
Unbalanced diet	—	—	—	XX	—

Notes: XX indicates that the variable is relevant, — indicates that the variable is not relevant.

Source: Authors' compilation.

## 4 Changes in the determinants of health over 1980-2005 versus 1960-80

This section discusses the changes occurring during the last two decades in the determinants of health listed in Table 3.

### 4.1 Income growth

Trends in this area are well known (Berry and Serieux 2006) and are only briefly recalled hereafter (Table 4). To start with, world growth slowed down over 1980-2000 ('the era of the recent globalization') in relation to 1960-80 (the 'second golden age of capitalism'). Growth was particularly weak in the 1990s owing to stagnation in Europe, Japan, Latin America, MENA and, to a lesser extent, the Asian economies affected by the 1997 financial crisis and the recession in the transition economies and Sub-Saharan Africa.

Second, the unweighted standard deviation of the growth rate of GDP/c increased (Figure 1). Indeed, over the last two decades, negative or zero growth was recorded in 32 per cent of the countries analysed and growth rate of less than 1 per cent in another 18 per cent. With such changes, health status deteriorated or improved at a slower rate. In contrast, growth improved in East and Southeast Asia, India and China. Third, the engines of world growth shifted from the OECD to the Asian countries. However, given their initial low weight, their growth surge was overshadowed by the slowdown in the OECD countries, leading in this way to a global growth deceleration. Finally, during the period 2000-05, the growth rate of GDP per capita showed a timid recovery due to the continued growth in the Asian economies, a moderate recovery in Sub-Saharan Africa and Japan as well as strong growth in transitional Europe.

Table 4  
Period GDP/c growth rates<sup>a</sup> by main regions

	1960-70	1970-80	1980-90	1990-2000	1960-80	1980-2000	2000-055
High-income countries	4.11	2.60	2.39	1.88	3.35	2.13	1.45
China	1.49	4.31	7.71	9.26	2.89	8.48	8.77
East Asia & Pacific, excl. China	2.87	4.51	3.47	3.18	3.69	3.32	3.60
Eastern Europe & Central Asia	5.0 <sup>b</sup>	2.3 <sup>b</sup>	2.1 <sup>b</sup>	-1.03	NA	NA	5.07
Latin America & Caribbean	2.54	3.15	-0.89	1.68	2.85	0.39	0.94
Middle East & North Africa	NA	NA	0.14	1.88	NA	1.01	2.15
India	1.69	0.68	3.58	3.62	1.19	3.60	5.25
South Asia, excl. India	2.60	0.40	2.82	1.93	1.50	2.38	2.52
Sub-Saharan Africa	2.31	0.76	-1.04	-0.32	1.53	-0.68	1.96
World	3.25	1.83	1.38	1.41	2.54	1.39	1.53

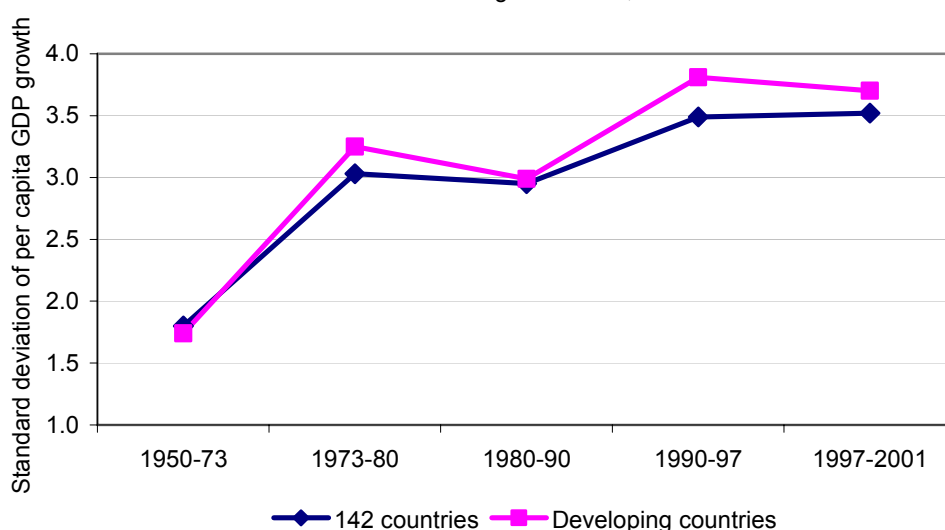
Notes: Japan not included in East Asia;

<sup>a</sup> Average yearly compounded and population weighted growth rate computed on a point-to-point decennial basis;

<sup>b</sup> The data refer to the periods 1950-70, 1970-80, 1980-90 and are derived from Cornia and Danziger (1997).

Source: Authors' calculation on World Bank-WDI (2004).

Figure 1  
Standard deviation of GDP growth rates, 1950-2001



Source: Ocampo (2004).

## 4.2 Economic instability

In most low- and high-income countries, ‘macro instability’ remained broadly unchanged during the last quarter century (Table 5), though ‘micro instability’ rose in several others. For instance, in the early 1990s Japanese companies were allowed to scrap the old lifetime employment system in favour of a more flexible one. As a result, unemployment rose from zero in the late 1980s to 5.4 per cent in 2002. While mortality rates for most causes declined slowly, the number of suicides grew by 80 per cent between 1990 and 2000, entailing for the decade as a whole 80,000 suicides among the newly unemployed and bankrupt managers (Lamar 2000).

Table 5  
Average standard deviation of GDP/c growth rate by country groups, 1960-2005

	1960-70	1970-81	1982-90	1990-2005
Low income	4.69	6.32	4.95	4.58
Low and middle income	2.77	3.48	4.44	5.62
High income	1.93	2.69	1.91	2.58

Note: The above values are obtained by computing the decadal standard deviation of each country, which was then averaged by the three main areas.

Source: Authors' elaboration on World Bank-WDI (2006).

Table 6  
Number of banking and financial crises

Type of crises	1970-79		1980-95	
	Total	Average per year	Total	Average per year
Balance-of-payments	26	2.6	50	3.13
Twins	1	0.1	18	1.13
Single	25	2.5	32	2.0
Banking	3	0.3	23	1.44

Source: Kaminsky and Reinhart (1998).

In contrast, both macro and micro instability rose perceptibly in most middle-income countries. Indeed, with the possible exception of South Asia, globalization appears to have heightened the instability of GDP/c growth rate (Table 5), private consumption (Prasad et al. 2003), investment and FDI/GDP (ibid.).

A main contribution to the surge in instability of the last 20 years was the epidemic of banking, financial and currency crises that followed the financial deregulation of the mid-late 1980s and the capital account liberalization of the 1990s. In a world closely interlinked by flows of trade, remittances, technology and finance, such crises were quickly propagated from the affected countries to the rest of the world, as shown by the parallel rise in banking and balance-of-payments crises over the 1980-95 period (Table 6).

The impact of growing instability on health is documented by a few recent analyses. A study on macro data by Guillaumont, Korachais and Suvervie (2008) finds that in 68 developing countries the standard deviation of the average quadratic deviation of GDP/capita growth rate from its trend was negatively correlated to the survival rate of children under five years of age and that a five-point rise in instability augmented on average U5MR from 110 to 128. The most shocking case of mortality caused by macro instability is that observed during the transition in the former Soviet Union which recorded 10 million excess deaths during the 1990s (Cornia and Panicià 2000). Likewise, the Russian financial crisis of August 1998 and the subsequent 100 per cent rouble devaluation caused a sudden three-point rise in unemployment as well as three-year fall in male life expectancy between the 1997 and 2000 period.

Micro studies of the health impact of instability are less common but point in the same direction. An example is given by the sharp rise in suicides among cotton farmers in the Warangal District in Andhra Pradesh (Cornia 2004). In July 1991, the Indian government cut state support for seeds, fertilizers, rural credit and output prices, liberalized trade in agriculture and encouraged subsistence farmers to enter production for the export of input-intensive commodities such as cotton. Following the introduction of these reforms, the Warangal District experienced a surge in suicides among small cotton farmers caused by rising volatility in world cotton prices, the absence of price stabilization mechanisms, declining support to rural activities and the feudal nature of local inputs and output markets dominated by moneylenders. Squeezed between volatile world prices and rising costs and indebtedness, increasingly desperate cotton farmers saw suicide as the only option. Another example is that of South Korea, where health deteriorated following a rising instability in the labour market caused by the financial crisis of 1997-98. Unemployment rate rose from 2 per cent prior to the crisis to 8.4 in the first three months of 1999, to return to 4.6 by 2001 while the share of parttime and daily workers jumped from 42.5 to 52.5 per cent. Consequently, between 1996 and 1999, the number of deaths from work accidents rose by 10 per cent, from occupational ailments by 18 per cent, from ischemic diseases by 100 per cent and from suicides by 80 per cent (ibid.).

### **4.3 Income inequality**

From the early 1980s income inequality started to rise in most OECD countries as well as in Latin America, the European economies in transition and in China (Cornia 2004). A reversal of inequality trends has been observed also in the egalitarian economies of East Asia and in India since the liberalization of 1991 (Deaton and Drèze 2002).



Inequality rose also in Sub-Saharan Africa where data problems, however, impede a systematic assessment of recent trends. The results of case studies are confirmed by overall econometric analyses. Jäntti and Sandström (2005) conclude that inequality increased in most of the 115 countries they analysed because of a rise in the income share of the richest quintile. In turn, Cornia and Rosignoli (2007) suggest that income inequality rose by various degrees and with different timing and health impact in 60 of the 85 countries for which it was possible to construct a long-term inequality trend (Table 7). However, their study also shows that in eleven of the 60 countries that recorded a rise, inequality stabilized in the 1990s or 2000s after completing the shift from Keynesian to liberal policies (in the UK) or following a recovery of growth (in Romania).

Table 7  
Trends in the Gini coefficients of the distribution of income from the 1950s to the 2000s  
for 85 developed, developing and transitional economies

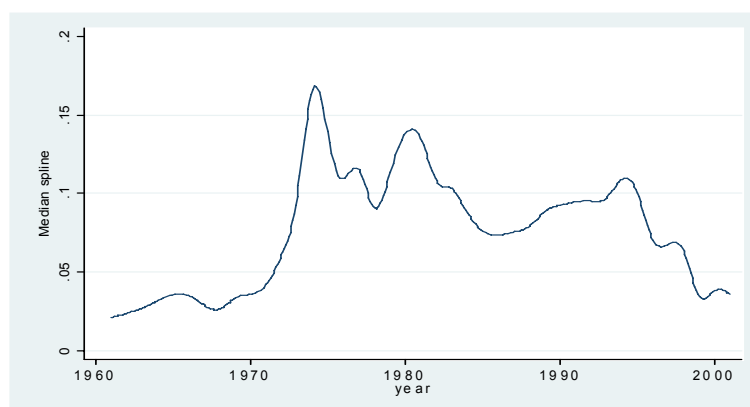
Inequality trend	No. of countries:				Per cent of:		
	OECD	Transitional	Developing	World	Countries	Populations	GDP-PPP
Rising	13	24	23	60	70	76	71
Constant	1	1	14	16	19	19	18
Declining	6	0	3	9	11	5	12
Total	20	25	40	85	100	100	100

Source: Cornia and Rosignoli (2007).

#### 4.4 Inflation and prices of basic goods

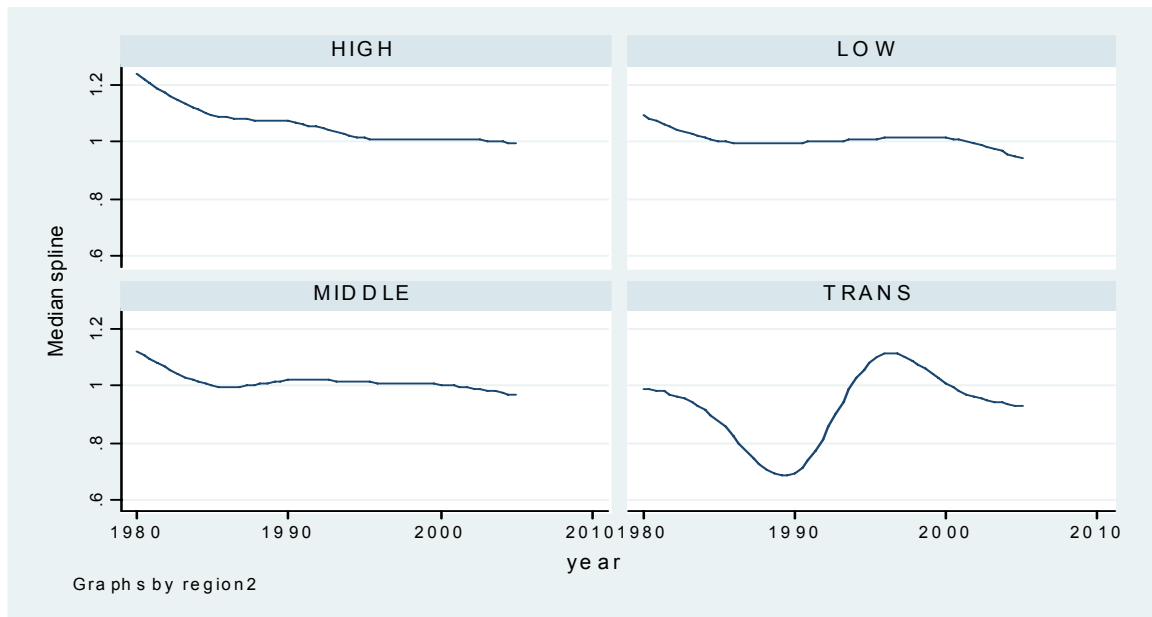
Prices rose slowly for most of the 1980s and 1990s (Figure 2) due to the emphasis placed by the IMF and many governments on achieving low inflation. Yet, the reforms of the last quarter century emphasized measures such as price liberalization, removal of subsidies to key goods and devaluation which could have led to rises in food prices faster than in the CPI. Examination of the trend of the food price index/CPI ratio (Figure 3) did not find evidence of such effect, except for the transition economies.

Figure 2  
Trend in the median inflation rate for all countries, 1960-2002



Source: Authors' elaborations on the basis of the GHDN database.

Figure 3  
Trend in the 'food-price/consumer price' index by country groups, 1980-2005

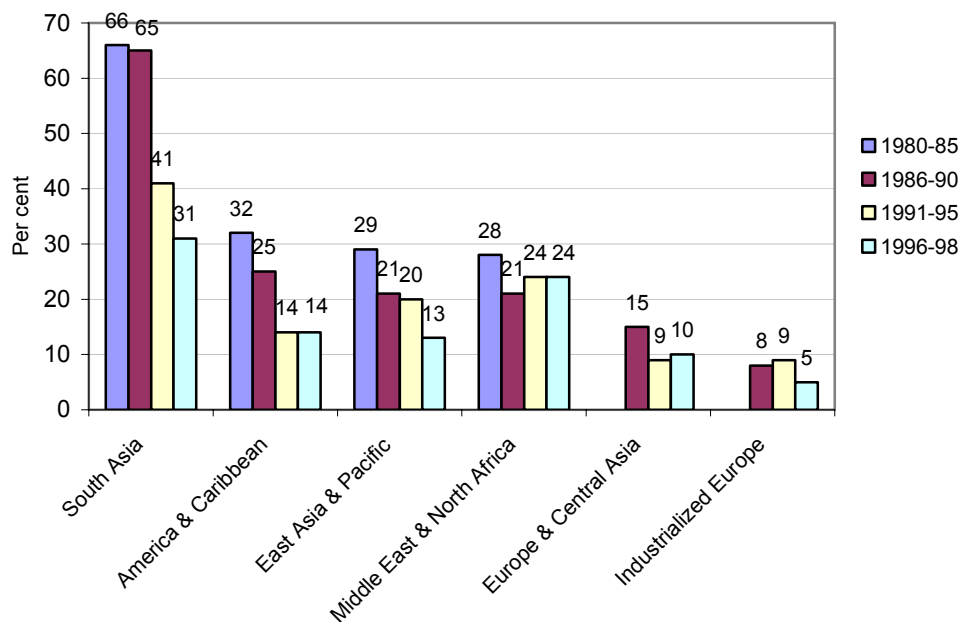


Source: Authors' elaborations on the basis of the GHDN database.

#### 4.5 Taxation, public expenditure on health and health financing

In the industrialized countries, health expenditure rose because of population ageing and the high income elasticity of the demand for health care. The situation in developing countries is heterogeneous. With declining deficits due to the introduction of stringent stabilization policies, the spending capacity of governments became increasingly determined by the tax revenue collected. In this regard, the reduction of tariffs following

Figure 4  
Average un-weighted tariff rates (in per cent) by region, 1980-98



Source: World Commission on the Social Dimension of Globalization (2004). *Global Economic Perspectives* (2001).

trade liberalization (Figure 4) limited, *ceteris paribus*, the spending capacity of liberalizing governments. Furthermore, in the new era of mobile capital and immobile labour, developing countries hoping to attract foreign direct investment (FDI) engaged in a downward bidding, simultaneously entailing a reduction in corporate income tax and the concession of tax holidays to foreign investors. A recent analysis of the trend in the tax/GDP ratio for a panel of developing countries points to an average drop of one percentage point in the tax/GDP ratio over the 1980s-90s period, as opposed to a rise of 1.6 points between the 1970s and 1980s (Chu, Davoodi and Gupta 2000). As a result of such a decline, public health expenditure dropped in several countries (as in China between 1978 and 1990 and India after 1991) although in other cases it did not change much or even increased, as in the Middle East and North Africa.

Access to health care and health status were also influenced by changes introduced in health sector financing during the last 25 years. These were often instigated in the wake of the early-mid 1980s budget crises and the structural adjustment programmes introduced to tackle them. Such reforms proposed user fees in state clinics, decentralized service provision, opened up the health sector to private providers, privatized government hospitals and introduced health insurance. Most of these reforms remain highly controversial. Research has shown that market-based reforms in the health sector of Sub-Saharan Africa have reduced service utilization over the past 20 years (Reddy and Vandemoortele 1996). A survey-based review of eleven Asian countries by van Doorslaer et al. (2006) shows that out-of-pocket payments (medical fees, charges for public care, purchases of medicines, insurance co-payments and so on) became very important, but that in Malaysia and Indonesia the state raised sufficient revenue through taxation, enabling charges in the public sector to be kept to a minimum.

Similar effects are reported in most economies in transition. With the *Doi Moi* of 1986, Vietnam reformed the provision of health care from a state-financed system to one based on health insurance for those working in the formal sector, user fees in public hospitals, legalization of private medical practice and liberalization of drugs sales. Such reforms led to a drop in public health expenditure from 1.57 to 1.34 of GDP and a rise in out-of-pocket costs from 59.6 to 74.2 per cent of the total health expenditure between 1995 and 2000. Microeconomic analyses for 1993 and 1998 show that as a result of such reforms, the share of sick people not seeking treatment rose from 6 to 17.6 per cent (Tiberti 2006). The Chinese data point to an even more worrisome situation. With the

Table 8  
Access to health care and financial problems in China, 1993 and 1998

Year	Cities, by size			Rural areas			
	Major	Medium	Small	I	II	III	IV
% of patients not seeking medical treatment because of financial difficulties							
1993	3.2	2.4	9.6	15.1	21.4	19.5	24.4
1998	36.7	23.5	42.9	30.1	31.7	42.3	38.7
% of patients missing out on hospitalized treatment due to financial difficulties							
1993	34.1	33.9	53.4	47.9	63.5	61.1	67.7
1998	53.1	58.4	70.8	63.8	54.1	70.2	69.4

Note: I-IV refers to groups of rural areas ordered in declining income order.

Source: Lu (2006).

health reforms of the 1980s and 1990s, the public health system was replaced by the privatization and marketization of health services, causing a drop in the public health expenditure/GDP ratio from 3 to 1 per cent and the transfer of responsibility for public services to local governments. After almost 30 years of transition, only half of the urban workforce and 10 per cent of the rural population are now covered by health insurance. For most people, out-of-pocket payments, which rose from 20 to 56 per cent of total health expenditure over 1978-2003, have become the only way to secure medical care (Lu 2006). As a result, despite the rise to 5.6 per cent of GDP for public and private health outlays, a growing part of the population is left with no coverage (Table 8).

#### **4.6 Migration and family arrangements**

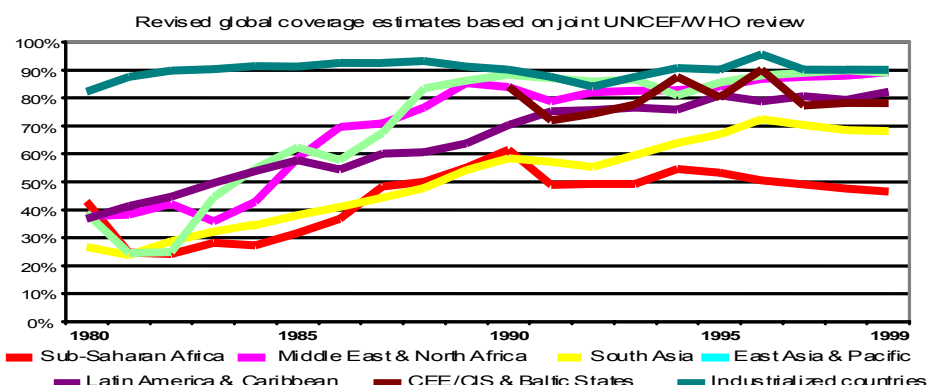
In 2005, the world stock of migrants reached 190 million. While migrants may have suffered a decline in life expectancy, they might have helped to improve the life expectancy of the people in the destination countries. This effect, which is seldom discussed in the literature, might have taken place through, first, the better staffing of health services and care of the elderly in the OECD and Gulf states. For instance, 30 per cent of the Ghanaian and 43 per cent of the Liberian physicians work in the US or Canada (Bach 2006). Likewise, over half of the doctors registered in the UK in 2002 have been trained outside the country (ibid.). Second, migrants often work in low-skilled jobs no longer favoured by the locals, thus contributing in this way to overall growth. Third, migration moderates the growth of wages in the countries of destination, thus enhancing the competitiveness of their declining sector. More controversial is the impact of migration on health in the countries of origin. While the migration of medical personnel is a source of 'brain drain', their remittances may raise the consumption of food and drugs at home and so contribute to better health outcomes.

#### **4.7 Technical progress in health**

Assessing the impact of medical progress on health requires addressing three questions: (i) has globalization enhanced the incentives to generate new research to address the health problems of advanced and developing countries?; (ii) have international trade and technology transfer policies facilitated the shift of medical knowledge to the less advanced countries? and (iii) have domestic policies enhanced access to the transferred technologies?

It is difficult to assess whether liberal policies have led to an acceleration in health discoveries, although this is likely what has happened in the advanced countries. What is abundantly clear, however, is that research continued to focus on the health conditions typical of advanced societies. As noted in Labonte and Schrecker (2006), only 10 per cent of research expenditure is allocated to diseases that are common in developing countries and that account for 90 per cent of the global burden of diseases. Of 1,393 new drugs patented between 1975 and 1999, only 16 were for tropical diseases and tuberculosis (ibid.) and as of today no vaccine has been developed to fight malaria. Second, trade liberalization affected favourably the transfer of health knowledge and technology by reducing tariffs. Likewise, a cheaper and faster transmission of data via the internet sped up the diffusion of information on appropriate health practices. For instance, the diffusion of new knowledge about the risks of smoking and new drugs for cardiovascular diseases reduced mortality in the advanced countries (Deaton 2004). The

Figure 5  
DPT3 percentage immunization rate, 1980-99



Source: Authors' elaboration on Unicef data.

last 20 years have seen also in the developing countries the diffusion of vaccines, oral rehydration salts, nutritional supplements, antibiotics, aspirin and drugs whose patents expired. The spread of these low-cost health technologies played a key role in reducing infant and overall mortality. As shown in Figure 5, the immunization rate of DPT3 (diphtheria, pertussis and tetanus) rose sharply in all regions between 1980 and 1990, but stagnated everywhere after 1990 and fell in Sub-Saharan Africa.

The transfer of sophisticated drugs and technologies including beta-blockers, screening equipment, cardiac units and antiretroviral drugs was more limited due to the adoption of the TRIPS Agreement that raised the cost of newly patented drugs and medical technologies. As put by Deaton (2004: 30), 'There is clearly a long way to go before the [health] habits and technology of the rich countries are fully adopted even in middle-income countries'. Third, the free market policies implemented also in the health sector emphasized the adoption of user fees in state facilities, health insurance and privatization of health, i.e., measures that tend to exclude the poor from health care.

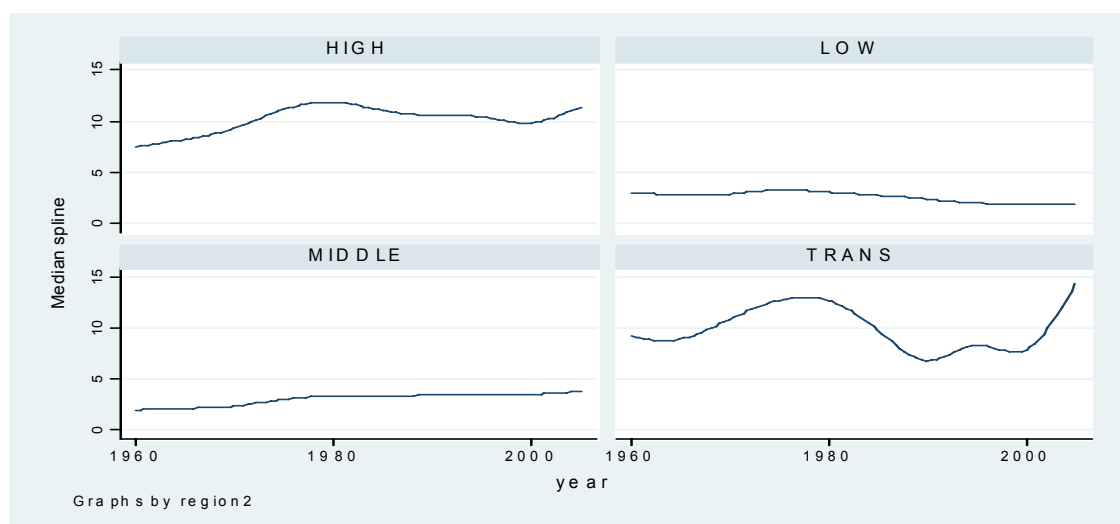
#### 4.8 Smoking, drinking and obesity

During the last quarter century, these risk factors have become relevant for a growing share of the population of developing countries. The International Mortality and Smoking Statistics database shows that after a rising trend from 1960 till about 1980, smoking incidence among men (though not always for women) fell steadily in most OECD countries as a result of awareness campaigns, various prohibitions and class actions against the tobacco companies. In contrast, smoking prevalence continues to rise in Eastern Europe for both men and women. These smoking patterns clearly mirror international patterns of mortality from lung-cancer (Deaton 2004). Data on the developing countries are scanty but the tendency is towards rising smoking incidence partly because the relocation of transnational corporations (TNCs) in these countries was made possible by the liberalization of FDI.

In developing countries, supermarket purchases of western processed foods and drinks rich in salt, sugar and fat and low in fibre have increased steadily, already accounting for a quarter of total food purchases (Hawkes 2005). The results of this transition to western diets at low-income levels are analysed by Ezzati et al. (2005). After a review of a large number of clinical studies for over 100 countries, these authors argue that

such early nutrition transition has led to a rapid increase in obesity, cholesterol, blood pressure, cardiovascular diseases and diabetes among the urban poor. As a result, cardiovascular mortality is rising in developing countries at much lower stages of economic development than implied by the ‘diseases of affluence’ paradigm. Finally, the consumption of alcohol exhibits a rising trend over the last 20 years, with the exception of the low-income nations (Figure 6). This trend is particularly marked for the transition economies, where alcohol prices and sales were liberalized in the early 1990s.

Figure 6  
Trends in the spline of alcohol consumption per capita by region, 1960-2005



Source: Authors' elaborations on the basis of the GHDN database.

#### 4.9 Random shocks<sup>4</sup>

Major food shortages were recorded in Sub-Saharan Africa over 1983-85, Sudan and Southeastern Africa in 1990-92 and North Korea in the mid-1990s. At present, an important part of the population of Eastern Africa depends on food aid for its survival. Hunger-related deaths are particularly severe in war zones where civil unrest prevents the delivery of humanitarian aid. This can be proxied by a dummy variable or by the number of war deaths. The last quarter century has also witnessed a sharp rise in the number of internal wars, ethnic struggles and complex humanitarian emergencies which climbed from 25 per year in the early 1980s to almost 60 in the mid-late 1990s-2000 period.<sup>5</sup> Sub-Saharan Africa and the former Soviet Bloc were the two regions most seriously affected. For instance, in 1994, there were no less than 13 full-fledged wars in Sub-Saharan Africa. Such conflicts raised the number of deaths due to violence, starvation and infectious diseases. While the related mortality spikes in some cases

<sup>4</sup> Most random shocks analysed in this section can be linked to policy decisions. Natural disasters might be the result of an unsustainable development model, conflicts of the instability provoked by TNCs operating in the commodity sector, and HIV-AIDS of policies that raise inequality. There is a grain of truth in these claims, but it is difficult to convincingly link these shocks to specific domestic and globalization policies.

<sup>5</sup> Contrary to the CRED database, the *2005 Human Security Report* suggests that the number of internal conflicts and humanitarian emergencies has declined since the mid-late 1990s. Both sources agree, however, that the number of such events rose from the mid-1980s to the mid-late 1990s.

quickly returned to pre-crisis levels at the end of the shock, this was not true in parts of Sub-Saharan Africa where conflicts have become endemic. The CRED ([www.cred.be](http://www.cred.be)) database shows that the number of casualties involved in such conflicts can be considerable, i.e., between 200,000-500,000 in Rwanda, 100,000 in Angola in 1994, Burundi in 1993 and Mozambique in 1992, about half in Liberia in 1993 and smaller but non-negligible numbers in Sudan and South Africa in 1993. This variable can be expressed through a dummy or the number of war casualties.

Mortality increases over the last 25 years were also caused by the spread of HIV-AIDS that currently kills about 2.3 million people a year, mostly in Sub-Saharan Africa. Its incidence is the highest in Eastern and Southern Africa where urban adult prevalence rates in the late 1990s ranged from 12 per cent (Tanzania) to 35 per cent (Botswana).

## **5 Econometric models of LEB, IMR and U5MR**

### **5.1 The Globalization-Health Nexus Database (GHND)**

The GHND includes variables on IMR, U5MR and LEB, their determinants, indexes of policies that may influence the determinants of health for Latin America and Eastern Europe and random shocks. Information on these variables is compiled for the 1960-2005 period on the basis of existing databases, national sources and specialized literature. GHND comprises 136 countries and ten quinquennia (1960, 1965, ..., 2005) and, in the case of the European economies in transition, annual observations for the period 1985-2005.<sup>6</sup> If data for all countries and years were available, the 'quinquennial GHND' would count 1,360 (136x10) data points for each of the variables in Table 5. Missing data, especially at the beginning and end of the period analysed, reduce the number of country-years for which all data are available. When missing data for one or two years and for variables concerning a qualitatively well-known phenomenon threaten to reduce the number of complete data-strings, the missing data are filled in by interpolation or on the basis of information taken from the literature. The data points thus added represent 6 per cent of the total number of observations, except for DPT vaccination for which expert information on the stability of vaccination at low coverage during the 1960-80 period allows us to add missing data that account for 18 per cent of the data on vaccination<sup>7</sup> used in regression analysis. GHND and its complete documentation are available on [http://www.dse.unifi.it/sviluppo/database\\_eng.html](http://www.dse.unifi.it/sviluppo/database_eng.html).

The 136 countries included in GHND are grouped into eight regions (Sub-Saharan Africa, South Asia, Southeast and East Asia, MENA, Latin America, OECD, Eastern Europe and former USSR). These are further grouped into four regions characterized by different mortality patterns and affected by globalization policies through different pathways. The first (low-income developing countries) includes Sub-Saharan Africa, South Asia and China. The second region (middle-income developing countries) comprises Southeast and East Asia except China, Latin America and MENA, while the

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<sup>6</sup> For this region, data for the 1960-80 period are mainly unavailable, making it necessary to rely on annual data in the estimation of a mortality model for the transition countries.

<sup>7</sup> The vaccination data imputed in the database represent 44 per cent of all DPT data, but only 18 per cent is used in the regression analysis. Ignoring this 18 per cent of imputed data would have prevented the use of all information for the years 1960-75. In any case, there is very little change in the descriptive statistics before and after imputation.

third includes the transitional economies of Central Europe and the former USSR. the OECD countries comprise the developed-nations group.<sup>8</sup>

## 5.2 Model specification and regression plan

The GHND is organized as a tri-dimensional matrix, with 136 countries on one axis, ten quinquennia on the second and the dependent and explanatory variables on the third. Such a dataset stipulates that the procedure chosen for the estimation of the mortality model takes into account that each country is observed over several periods. Such a model takes therefore the following form:

$$y_{it} = \alpha + x_{it} \cdot \beta + u_i + \varepsilon_{it}$$

where  $y$  is the dependent variable,  $x$  is a vector of explanatory variables, the subscripts  $i$  and  $t$  represent respectively the countries and the quinquennia of the panel,  $u_i$  the error term for each country,  $\varepsilon_{it}$  a joint error term for countries and time periods and  $\alpha$  and  $\beta$  the parameters to be estimated. Given the nature of GHND, the OLS procedure yields inefficient estimates and distorts the values of  $\alpha$  and  $\beta$  as information on the countries' fixed effect would be neglected (Baltagi 2005; Wooldridge 2001). The estimation procedure best suited to situations in which  $u_i$  varies from country to country is the fixed effects model<sup>9</sup> in which  $u_i$  is not treated as a random variable. The Hausman test confirms that such a model is the most appropriate under these circumstances and is preferable to a random effect model. Furthermore, the computational algorithm chosen as part fixed effects model estimation procedure automatically takes into account the fact that the GHND panel is unbalanced, as several data are missing for 1960, 1965 and 2005.

To improve the goodness of fit, improve the robustness of the estimates and avoid multi-collinearity problems, a few explanatory variables are either dropped or normalized. For instance, the Gini coefficient<sup>10</sup> is in some cases standardized for the time trend (proxied by 'year-1959') to remove its inverse correlation with GDP/c. In turn, the variable 'log doctors per 1,000 people' is divided by the Gini coefficient or by the log of GDP/c, obtaining an index of the availability of distribution of health personnel relative to the GDP/c norm. Output volatility is proxied by the maximum value in any five-year period of the five-year rolling standard deviation of GDP per capita. The health impact of technical progress is proxied in two ways. First, the

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<sup>8</sup> The robustness of this regional classification is tested through a k-mean cluster analysis identifying country groups on the basis of four variables that accurately describe the economic-health nexus in most countries, i.e., U5MR, log of GDP/c, total fertility rate and the Gini coefficient of income distribution. This analysis shows there is a large overlap between the cluster-based groups and the regional aggregates described above.

<sup>9</sup> The estimates of the fixed effects model include an intercept for each of the 136 countries in the GHND panel. Such intercepts capture specific-country effects due to geography, institutions and unobservables. For this reason, adding a dummy for tropical countries would cause problems of multi-collinearity.

<sup>10</sup> Gini coefficients are taken from WIDER's World Income Inequality Database, the most updated and complete dataset of aggregate high-quality and well documented statistics on income inequality (available at: [www.wider.unu.edu/wiid/wiid.htm](http://www.wider.unu.edu/wiid/wiid.htm)).



coverage of immunization against diphtheria, pertussis and tetanus (DPT) is used as a proxy of overall immunization coverage, oral rehydration therapy and delivery care. In addition, regional time dummies are introduced for the period 1985-2005 to capture the effect of health progress during the recent ‘globalization era’ in relation to the 1960-80 period. All other variables are included without change in their usual metric. The age dependency ratio is introduced only in the transition economies (where such variable changed markedly during the last 25 years) but not in the other regions or in the global model as this variable is very heavily trended, therefore correlating closely with GDP/c.

### 5.3 Results of the global mortality model

Table 10 presents the results of the estimation of the global relation between health status (measured alternatively by LEB, IMR, U5MR) and its determinants. The parameters in Table 10 capture the average global impact of the explanatory variables included in the five mortality pathways analysed and of the random shocks discussed in section 3. Given the large number of very different countries and long timespan on which the analysis is based, the estimates of this ‘multi-pathway model’ are quite stable. The regression results on LEB are presented separately for the entire 1960-2005 period and the subperiods 1960-80 (the ‘second golden age’) and 1985-2005 (the current globalization).

Models (1), (4) and (5) present the results of the estimation of a multi-pathway mortality model over the 1960-2005 period. Although based on 556 observations (553 for U5MR) out of a theoretical maximum of 1360 for 97 countries (out of 136), the estimates in Table 10 are very satisfactory. Practically all variables have the expected sign and plausible and statistically significant coefficients.<sup>11</sup>

Models (1), (4) and (5) suggest that an important portion of the gains in LEB, IMR and U5MR (ranging between 0.74 years in the OECD to 3.4 LEB years in South Asia and MENA) in relation to 1960-80 decades is due to the ‘technical progress in health’ realized over the 1985-2005 period. The negative and significant value recorded by this variable in the transition economies is correct as it reflects the disarticulation of the socialist health care model during the 1990s and the difficulties met in replacing it with

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<sup>11</sup> This, however, does not exclude the possibility of reverse causation which is usually tested by means of the Granger test. However, such a test is not suitable for the GHND quinquennial dataset in which each variable has at best ten observations (Hurlin and Venet 2001). It is therefore more appropriate to deal with this problem in theoretical terms. In this regard, it must be noted that reverse causality makes no sense in the majority of the relations in Table 10 (for instance, it is not plausible that an increase in IMR can raise economic volatility, or that a fall in LEB will rise the interperiodal Gini variations larger than four points). The only relation in which reverse causation may be plausible is that between LEB and GDP/c. In this case, however, the relation between rising LEB (due, for instance, to a fall in U5MR) and higher GDP/c would be characterized by time lags, thus excluding the possibility of reverse causation on synchronous data. The parameters are also affected by estimation bias caused by the omission in the regression analyses of a few variables discussed in section 3—such as out-of pocket health costs and coverage of health insurance which were dropped because of insufficient data. In addition, the parameters may be further distorted by the possible endogeneity of some explanatory variables, which are simultaneously determined by the dependent and policy variables. Formally solving this endogeneity problem by means of simultaneous equations system is a difficult task in a panel with 136 countries. In addition, such a problem is likely to be less severe if one considers that economic theory does not suggest—with the possible exception mentioned above—that LEB is a main current determinant of the explanatory variables.

a new system. It must be noted, however, that ‘technical progress in health’ is proxied by a time dummy that could capture other unexplained effects such as the institutional shock experienced after 1990 in the case of the economies in transition. The impact of technical progress in health is captured also by the highly significant values of the coefficient of DPT vaccination. For instance, model (5) suggests that raising the DPT immunization rate by 30 points would reduce U5MR by 18.4 points.

Log GDP/c is also highly significant for the 1960-2005 period as well as for the two subperiods considered. The same is true for the volatility of GDP/c that affects

Table 10  
Results of worldwide regression analysis for 1960-2005 on LEB<sup>a</sup>, IMR, U5MR

	LEB			IMR	U5MR
	1960-2005 (1)	1960-80 (2)	1980-2005 (3)	1960-2005 (4)	1960-2005 (5)
Constant term	38.966***	52.707***	39.673***	165.088***	254.926***
Dummy technical progress 1980-2005					
OECD	0.792*	...	...	3.818	8.297**ws
East Asia	1.362**	...	...	1.192	1.051
Transition economies	-2.461***	...	...	-3.064	1.2714
LAC	3.311***	...	...	-21.126***	-31.583***
MENA	3.432***	...	...	-44.478***	-56.951***
South Asia	3.397***	...	...	-8.411**	-25.279***
SSA	2.438**	...	...	-12.971***	-18.3312***
Log GDP/c	3.203***	2.307***	3.148***	-14.19***	-21.75***
GDP/c volatility	-0.0009**	-0.0007	-0.0008*	0.0042*	0.0093***
Gini income distribution	-0.057**	-0.1058**	-0.0498***	0.3215***	0.4424**
Δ Gini coeff >4 points	-0.0423*-	-0.0645	-0.0398	0.0861	0.2821
Female illiteracy (%)	-0.098***	-0.2763***	-0.0427*	0.5779***	0.9464***
Log physicians per 1000 people/Gini	36.89***	7.305	55.392*-	-90.98*-	-158.69*
DPT immunization rate (%)	0.0861***	0.1425***	0.0828***	-0.3631***	-0.6155***
Immigrants stock/total population	0.0026***	0.0040***	0.0042*-	-0.0007	-0.0042
Alcohol consumption/c	-0.2536***	-0.4074***	-0.2702***	0.4841*	0.3820
War/humanitarian emergencies	14.95**WS	-24.420	13.56*-ws	-15.63	-4.332
Disasters	0.2864	0.4415	0.2106	2.6132*	3.2774*-
HIV/AIDS	-0.8495***	-2.099***	-0.7737***	1.1505***	1.8334***
F statistic	126.89***	56.45***	77.02***	113.39***	113.64***
R square	0.897	0.847	0.890	0.820	0.845
Number of observations	556	234	385	556	553
Number of countries	97	65	97	97	97

Notes: \*\*\* significant at the 1% level; \*\* between 1 and 5% level; \* between 5 and 10% level; \*- significant at 10-15%;

ws = wrong sign;

<sup>a</sup> The use of LEB (instead of 100-LEB, as in Table 1) does not change the results of the model, as every linear transformation of the dependent variable in a regression model does not change the value of the parameters (which however take the opposite sign) obtained when using LEB as dependent variable.

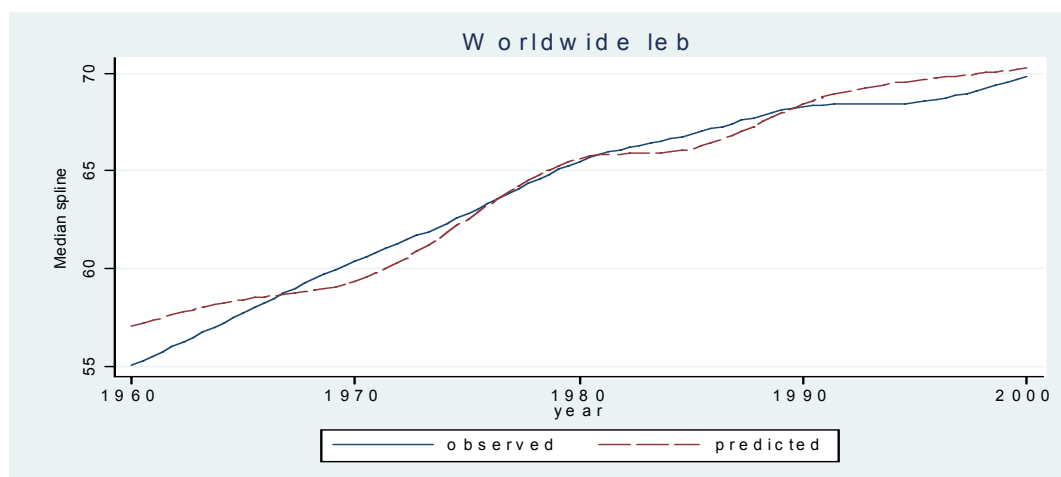
Source: Authors' calculations based on GHND.

negatively, albeit modestly, LEB, IMR and U5MR. In turn, income inequality affects all three health indicators strongly and significantly. Increases in income inequality greater than four Gini points from one quinquennium to the next are also found to be significant in all three LEB models, though they are, as expected, weakly significant in the case of IMR and U5MR. For instance, rises in the Gini coefficient of 10 points from one quinquennium to the next reduces at the margin LEB by one year, strengthening the conclusions of prior studies about the effect of sudden shifts in inequality on cardiovascular and violent mortality. Female illiteracy is strongly significant in all five models, confirming on panel data the findings of the micro studies cited in section 3. For instance, a reduction by 10 percentage points in female illiteracy raises average LEB by 0.76 years and reduces IMR and U5MR by 5.1 and 8.2 points, respectively.

The availability of health services (measured by log physicians per 1000/Gini) is significant in all five models in Table 10, but is weakly significant for the 1960-80 period. In turn, adopting health-damaging behaviours, such as excessive alcohol consumption, affects LEB and, surprisingly, IMR. Finally, the model confirms a positive, if small, impact of migrant stocks greater than 3.5 per cent of the resident population on the LEB of the destination countries. This result is interesting in the light of the debate on the impact of migration.

As for the ‘random shocks’, HIV-AIDS appears to have a large and significant effect on LEB, IMR and U5MR. Raising its prevalence rate by 30 points reduces LEB by a staggering 25 years (as observed in Botswana) and raises child mortality by 52 points, i.e., values similar to those estimated in Cornia and Zagonari (2002). ‘Disasters’ and ‘war and humanitarian emergencies’ are nonsignificant and often have the wrong sign. This may be due to their low frequency (only 87 and 63 have non-zero values out of 556 observations) or to low coverage of the CRED database, or because the variable was poorly proxied in the GHND.<sup>12</sup>

Figure 7  
Observed and fitted median spline of world LEB



Source: Authors' elaborations on the basis of results presented in Table 10.

<sup>12</sup> ‘Wars’ have been more common in low- and middle-income countries. Their significance is thus tested separately for these country groups. It would appear that while wars do increase mortality sharply on the occasion of large conflicts, their impact is comparatively small in relation to deaths due to traditional causes.

Figure 7 shows (solid line) the observed trend in the LEB spline (the unweighted median of LEB for all 136 countries included in the panel) which, as discussed in section 2, has grown since the early 1980s at a slower than during the prior 20 years. It also shows that the LEB predicted by model (1) (dotted line) fits the actual trend very well except, perhaps, for the first five years. A comparison of the stability of the estimates in models (1), (2) and (3) shows that while the sign and size of the parameters remain broadly unchanged, the significance of a few parameters is lower over 1960-80, as in case of the volatility of GDP/c and alcohol consumption, possibly because these two phenomena were less pronounced over the 1960-80 years. It shows also that female illiteracy has become nonsignificant over 1985-2005 as this phenomenon is becoming less common. The loss of significance is also due to the smaller number of observations and reduced variance of the variables in each of the two subperiods.

To conclude, it must be noted that the reduced form models in Table 10 include variables alluded to in more than one of the five models discussed in section 3 and that in these cases the impact estimated by model (1) is the sum of the effects of different mortality models. While log GDP/c unambiguously captures the importance of resources for health in the 'material deprivation pathway', income inequality simultaneously captures the effects described in the 'psychosocial stress', 'material deprivation' and 'social cohesion' models.

#### **5.4 Regional results**

The mortality models described in Table 10 are further validated on the high-income, medium-income, low-income and transition economies to test if the intensity of the relations described above also holds in diverging country groups. The variables that do not influence mortality in each specific region are omitted (e.g., the relative price of food, wars and disasters in the advanced countries, or HIV-AIDS in the economies in transition), while the expected sign of some variables (e.g., the migrant stock/resident population) is expected to possibly change from region to region and that of others (e.g., log GDP/c) may become insignificant in the high-income group. Also, the same phenomenon (e.g., female education) is proxied in ways relevant to local conditions, e.g., using the percentage of women with post-secondary education in the high-income and transition group and female illiteracy in the medium-income ones. When available, regional variables are added, such as smoking in the high-income group, while variables with no or only few regional observations are omitted. Finally, it must be noted that the estimation of models similar to those in Table 10 at the regional level entails dividing the sample of 556 data in four subsamples, a fact that by definition causes some loss of significance of the parameters, particularly for regions with few data and large measurement errors in the variables. This is the case for the transition countries, for which the lack of sufficient quinquennial data imposed testing the model on annual data for 1980-2005.

The results for the high-income countries (130 observations) are satisfactory (Table 11). Of the ten variables explaining LEB, all but one (log of physicians per 1000/log GDP/c) have the right sign and are significant. Smoking and drinking depress LEB in a significant way, while immigration has a positive (but modest) effect on LEB. As predicted by the Preston curve (1976), GDP/c is not significant if considered alone but turns to be significant when interacted with its volatility. Likewise, increases in Gini coefficients  $>4$  are not significant as this phenomenon is seldom observed in the region.

All other variables have correct signs and plausible parameters. In the case of IMR-U5MR, half of the variables have the right sign and are statistically significant, although the economic variables measuring stress and resources (log GDP/volatility, income inequality and sudden changes in inequality) have, as expected, nonsignificant signs. As expected on theoretical grounds, smoking and the migrant stock are also not significant suggesting that such variables do not substantially affect the survival of children although on the part of adults, they do.

The mortality models are validated in an equally satisfactory way for the middle-income countries (218 observations), as all twelve variables (including war and disasters) have the expected sign and are highly significant with the exception of  $\Delta$  Gini  $>4$ , GDP volatility, disasters, wars and medical progress in East Asia. Similar results are obtained for IMR and U5MR. Interestingly, the latter rises when the 'migrant stock' increases (though the parameters are not significantly different from zero).

Table 11  
Results of the regression analysis on LEB, IMR, U5MR for high- and middle-income countries, 1960-2005

	High-income countries (5 quinquennia data)			Middle-income countries (5 quinquennia data)		
	LEB 1960-2005	IMR 1960-2005	U5MR 1960-2005	LEB 1960-2005	IMR 1960-2005	U5MR 1960-2005
Constant term	94.43***	2.5942*-	-5.4486	38.56***	158.22***	208.53***
Dummy medical progress 1980-2005						
OECD	1.06***	-3.9686***	-5.1890***			
East Asia				0.6603	9.19**ws	12.49*-WS
LAC				1.8315***	-13.40***	-19.07***
MENA				1.2796*	-22.96***	-34.55***
Log GDP/c	...	...		2.5239***	-13.31***	-18.37***
Log GDPc/volatility	74.78***	-30.22	-102.16			
GDP/c volatility	...	...		-0.00003	0.0071	0.0169*
Gini income distribution	-0.0482*	0.3415***	0.5013***			
Gini income distribution/t	...	...		-0.0679***	0.2534***	0.4695***
$\Delta$ Gini coeff $>4$ points	0.1002	-0.5582	-0.7957	-0.0456	0.1780	0.6743*-
% women $>25$ with post secondary education	0.2888***	-0.7689***	-0.9792***	...	...	...
Female illiteracy	...	...		-0.1918***	1.1433***	1.7979***
Log physicians per 1000/log GDP/c	-28.9***ws	20.80	36.57	11.2796***	-14.75	-31.33
DPT immunization rate (%)	0.0775***	-0.1969***	-0.2514***	0.0701***	-0.3296***	-0.5999***
Immigrants stock/population	0.0017***	0.0029*-ws	0.0027	0.0035*-	0.0099	0.0128
Alcohol consumption/c	-0.2582***	0.4301**	0.5003***	-0.4350***	1.4932***	1.7121**
Smoking	-0.0544***	-0.0210	-0.0306	No data	No data	No data
War/humanitarian emergencies	Unobserved	Unobserved	Unobserved	-10.3808	94.22	136.06
Disasters	Unobserved	Unobserved	Unobserved	-0.2075	1.6205	1.3079
HIV/AIDS	Unobserved	Unobserved	Unobserved	Unobserved	Unobserved	Unobserved
F statistic	69.81***	40.97***	40.85***	185.63***	115.03***	127.17***
R square	0.287	0.509	0.513	0.837	0.684	0.721
Number of observations	130	130	130	212	212	212
Number of countries	22	22	22	34	34	34

Notes: See notes to Table 10.

Source: Authors' calculations based on GHND.

Table 12  
Results of the regression analysis on LEB, IMR, U5MR for low-income and transitional economies,  
1960-2005

	Low-income countries 1960-2005 (quinquennial data)			Transition countries 1980-2005 (yearly data)		
	LEB	IMR	U5MR	LEB	IMR	U5MR
Constant term	22.10**	158.73***	291.25***	54.37***	80.29***	67.92***
Dummy technical progress 1980-2005	3.041***	-19.06***	-33.58***	....	....	.....
Dummy trans 1990-2005	...	...	...	-0.15139	-1.128**	-0.9778*-
Log GDP/c	3.6640***	-7.8231*	-18.91**	1.6664**	-2.9997**	-2.2838
GDP/c volatility	-0.0064*	0.0065	0.0396*-	-0.0012***	0.0007*-	0.0009*-
Gini income distribution	-0.2032***	0.8179***	1.5343***	-0.0062	-0.2843***ws	-0.3061***ws
$\Delta$ Gini income 4 pts	0.0641	-0.2959	-0.7060	-0.1421**	0.3840***	0.7762***
% enrolment in secondary education	...	...	...	0.0346***	-0.0761***	-0.0504***
% women with completed primary education	0.1913**	-0.6223*	-1.0926*	...	...	...
Log physicians x 1000 people /log GDP/c	14.2350**	-14.48	-24.7722	8.6528**	-36.66***	-32.9712***
DPT immunization rate (%)	0.1147***	-0.5339***	-0.8950***	...	...	...
Immigrants stock/population	-0.0276**	0.0030	0.0818	...	...	...
Age dependency ratio	...	...	...	-15.2211***	45.395***	59.2501***
Alcohol consumption/c	-0.0240	-0.2135	-10.4582	No data	no data	No data
War	26.66	-198.94	-291.25	No data	No data	No data
Disasters	0.0246	4.7663**	7.353*	No data	No data	No data
HIV/AIDS	-0.7208***	0.6006***	0.9750***	Unobserved	Unobserved	Unobserved
F statistic	32.21***	32.60***	27.49***	28.95***	43.66***	45.36***
R square	0.743	0.661	0.613	0.170	0.586	0.605
Number of observations	123	123	114	325	316	316
Number of countries	23	23	22	24	24	24

Notes: See notes to Table 10; The years 1960 and 2005 have a low coverage.

Source: Authors' calculations based on GHND.

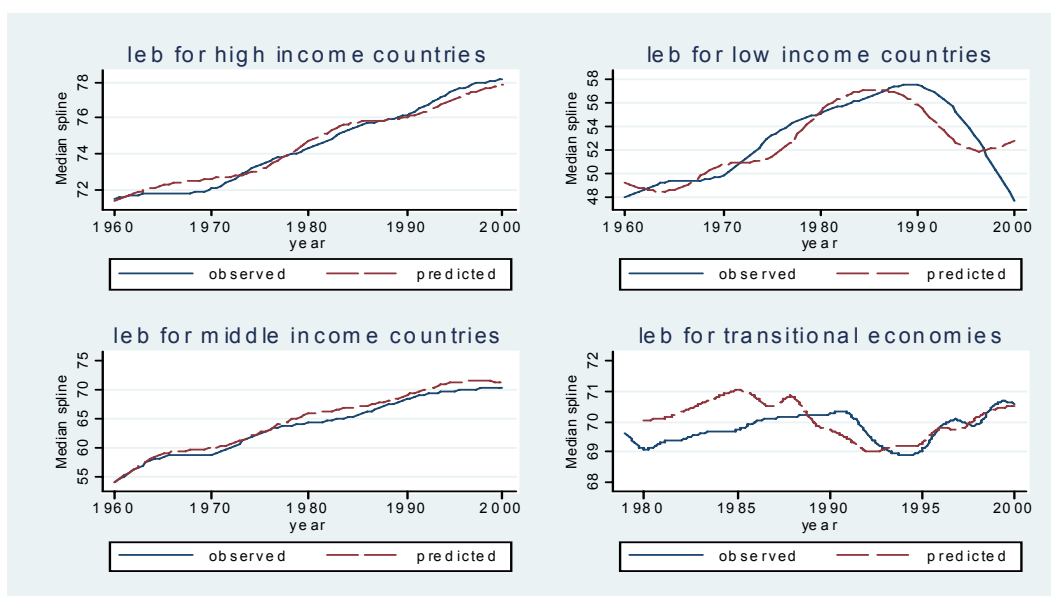
For the low-income countries (125 observations) the LEB model shows very satisfactory results (Table 12) as all variables have the expected sign (except for alcohol consumption, disasters and wars which are also nonsignificant) and are statistically significant (except for  $\Delta$  Gini >4), thus confirming the conclusions arrived at on the basis of the global model. It must be noted that the value of the parameters (e.g., of log GDP/c, Gini, DPT and so on) is generally greater than in the global or middle-income model, confirming the theoretical expectations that changes in such variables have much greater effects in poor than in rich countries. Furthermore, in this country group, the variable 'disasters' takes the correct sign in the case of IMR and U5MR though it is still not significant.

Finally, the estimates for the transition countries are less comprehensive than those for the other three regions, as the estimation is carried out on yearly data for 1980-2005 and also as no information is available for DPT immunization, migration, alcohol consumption, war and disasters. Several of the key effects are, however, correctly estimated also in this case: the LEB model (Table 12) captures most effects discussed so

far, i.e., those related to the negative progress in medical research (due to the change in institutions), GDP volatility, GDP per capita, large Gini increments, female enrolment rate in secondary education, the availability of doctors and the dependency ratio, a variable particularly relevant in this region that suffered a true demographic collapse in the 1990s. The Gini of income distribution is statistically nonsignificant, even though its large increments are. Finally, similar results are obtained for IMR and U5MR, though also in these two models the Gini of income distribution has the wrong sign and log GDP is nonsignificant. A more complete dataset is needed to test fully the above mortality models for this region.

A confirmation of the good results of the estimations presented in Tables 11 and 12 is given by Figure 8 that describes the good fit of the LEB estimates (dotted lines) in relation to the observed values (solid line) for the respective reference periods and four regional groups.

Figure 8  
Trend in the observed and estimated of the median spine  
of the life expectancy at birth in the four subregions



Source: Authors' elaborations on the basis of results presented in Tables 11 and 12.

## 6 Simulation of LEB changes due to globalization and shocks

The above global and regional models can be used to assess whether changes intervening during the recent globalization era in the policy-driven health determinants (growth of GDP/c, inequality, instability, health provision, etc.), random shocks (HIV-AIDS, wars and disasters) and endogenous medical progress had led by the year 2000 to LEB values being higher, equal or lower than those which would have been achieved under a 'counterfactual scenario' in which LEB determinants over the 1980s and 1990s had not changed from their 1980 values, or had during these decades maintained the trend of the 1960-80 or 1960-90 periods.

In practice, this means fixing a 2000 value for each independent variable which is obtained by prolonging the past trend over time or keeping its 1980 value constant and, second, by simulating the values that LEB would have taken by 2000 on the basis of these counterfactual values and the parameters of the regional LEB models in Tables 11 and 12. The specific hypotheses made in the construction of the counterfactual scenario are:

- the log of GDP/c\*Gini, log of physicians per 1000/log GDP/c and migration stock rise, over 1985-2005 according to their 1960-80 trend;
- DPT immunization rates, female illiteracy (or primary or secondary education) and alcohol consumption rise according to their 1960-90 trend;
- GDP volatility, the Gini index of the distribution of income, age dependency ratio and smoking incidence remain at their 1980 or 1985 level and—by consequence—that the  $\Delta$  Gini coefficient is equal to zero;
- there is no progress in health technologies over 1985-2005; and
- HIV-AIDS incidence remains at its 1980 level and there are no disasters and wars.

Thus, for each region the *simulated* values LEB in 2000, indicated as  $LEB_i^s$  is equal to the sum of the products of the simulated 2000 values of the explanatory variables by the parameters  $\alpha_1, \alpha_2$ , etc. of Equation (1) in Tables 11 and 12. In symbols:

$$LEB_i^s = \alpha_0 + \alpha_1 \text{ Dummy Health Progr}^s (=0) + \alpha_2 \text{ Log GDP/c}^{s*} \text{ Gini} - \alpha_3 \text{ GDPvolatility}^s - \alpha_4 \text{ Gini}^s - \alpha_5 \Delta \text{Gini} > 4^s - \alpha_6 \text{ Female Illiteracy}^s + \alpha_7 \text{ Log Phys per 1000/Log GDP/c}^s + \alpha_8 \text{ DPT}^s + \alpha_9 \text{ Migrant stock}^s - \alpha_{10} \text{ Alcohol/c}^s - \alpha_{11} \text{ AIDS}^s$$

The *observed* values of LEB in 2000, indicated as  $LEB_i^o$ , are the sum of the products of the observed 2000 values of the explanatory variables multiplied by the parameters  $\alpha_1, \alpha_2$ , etc. of Equation (1) in Tables 11 and 12. In symbols:

$$LEB_i^o = \alpha_0 + \alpha_1 \text{ Dummy Health Progr}^o (=1) + \alpha_2 \text{ Log GDP/c}^{o*} \text{ Gini} - \alpha_3 \text{ GDPvolatility}^o - \alpha_4 \text{ Gini}^o - \alpha_5 \Delta \text{Gini} > 5^o - \alpha_6 \text{ Female Illit}^o + \alpha_7 \text{ Log Phys per 1000/Log GDP/c}^o + \alpha_8 \text{ DPT}^o + \alpha_9 \text{ Migrant stock}^o - \alpha_{10} \text{ Alcohol/c}^o - \alpha_{11} \text{ AIDS}^o$$

It is now possible to compute the difference, region by region, between  $LEB_i^o$  and  $LEB_i^s$  as the sum of the differences between the observed and simulated values of each explanatory variable multiplied by the parameters  $\alpha_1, \alpha_2$ , etc. of Equation (1) in Tables 11 and 12, i.e.:

$$LEB_i^o - LEB_i^s = \alpha_1 [\text{Dummy Health Progr}^o (=1) - \text{Dummy Health Progr}^s (=0)] + \alpha_2 [\text{Log GDP/c}^{o*} \text{ Gini} - \text{Log GDP/c}^{s*} \text{ Gini}] - \alpha_3 [\text{GDPvolatility}^o - \text{GDPvolatility}^s] - \alpha_4 [\text{Gini}^o - \text{Gini}^s] - \alpha_5 [\Delta \text{Gini} > 5^o - \Delta \text{Gini} > 5^s] - \alpha_6 [\text{Female Illit}^o - \text{Female Illit}^s] + \alpha_7 [\text{Log Phys per 1000/Log GDP/c}^o - \text{Log Phys per 1000/Log GDP/c}^s] + \alpha_8 [\text{DPT}^o - \text{DPT}^s] + \alpha_9 [\text{Migrant stock}^o - \text{Migrant stock}^s] - \alpha_{10} [\text{Alcohol/c}^o - \text{Alcohol/c}^s] - \alpha_{11} [\text{AIDS}^o - \text{AIDS}^s]$$



In this way, it is possible for each of the countries/regions identified below in Table 13 to derive, variable by variable, the LEB gains (+) and losses (-) in the year 2000 due to exogenous globalization policies affecting the determinants of health, endogenous changes and random shocks in relation to a 'business-as-usual counterfactual'. World changes in LEB and in each of its determinants are obtained by weighing regional LEB changes by their populations. Table 13 summarizes the results of such hypothetical simulation that seems sufficiently differentiated and broadly in line with real life changes.

Table 13  
Gains (+, green colour) and losses (-, beige colour) in LEB years by 2000  
due to changes in policies, endogenous changes and random shocks over the 1980s-90s period

Region	OECD	Transition	USSR	East Asia	China	Lamer	MENA	India	South Asia	SSA	World
Policy-driven LEB changes	2.02	-1.78	-3.92	0.49	-3.61	-1.54	2.19	-1.07	-1.59	-5.63	-1.52
Log GDP/c	0.00	-0.43	-1.91	-1.22	3.98	-0.80	-2.07	1.71	0.69	-0.99	0.73
Log GDP/c on volatility	-0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.07
Gini of income inequality	-0.03	-0.07	-0.12	0.00	-2.14	0.00	0.00	-1.15	-0.61	-0.45	-0.77
Gini of income inequality/(year-1959)	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00	0.00	0.00	0.00
GDP/c volatility	0.00	-0.72	-0.49	-0.05	-1.26	0.01	0.04	-0.63	-0.32	-0.09	-0.44
Intra-period D Gini >4 points	0.02	-0.58	-1.60	-0.08	0.00	-0.03	0.00	0.00	0.00	0.14	-0.08
Log physicians per 1000/log GDP/c	-0.44	0.02	0.37	1.10	-1.67	0.25	0.73	-0.97	-0.44	-0.60	-0.51
Log physicians per 1000/Gini	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Migrant stock/population	0.07	0.00	0.00	0.41	0.00	0.01	0.39	0.00	-0.12	0.06	0.07
DPT immunization coverage	0.31	0.00	0.00	0.70	-0.73	-0.05	-0.29	-0.18	-0.58	-3.37	-0.47
Female education	0.52	0.00	-0.16	-0.57	-1.78	-1.14	3.41	0.15	-0.21	-0.32	-0.31
Smoking/c	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
Alcohol consumption/c	1.21	0.00	0.00	0.20	0.00	0.22	-0.01	0.00	0.00	0.00	0.22
Endogenously driven LEB changes*	1.07	0.36	0.35	0.66	3.04	1.83	1.28	3.04	3.04	3.04	2.15
Age dependency ratio	0.00	0.66	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Technical progress in health field	1.07	-0.31	-0.31	0.66	3.04	1.83	1.28	3.04	3.04	3.04	2.10
Shocks-driven LEB changes*	0.00	0.00	0.00	0.00	-0.02	-0.04	-0.05	-0.57	-0.34	-6.36	-0.76
War/humanitarian conflicts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.18	0.02
Disasters	0.00	0.00	0.00	0.00	-0.02	-0.04	-0.05	-0.02	-0.02	-0.01	-0.02
HIV-AIDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.54	-0.31	-6.54	-0.76
Total LEB changes	3.08	-1.42	-3.57	1.15	-0.59	0.25	3.42	1.41	1.11	-8.95	-0.13

Notes: \* For the distinction between policy, endogenous and shocks-driven LEB changes, see footnote 1;

The results of the above simulation are based on the regional parameters (Tables 11 and 12). The results of the simulation based on the global parameters (Table 10) yield similar results for the world as a whole. As for the ten regions, the signs of the variations are similar but the size of the variations are obviously very different, as the parameters of the explanatory variables vary substantially between the global models (that measure an 'average' effect) and the regional models which reflect different regional circumstances.

Source: Authors' calculations based on the parameters of the regional models presented in Tables 11 and 12.

At the global level, policy changes seem to have reduced LEB by 1.52 years as a result of several offsetting effects. Higher income inequality than in the counterfactual scenario depresses LEB by 0.77 years. This loss is counterbalanced by LEB gains (0.73 years) due to a faster growth in GDP/c than in the counterfactual scenario in China, India and the rest of South Asia (in most regions, however, a GDP growth rate slower than that over 1960-80 contributed to a decline in LEB). Smaller LEB losses (0.08 years) are due to large intra-period rises of income inequality, while GDP/c volatility appears to have caused perceptible LEB losses in most regions. A rise during the 1980s-90s in the number of physicians per 1,000 normalized by log GDP/c slower than that in the counterfactual scenario led to a global LEB loss of 0.51 years in several regions. Smaller effects are observed for illiteracy while improvements in health behaviour (alcohol consumption and smoking in the OECD) and a faster rise in migrant stock than in the past generated small but telling improvements in world LEB. To these 'policy-driven effects', one has to add LEB changes due to endogenous progress in medical technology and (for the economies in transition) in age dependency ratios and subtract those due to AIDS, wars and disasters. Interestingly, at the global level, the gains achieved through medical progress almost completely cancel out the LEB losses due to policy changes and shocks. One may thus wonder how large these gains could have been, had the policies towards the transfer of health technology (such as the TRIP Agreement and international aid to health programmes) been more favourable. A related disturbing message of this simple simulation is that a perceptible LEB loss (0.47 years) is due to the stagnation or decline in DPT vaccination coverage since 1990, a result in line with the findings of Cutler, Deaton and Llera-Muney (2006) on the decline in national and international support to immunization campaigns during the 1990s. Finally, given the low value of their parameters, the variables wars and disasters do not appear to have generated perceptible LEB effects, although as noted earlier, this may be due to data and specification problems.

As expected, there are regional winners and losers from the policies introduced during the recent globalization era. The biggest losers of the policy-driven changes are Sub-Saharan Africa and the two regions in transition, but less obvious findings emerge from this hypothetical simulation. Among the winners one can count the OECD, East Asia, excluding China, a region that experienced LEB losses due to growing inequality, sudden and large inequality rises and a growth slowdown that were offset by improvements in the field of medical staffing, alcohol consumption and the eradication of female illiteracy. Surprisingly, MENA experienced large policy-driven LEB gains due to a faster increase in doctors, migrants and particularly female education than in the past. South Asia (excluding India) exhibits marked LEB losses due to a worse-than-expected performance in all economic and social areas, but large gains reflecting the transfer of health technologies. Interestingly, the two new 'growth superstars', i.e., China and India, seem to have suffered a policy-driven loss of LEB, as the effect of faster growth than that in the counterfactual is offset by losses resulting from a sharp rise in inequality, rising volatility, as well as poorer than expected performances in reducing female illiteracy, alcohol consumption, availability of physicians and DPT vaccination. Both in China and India, progress in health technologies and no or limited LEB losses from AIDS contribute to the fact that the changes made during the recent globalization era are, on balance, more positive than in the counterfactual scenario.

Though plausible and possibly interesting, the conclusions of the above simulation suffer from a few problems. First of all, with the exception of AIDS, wars, disasters and endogenous changes in health technologies and dependency ratios, the above approach

attributes all LEB gains and losses to the impact of globalization policies on growth, inequality, volatility, vaccination coverage, female illiteracy and so on. But it can be argued that other factors (e.g., institutions, external financing and so on) may in part be responsible for the changes recorded in these determinants. This problem is addressed in part in the next section. Second, although the multi-pathways model used for the simulation is already fairly complex, lack of data prevented including in the model a few determinants of health (e.g., diet and smoking) discussed in sections 3 and 4. Third, technical change in health is approximated by DPT immunization coverage and a period dummy. The latter captures the part of LEB not explained by the variables included in the model and, as such, could reflect the impact of omitted variables. Yet, as the number of variables in the model is fairly large and their fit rather good, this argument may not carry much weight.

## **7 Impact of policy changes on health determinants**

### **7.1 Methodological problems and literature review**

This section tests the extent to which the deteriorations observed during the last two decades in three key determinants of health—GDP/c, the volatility of GDP/c and income inequality—can be attributed to the premature adoption of liberalization and globalization policies without regard for the peculiarities of local conditions. The test consists of running regressions in which GDP/c, inequality and volatility are regressed on indexes of policy reform and control variables.<sup>13</sup>

A key methodological issue to be dealt with in this type of analysis is that the measurement of liberalization and globalization policies is highly problematic from both a theoretical and empirical perspective. Even in the comparatively straightforward case of trade liberalization, a policy change can be proxied by *policy-based* measures such as the average tariff rate, tariffs variance and peaks, coverage of contingents and so on, or a combination of all or some of them, as in the case of the World Bank's index of trade openness and the Sachs and Warner (1995) index. Instead, some authors use *outcome-based* measures of trade liberalization such as the export plus import/GDP ratio, ignoring, however the fact that such an outcome depends as much on trade policies as on country characteristics such as size, resource endowments and so on. Measurement problems are even more pronounced when dealing with reforms whose enactment requires changes in many institutional and regulatory areas, as with financial reforms. Finally, in some cases, privatization for instance, some of the most obvious measures (e.g., the share of state assets in total national assets) conceal more than reveal, as similar privatization indexes may refer to radically different models of privatization—ranging from the Chinese egalitarian land reform of 1978 to the Russian insider privatization of the 1990s—that impact on economic performance in opposite ways.

To get around these problems, most researchers rely on a synthetic reform index that summarizes the changes introduced in all reform areas. The computation of such indexes is generally carried by the staff of international organizations such as the IADB,

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<sup>13</sup> The main approaches used to assess the impact of policy reforms are the 'before-after', 'differences in differences', CGE models, structured comparisons of case studies, and cross-country or panel regressions.

ECLAC, EBRD, IMF and World Bank. Sectoral and overall reform indexes have been developed, for instance, by Lora (2001) for the years 1970-99 for Latin America and the European economies in transition. The Lora index suffers from the weaknesses illustrated above but is compiled according to the same methodology and thus allows a comparison of the extent of reforms across countries and over time. Each policy index varies between zero (no reform) and one (complete reform). The trade reform index is the average of the mean tariff rate and tariff dispersion, while domestic financial reform is proxied by the average value of bank borrowing, lending rates and reserves to deposits ratio. In turn, international financial liberalization is the average of indexes reflecting the control of foreign investments, limits on profit repatriation, controls on external borrowing and capital outflows, while the tax reform index is equal to the average of the maximum marginal tax rate on corporate and personal incomes and VAT tax rate and efficiency. Finally, the privatization index is expressed as one minus the ratio of value-added in state-owned enterprises to non-agricultural GDP. The general reform index is the simple average of the five indexes just described.

Reasons of space allow only a cursory allusion to prior research findings in this field. Some cross-country studies analyse the effect of openness on economic growth (Sachs and Warner 1995; Dollar and Kraay 2003 and the literature therein) and conclude that trade policy and openness are key growth determinants. However, these results are criticized by Rodrik, Subramanian and Trebbi (2002) who argue that growth is determined mainly by the quality of institutions that in their words ‘trumps’ everything else including economic openness. Other studies analyse the impact of liberalization and globalization on income distribution. The proponents of such policies claim that their distributive impact is likely to be neutral, as in their view, there is no evidence that within-country inequality has risen recently (Dollar 2004). Yet, an analysis of the impact of overall liberalization in 18 Latin American countries over 1980-98 (Behrman, Birdsall and Székely 2000) notes that these policies have had a significant short- and medium-term disequalizing effect, however declining over time. The study finds that trade liberalization did not significantly affect inequality, as country outcomes depended on specific country conditions, but that capital account liberalization, followed by domestic financial liberalization and tax reform, had a strong disequalizing effect. Likewise, a review of the effects of liberalization and globalization policies during 21 reform episodes in 13 Latin American countries as well as in Russia, Turkey, Zimbabwe and India over the last two decades (Taylor 2005) finds that inequality rose in thirteen cases, remained constant in six and improved in post-1990 Chile and Costa Rica, i.e., countries where the domestic conditions were ripe for trade liberalization.

Other analyses emphasize that the standard theory predicts that in countries with an abundant supply of labour, trade liberalization and opening up to FDI and portfolio flows raise exports of labour-intensive manufactures and employment and so reduce earnings inequality. While this might be true in the textbook model, the stringent conditions under which such predictions apply rarely exist and different models are needed to portray the real life situation of countries characterized by widespread market failures (Cornia 2005 and the literature therein). Indeed, standard theory is unable to predict the growth, inequality and volatility impact of internal and external liberalization, as it is based on models pivoting around highly restrictive assumptions that ignore the impact of institutional weaknesses, structural rigidities, incomplete markets, asymmetric information, protectionism and the complexity of trade and finance in a multi-country environment.

## 7.2 Empirical results

Conscious of these theoretical and data limitations, this section tests the impact of liberalization and globalization policies proxied by Lora's Overall Reform Index on three social determinants of health—i.e., GDP/c, income inequality and volatility—that explain about half of the LEB changes simulated in Table 13. To avoid distortions in the estimated parameters due to the lack of the Lora index for 1960-80, GDP/c is proxied as a GDP index (1980=100) or as a deviation from its 1960-80 trend, while GDP/c volatility is also expressed as deviation from its 1960-80 trend.

In models (1) and (4) in Table 14 on income inequality, the Overall Reform Index is lagged by five years, as reforms normally take time to alter the income distribution, while the reform increments over the subsequent five years are introduced to assess the time profile of the reforms' impact (Behrman, Birdsall and Székely 2000). In addition, the Overall Reform Index is interacted with the initial value of the Gini coefficient ( $G_0$ )

Table 14  
Results of the regression of Lora's Overall Reform Index  
on income inequality, GDP/c and volatility of GDP/c

	Latin America (1980-1999)			Latin America (1980-1999)		
	Income inequality	GDP/c index (1989=100)	GDP volatility (deviation from 1960-80 trend)*	Income inequality	GDP/c index (1989=100)	GDP volatility (deviation from 1960-80 trend)*
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	18.70***	1.09***	12.61***	37.37***	-0.5285***	8.43***
Reform index	...	-1.71***	31.29***	...	-0.2328***	8.62**
Reform index <sup>2</sup>	...	1.74***	-36.68***	...	-0.2090***	-10.57***
Reform index* Gini 0	...	...	...	-0.1851***	...	...
Reform index t-5	15.19***	...	...	13.53***	...	...
Reform increment t 4-5	12.58***	...	...	14.27***	...	...
Reform increment t 3-4	12.42***	...	...	11.28***	...	...
Reform increment t 2-3	10.64***	...	...	14.73***	...	...
Reform increment t 1-2	9.47***	...	...	13.58***	...	...
Reform increment t 0-1	6.40***	...	...	12.01***	...	...
Money supply (M2/GDP)	-0.0672***	0.0019***	...	0.0179 <sup>ws</sup>	0.0004	...
Total external debt	...	1.66*-	...	2.36***	-1.08***	...
Real interest rate	-0.0020***	-0.00004	-0.0273*-	...	-0.0003	0.0152**
External terms of trade	No data	No data	No data	-0.0047	-0.0003*-	0.0122 <sup>ws</sup>
Inflation	-0.0025** <sup>ws</sup>	...	0.0100***	0.00008	0.000001***	0.0006**
GDP index	29.08***	...	...	14.99***	0.6133***	...
GDP index <sup>2</sup>	-14.79***	...	...	-4.01**	...	...
F statistic	22.41***	29.81***	18.60***	10.08***	80.12***	2.39**
R square	0.018	0.280	0.047	0.005	0.680	0.009
Number of observations	120	127	306	183	191	191
Number of countries	17	17	24	12	17	17

Notes: \* See notes to Table 10. The variables have been computed as the difference between the observed values of the variable and that obtained by a prolongation of the 1960-80 trend, divided the value extrapolated on the basis of the 1960-80 trend.

Source: Authors' elaboration on GHND.

so as to test if the inequality impact of the reform is more pronounced in countries with low or high initial inequality. A GDP/c index and its square are also included to test if the impact of the reforms is more or less pronounced in countries with different income levels. Instead, in models (2) and (5) on the impact of reforms on GDP/c, the Overall Reform Index is expressed in quadratic form as the reform impact follows a concave pattern in the economies in transition. The same approach is followed in models (3) and (6) on the impact of reforms on the deviation of GDP/c volatility from its 1960-80 trend. Finally, to remove the confounding effects of other non policy factors, several controls variables (M2/GDP, total external debt, real interest rate, external terms of trade and inflation) are included among the regressors.

Table 14 presents the results of the econometric estimates obtained by means of a fixed effects model for the two regions and the periods indicated above. In both Eastern Europe and Latin America, the Reform Index t-5 has a significant positive effect on income inequality and so do the reform increments during the subsequent five years. In Latin America, the interaction term between the Overall Reform Index and the initial inequality is negative, indicating that the reforms will affect inequality especially in countries with low initial inequality. Finally, the parameters of GDP index and its square suggest that the impact of the reforms appears to be more pronounced in low-income countries, as observed for instance in the case of the European economies in transition where the richer Central European economies experienced smaller rises in inequality.

Regressions (2) and (4) confirm that economic growth is affected by the reforms in a concave way in Eastern Europe and in an increasingly concave way in Latin America. Similar conclusions apply to GDP/c volatility. Also in this case the negative effect appears to be particularly strong in the initial phase of the reforms. Finally, it must be noted that some of the control variables introduced appear to explain part of the increase in inequality, slowdown in growth and surge in volatility. This is particularly the case for the real interest rate (an exogenous variable reflecting in an open economy the monetary policies of large countries and the risk premium set by the rating agencies), inflation (part of which might be endogenous to the reforms) and money supply in Eastern Europe. In contrast, the external terms of trade appear to be of little significance.

These results would seem to provide some support to the hypothesis that in the two regions considered, the policy reforms of the last 20 years negatively affected the three key social determinants of health. In the case of inequality, the impact appears to be somewhat delayed and to affect most countries with low initial inequality and GDP/c. Instead, the control variables explain only a small part of the trends examined, although with all the precaution of the case, one can tentatively conclude that there is some regional evidence of the potentially adverse effect of the recent globalization policies on health.

Before accepting these conclusions, however, it is necessary to consider a recent observation by Rodrik (2005) who argues that standard growth-policy regressions can often be misleading because of a variety of problems that include parameters heterogeneity, omitted variables, model uncertainty, measurement error and endogeneity. In particular, Rodrik notes (2005: 11):

as long as policy interventions are not random and their presence responds to unobservables, regressing an economic performance variable on policy is uninformative about the degree to which market failures exist, the extent to which policy interventions are targeted on them, the effectiveness with which government policies are deployed, or the extent to which policy interventions are used to create and divert rents for political purposes.

For these reasons, it is impossible to attribute the negative effect of reforms squarely on market failures due to a premature implementation of liberal reforms, rather than on other factors. Yet, while one can only speculate about the factors that lay behind the negative association noted between liberalization-globalization policies, poor economic performance and unsatisfactory health trends, it is also evident that—for whatever reason—this association seems to be quite robust. Finally, confidence in the above results can also be derived from theoretical analyses and country studies of the type suggested by Rodrik, in which the predictions of key theoretical models (as the Heksher-Ohlin model) are juxtaposed with the observed values in a variety of economies where the model assumptions are not verified.

## **8 In lieu of conclusions**

The main conclusion of the paper is that globalization policies contributed—through different pathways—to a slowdown in the pace of improvement of the social determinants of health, which, in turn, caused a corresponding deceleration (relative to the 1960-80 trends) in health gains in several, if not all, regions as well as globally. Obviously, while this conclusion is plausible, as it is supported by historical and econometric evidence, there is hardly a case for regarding it as final. More data and analysis are required to confirm these initial insights.

This paper is not meant to provide policy recommendations, as these would require considerable space and make sense only in specific country contexts. Yet, some general observations on its key findings and the direction of policymaking and future research can be tentatively advanced. First, the paper confirms some of the findings in the literature on the slower growth, higher instability and inequality, reduced access to public health care and increased dependence on out-of pocket-expenditures observed in many countries between 1980 and 2000 and on the relation between these trends and the liberalization and globalization policies introduced in the 1980s and 1990s. Contrary to expectations, such policies caused a systemic increase in instability and inequality and a weakening of the role of the state in providing basic services. All this, as well as unfavourable changes in the TRIPS Agreement reduced the potential impact of medical technology transfers. In addition, while greater awareness of virtuous health behaviours appears to have spread in the OECD, external liberalization contributed to an increase in smoking, drinking and poor nutritional habits in the developing economies, countries to which the TNCs operating in these sectors have now relocated. For these reasons, there is some merit in the view that perceives the unsatisfactory health trends of the globalization era to be related to a premature and a critical application of liberalization-globalization policies.

Confirming the findings regarding the negative effects of premature liberalization and globalization policies on three key determinants of health (GDP/c, inequality and

volatility) and other areas (such as health provision, as discussed in section 4) requires a consideration of the present approach to policy reform, including health provision. It is quite possible that if properly managed, some (but not all) globalization policies could lead to health gains. Under ideal conditions, liberalization would reward effort and entrepreneurship, increase employment opportunities and improve health by raising family earnings and reducing consumer prices. In turn, an opening up of developed countries could help to incorporate developing nations with narrow domestic markets into the global economy, while less restrictive policies in the field of property rights would facilitate a north-south transfer of drugs, medical equipment and health knowledge. But, as noted, the conditions for the success of such policies are currently met only in some countries and it is doubtful whether, under the restrictive and asymmetric rules of access dominating the international markets, any further textbook liberalization and globalization would help the developing countries to improve their market position, economic efficiency, equity and health status. For these countries, selective integration into the world economy, linked to the removal of the major global asymmetries, is preferable to the destabilizing big-bang globalization policies. Meanwhile, these countries have a genuine interest in strengthening the domestic conditions and institutions that are the key for the success of liberalization policies by rekindling efforts in the field of universal access to basic health and education, redistributive policies, infrastructure and macroeconomic policies.

### **Acronyms**

CPI	consumer price index
DPT	diphtheria, pertussis and tetanus
ECLAC	UN Economic Commission for Latin America and the Caribbean
EECA	Eastern Europe and Central Asia
FDI	foreign direct investment
GHND	Globalization-Health Nexus Database
GDP	gross domestic product
IMF	International Monetary Fund
IMR	infant mortality rate
ICT	information communication technology
LEB	life expectancy at birth
MENA	Middle East and North Africa
PHC	primary health care
TNCs	transnational corporations
U5MR	under five mortality rate



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