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Inequality, Health and the Environment

The process of globalization affects more and more the life quality of people around the world. In particular, it impinges in different ways upon their health that is the most revealing single proxy of life quality. The health of people affects in its turn the demographic and economic growth of nations as well as their sustainability. Notwithstanding the fundamental importance of this complex network of interactions, however, the nexus between globalization, sustainable development and health has been so far insufficiently analyzed.⁴⁸

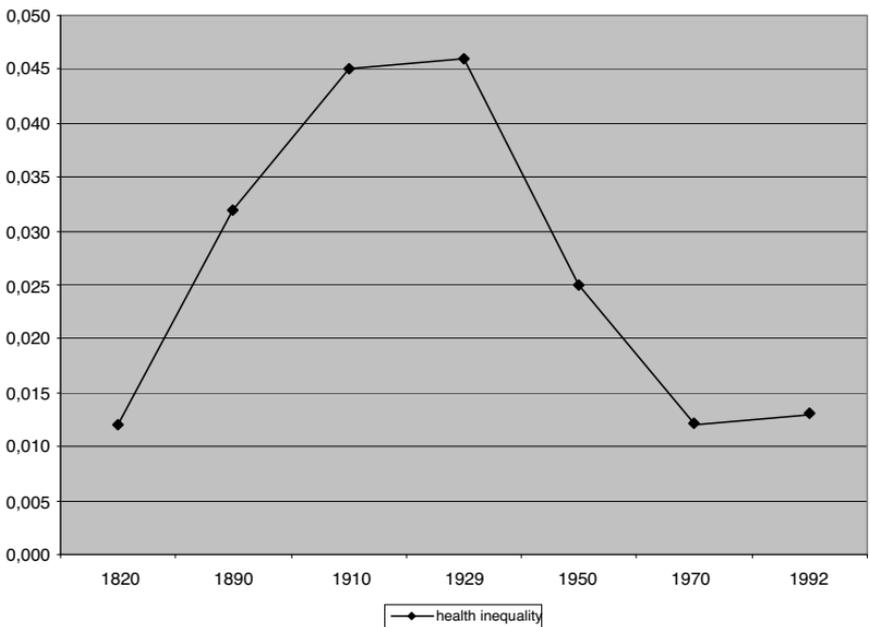
This chapter aims at exploring the main channels of influence through which the recent process of globalization has affected the population health in different countries. This crucial influence has impinged on the sustainability of world development not only by affecting income growth but also income inequality and environmental deterioration. In order to explore the causal factors underlying the feedback between globalization and health, we try to identify the principal, both direct and indirect, empirical correlations between the main features of globalization and different indices of health; we then proceed to a preliminary discussion of their causal significance taking into account that the influence often runs in both directions.

We have to emphasize at the very outset of this inquiry, that the nexus between globalization and health is blurred by a partly spurious correlation between the indices that measure them. While globalization spread and intensified since the early 19th century (with the only exception of the period 1915–1945 encompassing the two world wars and the inter-war times), in the same period also the indices of health improved, mainly for the increasing prosperity of nations and the continuous progress of theoretical and applied medicine, pharmacology and hygiene. No doubt, globalization has given a contribution of its

own to the strengthening of this positive correlation by promoting the growth of per capita income as well as by spreading updated medical knowledge, know-how, medicines and therapeutic instruments around the world. It is very difficult, however, to disentangle the specific contribution of globalization to health from that of scientific and technological progress, and of other economic, social, institutional factors that are in principle quite independent of, though correlated with, globalization.

The empirical evidence shows that the process of world development, as represented by the growth of per capita income, is correlated not only with income inequality within countries but also with health inequality across countries (see Figure 5.1). In the latter case we find a Kuznets-like pattern with a maximum around the early 20th century.⁴⁹ To the best of our knowledge this particular version of the KC concerning health inequality has been completely ignored in the economic literature, notwithstanding its optimistic implications for the positive role of globalization. In fact the latter improved dramatically per capita

Figure 5.1 Health inequality across countries



Source: Authors' elaboration on Bourguignon and Morisson (2002).

income in the globalizing countries, reducing the percentage of poor people and improving the average indexes of population health. The marked and progressive reduction of health inequality in the 20th century may be explained in part with the stabilization of between-country income inequality and in part with the beneficial transmission across countries of superior knowledge and know-how. Unfortunately, also in this case, the optimist message springing from the curve is questioned by the inversion of the trend observed since the early 1980s. We may speculate that this inversion is related to specific episodes such as the epidemics of AIDS (Acquired Immune Deficiency Syndrome) that hit particularly the poor countries especially in Africa, and the breakdown of health indexes induced by the poorly managed transition in Eastern European countries. These episodes point to shortcomings in the recent process of globalization due to deficient transmission of medical knowledge or institutional deficiencies in the transition to an open market economy. In any case, this example suggests that we need a detailed analysis of the causal links between globalization and health in order to be able to filter the beneficial influences of globalization from its potentially negative effects on population health.

In this chapter we focus in particular on a few specific causal links between globalization and health that may explain the observed deviations from the long-run positive correlation between them. The study of these socioeconomic factors of health is important for policy because the elimination, or at least the mitigation, of the negative influences of globalization and the corroboration of its positive influences could significantly improve global health.

1 The evolution of health factors in the last two centuries and the epidemiological transitions of the 20th century

Epidemiologists classify the factors that influence population health in five main categories: (i) genetic factors (genes inheritance and mutation); (ii) diffusion of health-damaging behaviors (such as diet, tobacco and alcohol use, drug addiction, physical fitness); (iii) quality of medical care and public health infrastructures (efficient diagnosis and therapy, sanitation, quality and availability of drinking water, etc.); (iv) ecological factors (pollution, exhaustion of natural resources); and (v) socio-economic factors (poverty, malnutrition, income inequality, depletion of social capital).⁵⁰ The relative importance of these categories of factors changed through time. In the early history of humanity, population health was mainly influenced by the all-absorbing struggle with natural phenomena

(primarily atmospheric events such as flooding, drought, famine, etc.). Since the bronze age, beginning around the 2500 B.C., the human kind learned how to cope with most natural threats by developing better housing, more efficient and specialized economic activity (agriculture, animal husbandry, metallurgy, manufacturing and trade), and a more stable social organization aimed to ensure security, justice, and education. These advances led to the concentration of population in restricted spaces (towns and villages) and nurtured continuous wars between competing towns and tribes. This produced the conditions for widespread bacterial and viral infections (epidemics, pandemics and plagues) that became the principal threat to population health for more than 4000 years.

In the 19th century bacterial and viral infections were still the main threat to individual and population health. During the 20th century two major epidemiological changes occurred in developed countries.⁵¹ The first one started at the turn of 19th century. The relative impact of infectious diseases on population health began to decline quite rapidly in consequence of more wealth, better nutrition,⁵² advances in medical care, improvements of public health infrastructures such as quality of (and accessibility to) drinking water as well as modern sanitation. The steady increase of per capita income progressively removed the material constraints to the spreading of risky behaviors (sedentary life, high-fat diet, abuse of tobacco, alcohol and drugs, and so on). In consequence of these opposite trends, the main cause of death shifted from infectious diseases to chronic diseases:

Tuberculosis, pneumonia, and sepsis have been replaced in population significance by coronary heart disease, high blood pressure, stroke, diabetes, cancer, emphysema, cirrhosis, and so forth (Tarlov and Peter, 2000, p.xiv).

The second epidemiological change started to spread since the middle of the 20th century but it enhanced its impact since the 1970s when, in consequence of the gradual diffusion of healthier life styles and increasing income inequality in many OECD countries, the main cause of chronic diseases shifted from risky behaviors to socio-economic factors. This shift occurred notwithstanding the increasing impact on health of ecological factors through natural alterations (global warming, increasing scarcity of drinking water and non-renewable energy sources, desertification, deforestation), genetic modifications (due to the thinning of the ozone layer and radioactive emissions from nuclear power plants and

waste) and infectious diseases (spread by increasing pollution of water, air and soil).

In consequence of the second epidemiological change, the main socio-economic factors of health shifted progressively from absolute income (per capita GDP) to relative income (inequality in the distribution of income). Wilkinson, the well-known epidemiologist, called "epidemiological transition" the overall evolution process characterized by the two successive structural changes mentioned above. In his words, the epidemiological transition marks a fundamental change in the main determinants of health and seems to indicate the point in economic development at which the vast majority of the population gained reliable access to the basic material necessities of life (Wilkinson, 1994, p.64). When the individual income is very low, the access to medical care (diagnosis and therapy) is severely limited by absolute income, necessary to buy medicines, medical services and assistance. Epidemiological research, however, found that beyond a threshold of about \$5000 of income per year, a further increase in individual income would improve health only quite marginally.

Epidemiologists estimated the relative importance of health factors in developed countries in consequence of the epidemiological transition.

As for the genetic causes, we have to distinguish two main factors: mutation of genes and polygenic inheritance, i.e. the specific combination of normal genes that confers a bias towards specific chronic diseases, such as high pressure, diabetes, and cancer. Research has found about 4000 mutant genes that may cause diseases such as sickle-cell anemia, cystic fibrosis, and Huntington's disease (Tarlov and St. Peter, 2000, p.x). Epidemiologists maintain that the relative incidence of these diseases is very low as it did not exceed a value around 5% of the total (*ibidem*). In the case of polygenic inheritance, for a chronic disease actually to manifest itself, concomitant circumstances have to concur, such as health-damaging behaviors or socio-economic factors. We may thus consider its impact important but only in the distribution of chronic diseases rather than in their aggregate incidence on population health.

As for health-damaging behaviors, epidemiologists estimate that their incidence does not exceed one fifth of the aggregate disease burden (Drever *et al.*, 1996). Moreover, they estimate that the impact of improved medical care on population health is surprisingly small as different studies attribute to it no more than a fifth of the overall influences during the last decades (see Tarlov and St. Peter, 2000, on the basis of studies by McKeown, 1976; Bunker *et al.*, 1994, and Bunker, 1995).⁵³

According to these estimates we have to conclude that in developed countries, in consequence of the epidemiological transition of the 20th century, the main impact on health has by now to be attributed to social characteristics (in particular poverty, inequality in the distribution of income, depletion of social capital) and environmental factors (pollution, depletion of natural capital). In other words, we may say that the social and environmental conditions of sustainability have been playing an increasing role in determining population health. In addition, we notice that sustainability conditions also play an increasing, indirect role in enhancing the impact of the other health factors. The genes mutation was accelerated by environmental manipulations such as the thinning of the ozone layer (weakening the natural filter of cosmic rays), abuse of radiography, nuclear pollution and progressive introduction of genetically modified organisms (GMOs). Analogously, health-damaging behaviors are nowadays often triggered by social factors. A feeling of relative deprivation or stress nurtured by social factors may induce use of alcohol, tobacco or drugs, and encourage excessive food consumption. Finally, the availability of medical care and public health facilities, such as access to safe drinking water, adequate sanitation and medical care, obviously depends on socio-economic conditions and is currently jeopardized by severe cuts in public expenditure, motivated by budget strictures and privatization.

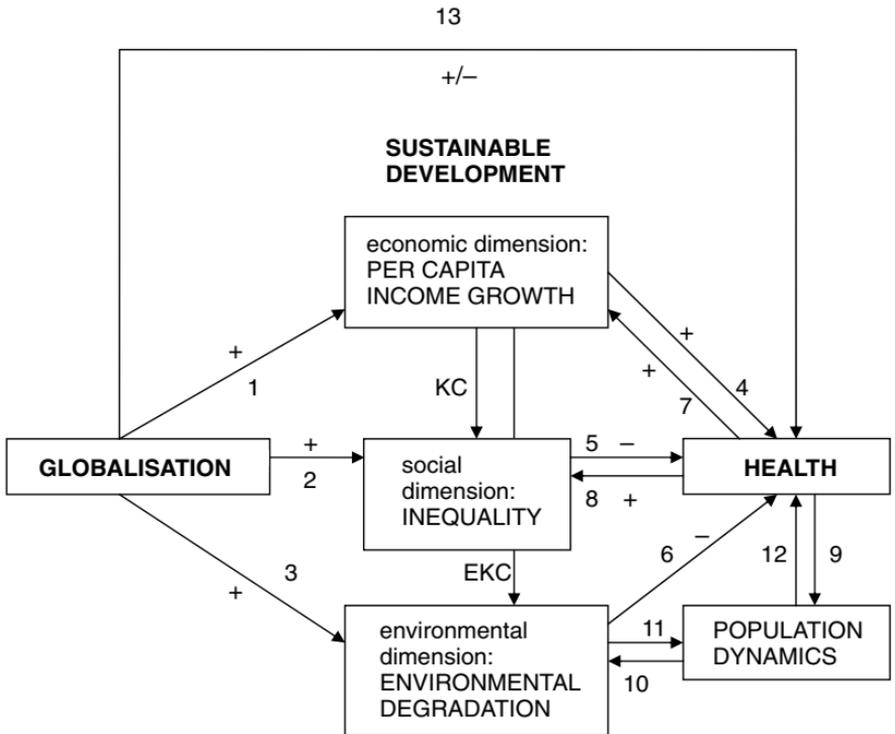
We may conclude that a study of the environmental and social conditions of sustainable development is becoming an increasingly crucial factor in the study and promotion of public health.

2 Influence channels between globalization, health and sustainable development

In the preceding section we have seen that, in consequence of the epidemiological transition, the sustainability conditions have become a crucial determinant of public health and of its cross-country variations. We know from the preceding chapters that the process of globalization has exerted a crucial impact on these conditions, and therefore indirectly also on public health. In addition, we have seen that the process of globalization has affected, and continues to affect, the evolution of per capita income that, in its turn, had a crucial role in the epidemiological transition of the 20th century.

In this section we intend to suggest a fairly comprehensive map of the main channels of influence connecting globalization, sustainable development and health. This map is summarized through a block-

Figure 5.2 Block diagram of the main correlations between globalization and health



Note: The sign + indicates a positive correlation, the sign - indicates a negative correlation

diagram where the arrows express the direction of the influence between the key variables examined (see Figure. 5.2).

As we have seen in Chapter 1, the process of globalization affects the sustainability of development mainly through three pathways that we may label respectively as economic, social and environmental channels. The economic channel represents the effects of globalization on per capita income growth, the environmental channel its effects on a variety of environmental deterioration indices, while the social channel includes the consequences of globalization on income inequality and poverty.⁵⁴ This conceptual framework may help to understand the influence of globalization on health since per capita income, environmental degradation and income inequality are affected by globalization and have a remarkable impact on health.

As to the economic channel, the average per capita income of a community (at a local, national or international level) is generally

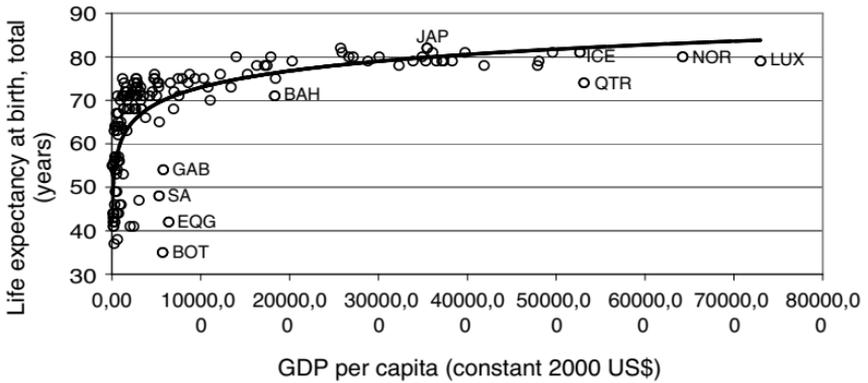
considered as a fairly good proxy of its average standard of living and thus also a major determinant of the average health of the people belonging to this community. Globalization tends to increase per capita income growth of a country to the extent that it participates actively in the process of globalization and this tends to improve also its health conditions (arrow 4 in Figure 5.2). For instance, an increase in per capita income is generally accompanied by higher expenditures in health programs, better technologies improving the therapeutic facilities and higher education levels favoring the diffusion of updated medical know-how.⁵⁵ In addition, it may help to relax the budget constraints originating in severe poverty that hinder the capacity of poor people to prevent and cure a disease.

The second main influence of globalization on health derives from its impact on the environment. The worldwide integration process of the markets has globalized also the environmental problems and these have by now huge effects on health (such as the thinning of the ozone layer, pollution, the exhaustion of vital resources such as drinkable water: see section 3.1). The influence of globalization on environmental deterioration is a quite complex and ambiguous process. By increasing the economic growth of the participating countries, the globalization process may contribute to raise the scale of production and consumption activities that damage the environment. At the same time, however, the higher economic growth that generally characterizes more globalized countries may promote technological progress and thus reduce the intensity of environmental degradation. The health effect of globalization through the environmental channel thus depends on which of these two opposite influences tends to prevail. The increasing levels of air, water and soil pollution that have characterized most of the countries in the last decades seem to suggest that the negative effect has tended to prevail in this recent period. Globalization, therefore, may have indirectly contributed to deteriorate health through environmental degradation.

As for the social channel, it is well-known that the health of the poor has higher income elasticity than that of the rich. Cross-country evidence suggests that life expectancy increases with average per capita income in relatively poor countries, whereas this relationship tends to vanish for relatively rich countries (Preston, 1975). This can be clearly seen by looking at Figure 5.3 that shows the relationship between life expectancy and per capita GDP in year 2005 based on WB data referring to 175 countries.⁵⁶

Similar results emerge also in single-country studies. Using a survey on health and income in Britain, Wilkinson (1992) finds that several

Figure 5.3 Life expectancy and per capita GDP in 175 countries in 2005



Legend: BAH = Bahamas; BOT = Botswana; EQG = Equatorial Guinea; GAB = Gabon; ICE = Iceland; JAP = Japan; LUX = Luxembourg; NOR = Norway; QTR = Qatar; SA = South Africa.

Source: Authors' elaboration on World Bank data (World Development Indicators, 2007b).

health indicators increase rapidly as income rises from the lowest to the middle classes of the income distribution, while no further health improvements occur at high income levels. Similarly, using data from the National Longitudinal Mortality Survey in the USA, Deaton (2002) observes that the male (age adjusted) probability of death decreases rapidly as income grows at low family income levels, while it flattens out at high family income levels.

What we have reported so far is consistent with the traditional view that health is mainly affected by absolute income. If so, a reduction in income inequality would improve population health only because individual health indicators increase at a decreasing rate with income. In recent years, however, several studies have argued that socioeconomic inequality has also an independent impact on individuals' health (arrow 5 in Figure 5.2), particularly in developed countries. A host of new evidence in different disciplinary fields clarified that, after a threshold of minimum income is reached (of about US\$5000), income inequality becomes a crucial determinant of health. Using data on nine OECD countries, Wilkinson (1992) finds evidence of a strong correlation between life expectancy and income distribution that is independent of absolute income.⁵⁷ Similar results emerge in several other studies that focused on different groups of countries and periods of time (e.g. Kennedy *et al.*, 1996; Cantarero *et al.*, 2005; De Vogli *et al.*, 2005; Leigh and Jencks, 2007).

The same relationship, moreover, may also apply at the local level. Comparing the 50 states of the USA, for example, a close relationship emerged between inequality and mortality rates (Kaplan *et al.*, 1996).⁵⁸ Analogously, among the 282 metropolitan areas of the USA the ones with the most unequal income distribution turn out to have the highest mortality rates (Lynch *et al.*, 1998). Similarly, De Vogli *et al.* (2005) have found that among Italian regions income inequality has had an independent and more powerful effect on life expectancy at birth than per capita income and educational attainment.

Although these regressions did not control for some further explanatory variables and there is not yet unanimous consensus in the literature on the evidence available,⁵⁹ these results suggest that relative income, independently of absolute income, may have a crucial influence on health. More generally, the relative deprivation suffered by people in the lowest deciles of the income distribution may determine their exclusion from the social activities that promote or preserve health. Moreover, as several empirical papers have pointed out (see section 3), relative deprivation may be a source of psychosocial stress, loss of self-esteem and chronic depression which tend to damage the individuals' health. People compare themselves with reference groups around them (neighbors, co-workers, friends, relatives, TV stars, and so on) and may suffer from chronic psychological stress when comparison with these benchmarks is unfavorable.⁶⁰ These psychological mechanisms, which are at work mainly within the part of population not affected by material deprivation, can adversely affect people's health (see, e.g., Sapolsky, 1998; Brunner and Marmot, 1999; Wilkinson, 2002). The assertion that relative income has a crucial independent impact on population health came to be called "Relative Income Hypothesis" (from now on RIH).

Since the RIH implies that increasing inequality damages the health of a population, we may say that globalization indirectly contributes to deteriorate health through an increase of income inequality, as observed in many OECD countries in the last thirty years or so (see retro Chapter 1).

To get a deeper understanding of the complex link between globalization and health, in what follows we will take a closer look to the way inequality may affect health.

3 The influence of inequality on health

Though the relevance of psycho-social factors on health has been occasionally recognized since long,⁶¹ until very recently only very few scholars claimed that they are an important cause of global health.⁶²

In addition, only lately the underlying physiological mechanism began to be understood. As a reserve of (relatively liquid) financial capital is crucial to absorb economic shocks, and a reserve of natural capital to absorb environmental shocks, analogously it has been argued that, in order to withstand physio-psychological shocks, a crucial role may be played by the intensity and quality of social relations, or what is often called "social capital". In particular, the lack of social trust was shown to be positively and significantly correlated with mortality in the USA (Kawachi *et al.*, 1997), with a correlation coefficient that ranges between 0.71 and 0.79 depending on the kind of social trust indicators used for the analysis.⁶³ Analogously hostility was found positively correlated with mortality. For example, Williams *et al.* (1995) estimated that mean hostility scores of ten cities in the USA were strongly and significantly correlated with their mortality rates after adjusting for race, age, gender, income and education level of the individuals.⁶⁴ On the other hand, trust and hostility appear to be strictly correlated to inequality. Two commonly used indicators of social capital (civic engagement as measured by membership in groups and associations, and social trust) were significantly associated to inequality in the USA (Kawachi *et al.*, 1997). Similar results were obtained by Uslaner (2001), who found a high correlation coefficient ($r = -0.684$) between inequality and trust in a cross-country analysis.⁶⁵ As the author has showed, this connection between the two variables holds true also in multivariate tests that take into account economic, cultural and religious aspects that might affect the observed levels of trust and inequality in the selected countries. In particular, by estimating a simultaneous equation model to test the direction of causality between trust and inequality, he found that trust has no effect on economic inequality, whereas the latter turns out to be the strongest determinant of trust among the explanatory variables. Analogously, many studies (see, e.g., Hsieh and Pugh, 1993; Kaplan *et al.*, 1996; Leigh and Jencks, 2007) have confirmed the existence of a close relationship between income inequality and violent crime indicators that can be interpreted as indirect measures of hostility and depleted social capital.⁶⁶

Summing up, the empirical evidence suggests that inequality acts as a wedge between people that engenders mistrust and hostility with negative effects on people's health, the more so the more incomes are unrelated or non-proportional to individual effort and merit. This may explain why the most egalitarian developed countries, not the richest, tend to have the highest life expectancy.⁶⁷ The close relationship between income inequality and mortality rates that is observed in cross-country

studies emerges also in time series referring to single countries including Russia, United Kingdom and Taiwan.⁶⁸

We may interpret income inequality as a measure of the intensity of relative deprivation affecting individuals in a society. Several studies found that in human and non-human primates (such as baboons and macaques) the experience of a low status severely damages health producing “obesity, glucose intolerance, increased atherosclerosis, raised basal cortisol levels and attenuated cortisol responses to experimental stressors” (Wilkinson, 2002, p.15 and literature there cited). The physiological mechanism is based “on the effects of sustained activation of the hypothalamus-pituitary-adrenal axis and the sympathetic nervous system. The stress response activates a cascade of stress hormones that affect the cardiovascular and immune systems” (*ibidem*, pp.15–16).

The mechanism through which chronic stress jeopardizes the health of individuals is very similar to economic “short-termism”, i.e. the myopic emphasis on short-term objectives to the cost of jeopardizing the achievement of longer-run objectives. In both cases all the available resources are mobilized to obtain a desired short-term goal even at the cost of jeopardizing the sustainability of good performance in the longer term. In fact, whenever a human being has to face an emergency, the body mobilizes all the physiological resources that may be useful to face the exceptional threat preparing muscular activity for fight or flight and/or alerting the nervous system for devising a quick solution to the challenge. The energy mobilized to face the immediate task, however, is subtracted from the physiological resources available for routine functions such as tissue maintenance and repair, growth, digestion and depuration of liquids and food through liver and kidneys, reproductive and immunity functions. This mechanism may be very efficient when the emergencies are brief and rare because in this case the suspension of routine functions does not produce serious damages. On the other hand, this emergency response is bound to affect health in an irreversible way when the shocks are frequent or permanent, like in the case of a worsening social status or relative deprivation. An increase in income inequality involves for the less advantaged people a reduction in social status and an increasing feeling of relative deprivation.

We have to stress the link between the physiological mechanism that explains how inequality deteriorates health and the economic mechanism that explains how certain aspects of globalization may deteriorate the economic “health”, i.e. the stability and sustainability, of the economic performance. In both cases, the pathology originates from short-termism. In the last three decades globalization, driven by the principles

of privatization and deregulation, progressively shortened the time horizon within which DMs optimize their strategies. We can examine this mechanism in some more detail by focusing on five of its salient factors.

The first one is the growing importance of the financial side in the balance sheets of corporations and households. Financial decisions are liable to big, often unexpected, gains and losses and have to be revised almost continuously in the light of the latest available information, thus greatly contributing to the shortening of the time horizon of economic decisions. Globalization accelerated this trend by unifying financial markets and increasing the size and velocity of “hot money” transferred at very short notice from one sector or country to the other for speculative purposes. This greatly enhanced the instability of financial markets and the size of potential losses and gains of financial decisions, focusing the attention of operators on the speculative factors rather than on the long-run trends of economic fundamentals (see Chapter 6).

A second important factor of short-termism is the growing flexibility of labor markets and industrial relations. Workers are compelled to shorten the time horizon of their decisions while the employers have the opportunity of revising their choices concerning the size and use of the labor force almost continuously on the basis of speculative considerations.

A third significant factor may be found in the field of corporate governance. Managers are evaluated and rewarded according to indices of performance calculated over increasingly short time horizon. This trend has negative implications on the sustainability of the economic performance of the firm and on its compliance with the tenets of business ethics and is a source of greater stress for the top managers and all the people affected by their decisions (see Chapter 7).

The fourth factor that we want to stress, the growing role of the mass media, is more general and progressively became a crucial determinant of economic, political and cultural processes in modern societies, including the socio-economic and physio-psychological processes mentioned above. The growing diffusion of the mass media, in particular television, flooded free time with information flows strongly biased towards negative events and risks often unduly dramatized. This spread feelings of insecurity and fear that greatly contributed to reduced social interaction, depletion of social capital, increasing stress and enhanced short-termism.

Finally, the fifth factor is the “neoliberal” market ideology that justified the first three factors and was supported by large part of the mass media

often prone to convince people that the negative effects of globalization are unavoidable “collateral effects” of modernization (see Chapters 6 and 9). This ideology coalesced in the 1970s and became rapidly hegemonic in many influential quarters in the 1980s, and influenced the choices of political elites. This point of view directed economic policy towards the systematic privatization of economic resources (including many public goods and global commons) and generalized deregulation of markets (even when regulation was justified by social and environmental externalities). This policy strategy greatly undermined in many countries the scope and efficiency of the welfare state and the underlying safety nets, contributing to the depletion of social capital, the growing stress of people, the rising impact of chronic diseases, and so on.

The recent phase of globalization has greatly reinforced the trends here briefly recalled. The increasing importance of financial capital was promoted by the radical liberalization of capital movements across countries. The growing flexibility of labor markets and industrial relations was enhanced by the increasing international competition based on the opportunity of shifting capital in the countries and sectors where the flexibility of labor is higher. In addition, the growing international mobility of capital and skilled labor encouraged the adoption of short-termist capital governance and reward systems. Globalized mass media made anyone aware in real time of catastrophes, crime episodes, wars and other negative events happening anywhere, also in distant countries. Finally, global cultural and political processes rapidly spread the values of the neoliberal ideology even among people greatly damaged by neoliberal policies.

Summing up, the growing short-termism progressively increased the stress of workers, entrepreneurs, shareholders and households and this nurtured an analogously short-termist physio-psychological response that undermined their health. Of course, this effect is particularly visible and sizeable in individuals affected by absolute and relative deprivation and weakly protected by a social security network and accessible social capital. This suggests a new strategy of policy intervention that it would be useful to explore in the future. We will come back on this issue in the last section of this chapter.

4 Critiques of the Relative Income Hypothesis and their soundness

As all scientific hypotheses, also the RIH raised criticisms of different nature (for a survey see the introduction to Kawachi *et al.*, 1999). We

may classify the main criticisms to the RIH in three separate strands, none of which, however, seems to undermine in a decisive way the fundamental soundness of the RIH:

a) Some critiques pointed out that the RIH is inconsistent with the positive correlation between increasing income inequality and the contemporaneous improvements in life expectancy observed in the last decades in most industrialized countries (see, e.g., Judge, 1995; Saunders, 1996). This criticism emerges from a misunderstanding of the scope of the RIH. The latter does not pretend to explain the long-run global trend of life expectancy that depends on a host of factors going beyond that of income inequality. The RIH only claims to explain the negative deviations from this positive long-run trend.

b) A second strand of criticism focused on the alleged methodological shortcomings of the studies that claimed empirical support to the RIH.

First, it was observed that these studies referred to different indexes of inequality without justifying the reasons of the specific choice. This may raise the suspicion of an ad hoc choice in order to corroborate the hypothesis. This criticism, however, is greatly weakened by the observation that most measures of income inequality are strictly correlated with each other (Kawachi and Kennedy, 1997).

Another criticism pointed out that most published studies did not adjust the estimates of the impact of income inequality by taking account of other relevant variables such as taxes, transfer payments, and household size. On the other hand, more sophisticated replications of the above studies adjusting for the missing variables did not change the substance of the results obtained by earlier studies (Kawachi and Kennedy, 1997).

c) The main challenge to the RIH came, however, from the third strand of criticism. Since a concave relationship has been observed between absolute income (that is, per capita GDP measured on the horizontal axis) and life expectancy (measured on the vertical axis), it is obvious that transferring income from the poor to the rich must result in a greater improvement of the health of the poor as compared to the smaller reduction in the life expectancy of the rich. According to the opponents of the RIH, this observation is consistent with the hypothesis that only absolute income is a genuine cause of health, while the relative income turns out to be a spurious cause (see, e.g., Fiscella and Franks, 1997; Gravelle, 1998).⁶⁹

Compelling as it seems at first sight, this argument is in fact inconclusive. In order to understand the real implications of the above observation, we have to distinguish between ontologic causality, that occurs when we detect in the empirical evidence an effective mechanism of production of the effect, and pragmatic causality, when we are able to control the effect by manipulating the cause, whatever its ontological reasons (Woodward, 1997; Hoover, 2001). The observation raised by the critics of the RIH, as a matter of fact, greatly corroborates it from the pragmatic point of view: even if we believe, and can prove, that only absolute income – and not relative income – is a genuine ontological cause of health at the individual level, we may considerably improve the health of a population by reducing the inequality in the distribution of income. From the policy point of view this is what really matters, therefore we can conclude that from the pragmatic point of view the RIH is not falsified.

We may then discuss whether relative income should be considered also an ontologic cause of health. From this point of view the observation that the relationship between absolute income and health is non-linear only proves that absolute income is in principle an ontologic cause sufficient to explain the correlations observed in the empirical evidence between income inequality and health but it does not exclude a possible role also for the latter variable. We may say, however, that the existence of plausible pathways explaining the influence of inequality on health, discussed in the preceding section, suggests that in many cases we should expect to find an independent causal effect also from the ontological point of view. Bad health of poor people due to infectious diseases may be transmitted to other people, even those belonging to the top levels of social stratification. In addition, relative deprivation, the burden of which may be felt virtually by anyone but the restricted elite at the top of social stratification, increases with income inequality adding a new independent influence path of the latter on population health. The consequences of an acute feeling of relative deprivation may nurture chronic diseases, crime, and health-damaging behaviors. This may damage other individuals including those at the top of social stratification who may become victims of crime, absenteeism, poor services, myopic and antisocial behaviors, even infectious diseases induced by a fall in the immune defenses of stressed individuals, and so on.

The criticisms briefly surveyed above warn the analyst and the policy-maker that, although we do not know yet how and to what extent inequality affects health, the knowledge accumulated so far suggests that more equality in income distribution would improve population health.

5 The influence of environmental degradation on health

In recent years numerous scientific studies have analyzed the effects that individual forms of environmental degradation can have on a person's health. Some of these analyses, such as the United Nations study on the so-called "Asian cloud" (UNEP, 2002), have recently received increasing attention in the mass media and on the part of public opinion for their interesting results. The World Health Organization (WHO) has estimated that bad environmental conditions are directly responsible for about 25% of all cases of preventable illness all over the world (WHO, 1997). In order to analyze the direct causal links between environment and health (summarized by arrow 6 in Figure 5.2), it may be useful to classify the health impacts of environmental degradation by distinguishing between atmospheric, water and soil pollution.⁷⁰

5.1 Effects of atmospheric pollution

Atmospheric pollution is considered the main cause of the large increase in cases of respiratory diseases observed in recent years. Some particularly volatile pollutants such as particulate matters (PM_{10}), nitrogen oxide (NO_x) and SO_2 – discharged by cars traffic, heating, and manufacturing – can penetrate as far as into the bronchioles, provoking asthma, bronchitis and emphysema (Worldwatch Institute, 1990).⁷¹ In Italy, it has been calculated (Galassi, 2002) that the number of patients with smog-related chronic coughs has doubled in the last ten years and about 20% of otherwise healthy non-smoking Italians suffer from this disease. This is all the more worrying because it affects especially individuals in the younger age groups thus damaging the average health conditions of future generations. Children living in Italian cities, for example, have a 20% higher likelihood of suffering from asthma than those living in rural or mountain areas where polluting emissions are lower.⁷² The data relating to the developing countries are even more alarming. A recent study of some Latin American capital cities reported by *The Economist* (2002a), estimated that a 10% reduction in ozone and particulate emissions by 2020 could avoid 37,000 premature deaths among the inhabitants of Mexico City and 13,000 in San Paolo. Another study carried out in Bangladesh by the WB estimated that the high level of atmospheric pollution in this country's towns is responsible annually for 15,000 premature deaths and a million cases of disease, with an estimated overall cost between 200 and 800 million dollars a year (World Bank, 2000, p.3). Bangladesh is one

of the countries worst hit by the effects of the so-called “Asian brown cloud”, a thick cloud formed by carbon particles and carbon monoxide, sulfur and nitrogen gases that stretches for about 16 million square kilometers over a large part of Asia. The cloud – caused by continuous burning of forest areas, emissions from electrical power stations and road traffic, and dust from desertified land – constitutes a new global emergency that has recently come to the fore because it brings about serious respiratory problems and it could easily spread to other countries and continents, carried by the wind.

Some authors think that the impact of atmospheric pollution on individual health may be even greater than that estimated in the above-mentioned studies which restrict their attention to the increase in respiratory diseases among the populations under consideration. Besides respiratory conditions, atmospheric pollutants are often responsible for cardiovascular diseases since, once inhaled, pollutants are carried round the body in the blood. It was observed (WHO, 1997) that high concentration of carbon monoxide in the air reduces the blood’s capacity to absorb oxygen and that an increase of PM₁₀ levels in the blood of 10 grams per square meter raises the incidence of death by cardiovascular disease by about 1%.

GHGs also have other negative effects on health. As is well-known, the depletion of the atmosphere’s ozone layer as a result of GHGs increases the population’s exposure to ultraviolet rays which may account for the increasing cases of skin cancer and eyes damages. Lastly, atmospheric pollutants can also damage health because they are deposited on water and soil, thus adding to the contamination of the water we drink and the food we eat.

5.2 Effects of water pollution

One of the measures of water pollution often found in the literature is the concentration of faecal coliform bacteria in water where there is no efficient treatment in place. The concentration of these bacteria, which are found in human and animal faeces, is a good index of the quantity of pathogenic agents responsible for diarrhoea, cholera, hepatitis, typhoid and other illnesses of the digestive system. Recent studies (WHO, 1997) have estimated that these diseases can be ascribed in 90% of cases precisely to the lack of clean water and to inadequate sanitation. Those worst affected are children in developing countries (where 95% of water is untreated), thus creating a serious obstacle to the future growth of these countries and to a reduction of the gap between rich and poor countries.⁷³

Another factor of water pollution that has serious consequences for human health is the presence in water of heavy metals (such as lead, cadmium, mercury, arsenic and nickel) and polluting chemical products (such as Poly-Chlorinated Biphenyls (PCB), Dichlorodiphenyl-trichloroethane (DDT) and dioxins). People ingest these elements by drinking water since they are difficult to remove under normal treatment processes, or when they eat fish where metals can accumulate. Various studies demonstrated that some heavy metals, such as nickel, cause serious damage to the nervous system, others, such as lead, mercury and arsenic, harm liver and kidneys.⁷⁴ All heavy metals and many chemical pollutants are also thought to be responsible for tumor formation. In this respect, a study on Lake Michigan (Glenn *et al.*, 1989) found that a high level of consumption of fish from this lake, polluted with high concentrations of PCB, DDT and other toxic chemical substances, increased the risk of a tumor by about 1%.

A recent example of water pollution caused by heavy metals that is causing great concern is to be found in Bangladesh and the Indian region of Bengal. In well waters used for drinking by the local population since the 1980s, the quantity of arsenic found was fifty times greater than the permitted safety level (*The Economist*, 2001). A WHO study (Smith *et al.*, 2000) estimated that the contaminated population could number between 35 and 77 million people, underlining the fact that prolonged exposure to arsenic causes skin disease (already evident in the populations of the villages concerned) and the appearance of tumors of lungs, bladder, liver and kidneys.

Furthermore, water pollution in combination with atmospheric pollution can modify the habitat of some ecosystems (temperature, humidity, vegetation density, etc.). This can encourage the survival and spreading of insects that are particularly harmful because of the diseases they may carry. This is the case of mosquitoes which transmit various diseases including malaria. This serious disease is thought to be responsible every year for a million deaths among children under 5 years and is becoming an increasingly serious problem, especially in sub-Saharan Africa where 90% of the world's malaria cases are concentrated (WHO, 1997).

5.3 Effects of soil pollution

Many chemical, biological and radioactive pollutants tend to settle on the soil, contaminating both the crops planted there and the resultant agricultural products. This can cause serious harm to population health which can then be passed on to the next generation and last for many

decades. One example is the pollution of food in Vietnam following the use by American troops, during the war, of an herbicide called “Agent Orange” which later proved to be carcinogenic.⁷⁵

In addition, soil pollution damages the health not only of farmers who work contaminated land and of children playing there, but also of the surrounding population since dust from the polluted area can be carried elsewhere by the wind. Direct contact with contaminated soil and with the numerous microbes and parasites contained in it is particularly harmful for children who are extremely vulnerable.⁷⁶

Not only pollution but also overworking the soil can damage the health of the population. This is particularly true for rural families in poor countries which are dependent on the food they produce. The attempt to achieve a minimum level of subsistence sometimes drives rural people to over-exploit land reducing its productivity. Lower productivity in turn reduces calorie and protein intake on the part of the farmers, reducing their productivity and making them more vulnerable to diseases. The loss of income resulting from illness and lower land and labor productivity increases the indigence of the farmers generating a vicious circle between poverty, environmental degradation and population health.

6 Reverse causation between health and sustainable development

The analysis developed so far has examined the consequences that globalization may have on health through three crucial dimensions of sustainable development, namely, income growth, inequality and environmental degradation. As many economists have underlined, however, there exists also a reverse causality going from health to the economic, social, and environmental conditions of sustainable development. We intend now to analyze these reversed causality channels in order to evaluate their strength and nature.

6.1 The impact of health on economic growth

Recent empirical studies have shown that a country’s economic growth is closely correlated with the average health of its inhabitants. Countries with low infant mortality rates (assumed as a proxy for a country’s health conditions), grew more rapidly between 1964–95 than those with higher mortality rates (WHO, 2001). Various empirical “cross-country” analyses seem to confirm that good health conditions can contribute to explain economic growth (as suggested by the positive

sign on arrow 7 in Figure 5.2).⁷⁷ By introducing, besides health, some traditional explanatory variables of economic growth into the econometric model (initial income level, economic policies, and the structural characteristics of the countries), these studies found that the coefficient of the health variable is statistically significant and that a 10% increase in life expectancy at birth gives a 0.3–0.4% increase in a country's annual economic growth.⁷⁸

It is possible to identify three main channels through which the health conditions prevailing in one country can influence its economic growth: (i) investment in the country; (ii) the average educational level of individuals; (iii) individuals' productivity. In the first place, a worsening of average health conditions discourages investment in the country. High incidence of a disease like malaria, for example, increases absenteeism and turnover in the labor market augmenting staff training costs for companies. This makes companies less likely to invest in the country and therefore the latter remains with lower growth capacity. In South Africa, for example, the incidence of AIDS among workers convinced many companies to cut their investment programs (WHO, 2001). An epidemic or a general worsening of population health can further reduce the rate of capital accumulation in a country since it reduces households' savings rate. This can happen either because the disease obliges families to face higher medical expenses, or because it shortens life expectancy and so also reduces the incentive to save for future consumption. Lastly, the accumulation of capital in a country hit by an epidemic falls also because the risk of contracting the disease discourages tourism and related investments in the area.

Secondly, as emphasized by a WHO report (WHO, 2001), the prevalence of bad health conditions in a population adversely affects not only investment in physical capital but also in human capital. When an adult member of a family is ill the sum of money that can be spent on children's education is curtailed both because the household spends more in order to treat the illness and because disposable income is reduced. Since the incidence of a disease is higher among poor families where there are already tight cash constraints, the children may be obliged to leave school prematurely to help support their family. The low level of investment in human capital seen in countries with poor average health conditions is also the result of low life expectancy which, by reducing the temporal horizon of an individual, makes the initial investment in education less profitable. Furthermore, high infant mortality drives poor families to have many children. This reduces the amount that the family can spend on each child, leading therefore – for a given

level of disposable income – to investing less on their education. This may have repercussions on successive generations. As argued by WHO (2001), the less education received by girls, the lower their future earnings will be and therefore the lower the opportunity cost of staying at home to raise their children once they reach adulthood, which means they will also have many children. In addition, the high birth rates generated by this behavior tend to reduce the proportion of the population of working age which various studies find to be directly proportional to per capita income (see, e.g., Bloom *et al.*, 2001a). Lastly, the early death of many adults prevents the passing on of precious knowledge to the next generation, which also lowers the level of human capital. This aspect is particularly important in African countries hit by the epidemics of AIDS, where the techniques of working the land are mostly passed on from father to son (WHO, 2001).

A third way in which the health of a population influences economic growth is through individual productivity.⁷⁹ A poor state of health increases the number of sick days taken by workers and reduces both their physical and mental productivity. In addition, it reduces children's ability to learn, thus adversely affecting their future educational achievement. In this regard, many studies (see, for example, Pollitt, 2001) have found strong links between a lack of iron and vitamin A in the organism and reduced cognitive skills. An individual's poor state of health can also have a negative spillover effect on the productivity of other family members or of people close to them. If an individual is ill other family members may have to give assistance, reducing the number of hours they can dedicate to their own work and often also reducing their productivity at work. This productivity loss may be the result of the poor concentration and stress caused either by worrying about and/or giving assistance to the sick relative.⁸⁰

Summing up, it can be said that the health of a population influences also the "health" of the economy. If a population is in good health this will generally encourage economic growth in the country, whereas the opposite occurs if the population is in bad health. In this light, health policies can promote economic growth, while the latter tends to improve health. The existence of circular relationships between health and economic growth can therefore give rise to vicious or virtuous circles according to the policies employed. Through its influence on economic growth, health can affect also inequality and environmental degradation. For those cases in which the KCs are empirically robust,⁸¹ promoting health policies may help increase a country's per capita income (moving along the horizontal axis) and eventually reach the downward side of

the two curves where inequality and environmental degradation tend to decrease.

Health, however, can also have other feedback effects on inequality and ecological degradation that are independent of income growth. We now turn to the analysis of these additional effects.

6.2 Feedback effects of health on inequality

There is a growing debate in the literature about the possible explanations underlying the observed correlation between health and inequality. In sections 4 and 5 we have discussed how and to what extent inequality can affect health, but it seems reasonable to argue that there exists a bi-directional link between these two variables. The health of the poor is generally worse than that of the rich since the rich enjoy higher living standards and easier access to the health care system than the poor. This fact tends to widen the gap in terms of present income and future income capacity, thus increasing the level of inequality in the country (Gwatkin, 2000). The children of poor families, in fact, generally have worse health than the children of rich families, and this adversely affects their future earning possibilities as adults. It has been observed, in fact, that even when the children of poor and rich families receive the same level of education, the former may suffer inferior cognitive capacities because of worse health conditions. For instance, several studies find a strong correlation between reduced cognitive capacity and low nutritional status, e.g., lack of iron and vitamin A in the organism (Bhargava and Yu, 1997; Pollitt, 2001). Health, therefore, as many other individual traits (e.g. wealth, race), may explain much of the inter-generational transmission of economic status (Bowles and Gintis, 2001).

Moreover, low health conditions can increase inequality not only within countries, but also across them (WHO, 2001). Developing countries, in fact, often have poor average health conditions that hinder their ability to grow and converge towards the developed economies. Countries with high rates of infant mortality have grown more slowly during the period 1964–1995 than countries with low levels of the same variable (WHO, 2001). Thus, inequality jeopardizes health and health in its turn strongly affects the earning capacity of individuals (arrow 8 in Figure 5.2). This feedback may trigger a vicious circle between bad health and inequality that risks to progressively reinforce both of them.

6.3 Feedback effects of health on the environment

The health of a population can indirectly influence the quality of its environment as a result of two factors which have an impact on

environmental degradation: economic growth and population dynamics. We have already discussed how health can affect economic growth. As to the population dynamics, the growth of the population is influenced by its average health conditions that strongly affect the birth rate. In this respect, it has been observed that the countries with the highest fertility rates are those that also have the highest infant mortality rates.⁸² This is because in countries with a high number of deaths in the first years of life, parents tend to have more children to ensure that at least some of them survive into adulthood. This trend is further reinforced by the fact that in many developing countries, having children is the only way parents can provide for their old age. As a result, the populations with the highest infant mortality rates are also those that grow most quickly, because the high rates of infant mortality are more than compensated by the high birth rates.⁸³ Reducing infant mortality in these countries would therefore tend to reduce population growth.

A lower population growth would have in turn a positive effect on the quality of the environment. Environmental degradation is so strongly influenced by the size of the resident population that the demographic issue holds center stage in the sustainable development debate, right from the first contributions in the literature (cf. Holdren and Ehrlich, 1974). The size of the population does, in fact, determine the amount of natural resources used to satisfy consumption needs and thus also the carrying capacity of an ecosystem. Demographic growth is likely to damage the environment since it is accompanied by both an increase in the demand for environmental goods and an increase in the waste coming from the growing production and consumption of a more numerous population. Therefore, the causal link we have just described starts with health, moves on to population dynamics and ends with the environment, as described by arrows 9 and 10 in Figure 5.2.

Alongside this link, we can nevertheless identify another one moving in the opposite direction, starting with environmental degradation and leading to average health conditions (indicated by arrows 11 and 12 in the block diagram), making the relationship between health and environment bi-directional, mediated by variations in the population. The high level of environmental degradation in some areas of the world has, in recent years, led to increasing migratory flows of “environmental refugees” (El-Hinnawi, 1985) who move on to escape from the pollution of their traditional habitat. There are so many cases of migration caused by environmental degradation that some authors (cf. Myers, 1997) argue that these refugees might become the largest group of involuntary migrants in the near future, while others (cf. Bates, 2002)

have attempted to classify some typologies of environmental refugees to provide a theoretical framework to the fast-growing literature on the subject. Amongst the examples given is the migration of 7 million Vietnamese rural people to the cities during the war with the United States because of the destruction of the forests and harvests following the use of the previously mentioned herbicide "Agent Orange" (Glassman, 1992). Another example is that of the 15 million people who may well be forced to leave Bangladesh by 2050 as a result of a rise in sea level (Myers, 1993). Migration caused by environmental degradation tends to change the population's distribution over the territory which can in turn affect the health of the population. An increase in population density in the cities, for example, can facilitate the transmission of diseases such as tuberculosis, meningitis, poliomyelitis, and measles which spread rapidly, mainly in the overcrowded hinterlands of large urban centers which also suffer from poor sanitation.

Summing up, the existence of inverse causality is confirmed by our analysis but, contrary to a diffuse opinion among economists, this does not imply the spuriousness of the direct influence of globalization on health. This is emphasized by epidemiologists who argue that "although ill health can affect socioeconomic position, the bulk of the research evidence indicates that the predominant force is in the direction of socioeconomic position influencing population health" (Tarlov and St. Peter, 2000, p.xv). They "have tracked individuals from relatively early on their careers (when they were free of illness), and demonstrated that low incomes lead to the higher onset of morbidity and premature mortality" (Kawachi and Kennedy, 2002, p.61; see also Wilkinson, 1996 and Tarlov and St. Peter, 2000, p.xv). We believe that we have to take seriously the argument put forward by social epidemiologists. In any case the coexistence of direct and inverse causality produces a vicious circle between income inequality and health that is very difficult to reverse.

7 Further influences of globalization on health

After examining the effects of globalization on health through economic growth, inequality and environmental deterioration, and the bi-directional nature of these links, let us now move to the analysis of a few further health effects of the worldwide economic integration (arrow 13 in Figure 5.2).

Globalization may increase the cross-border transmission of infectious diseases by augmenting the movements of people and the consequent risk of contagion. People move from the North to the South

and vice versa mainly for tourism and labor, although other causes can also contribute to this flow.⁸⁴

These large multi-directional movements of people that characterize the globalization process can spread, therefore, transmissible diseases across countries, which raises the health interdependence between developed and developing countries. Thus, for instance, large migrations from the South to the North may increase human settlements in poor areas without adequate sanitation and access to safe water (e.g. suburban areas in large Northern towns), augmenting the consequent risks of contagion throughout the Northern population. The worldwide diffusion of AIDS (apparently originated in Western Africa in the 1930s) and the transmission of multi-drug resistant tuberculosis from poor to rich countries provide other important examples of how low health conditions of the poor can have negative spill-over effects on the health status of the rich. The outbreak of SARS and avian flu are other recent examples. As these examples show, inequality tends to strengthen the health interdependence between developed and developing countries. In a globalized world, in fact, the health of a country crucially depends on infectious diseases that are bred by poverty in some far-distant country (Sandler and Arce, 2002).⁸⁵

Globalization has also a direct health effect through the consequences that international agreements can have on the health of the populations involved (Woodward *et al.*, 2001). The international agreements on food security standards and on the use of GMO, for instance, can have large positive as well as negative impacts on public health. These agreements pose important trade-offs between conflicting interests. The food security standards imposed by some developed countries, in fact, can protect the health of their inhabitants. The imposition of these standards, however, may come at the cost of reducing the exports of developing countries. If so, low-income countries might become even poorer, with a consequent negative impact on their average health and on inequality between countries. Similarly, the adoption of GMO poses a delicate trade-off between the need to feed an ever-increasing population in the developing countries (that have the highest rates of demographic growth) and the unknown consequences that GMO might cause to their population in terms of health risks and variability of the agricultural production.

The recent agreements on TRIPS provide another example of how the governance of globalization can directly affect public health. Even in this case, a trade-off arises between the need to promote research in health technologies (that generally takes place in developed countries) and the need to protect public health in developing countries that

cannot afford high-costs medicaments. The "Declaration on the TRIPS agreements and public health" promulgated at the WTO meeting in Doha in November 2001 tried to find a compromise solution between the opposite interests of developed and developing countries in this field. While reaffirming the commitment of the WTO members to the TRIPS agreement, the Declaration recognized that each member has the right to grant compulsory pharmaceutical licenses in case of national public health crises, especially those resulting from Human Immunodeficiency Virus (HIV) or AIDS, tuberculosis, malaria and other epidemics that afflict many developing countries. Most of these countries, however, were unable to make effective use of this right since they had no manufacturing capacities in the pharmaceutical sector and wanted therefore to be allowed to import the necessary pharmaceutical medicaments from countries that can sell them at low costs. This request caused a lively debate between developed and developing countries that have reached an agreement on this issue only after several months in Geneva (August 2003). During this long bargaining process, Brazil has asked for WHO to be involved in the negotiations to safeguard its own interests, which further confirms that global governance and public health are strictly intertwined.

The international agreements on labor standards represent another important case of global governance that can affect public health, particularly in developing countries. The possible existence of "sweatshops" working for some multinational corporations in developing countries and the use of children in their production process have recently attracted much attention in public opinion. The actual extension of this phenomenon is still the object of debate.⁸⁶ Some legitimate concerns exist, however, on the potential impact that these labor conditions might have on population health in developing countries. The exploitation of adults and children in unhealthy labor conditions could breed diseases among the poor in the developing countries and thus deteriorate health in these countries. If so, this would tend to raise inequality both within developing countries and across countries. On the other hand, one must be aware that imposing in the South the same labor standards of the North might increase labor costs in developing countries and reduce the incentive of Northern enterprises to invest in these countries. As the other international agreements mentioned above, therefore, also those on labor standards might generate a trade-off in developing countries between better health from higher labor standards and lower income (thus possibly lower health) from a reduction in investments.

Another channel through which global governance can directly affect public health is given by the international environmental agreements. The reduction in CO₂ emissions promoted by the Kyoto agreements, for instance, would largely benefit the health of the world population, regardless of where this reduction occurs. However, if the environmental policies required by the Kyoto Protocol had recessive effects, cutting CO₂ emissions might come at the cost of a reduction in per capita income and thus also of the average health conditions. Moreover, if the implementation of the Kyoto Protocol increases the costs of production of the firms that operate in developed countries, these might shift their polluting activities from the North to the South with potential negative effects on the health conditions of the population living in developing countries. If so, like in the cases examined above, the adoption of the international environmental agreements in the North might generate a trade-off in the South between better health (from lower CO₂ emissions at the world level) and lower health (from higher concentration of polluting activities in developing countries). Although the “pollution haven hypothesis” has found little empirical support so far, one cannot deny that such a displacement of polluting activities has occurred in a few deplorable cases and could occur in the future, particularly if the environmental costs of production were to increase substantially.⁸⁷

A deeper analysis of the economic and social implications of these international agreements goes beyond the scope of the present work.⁸⁸ These few examples, however, although largely incomplete, can help to clarify the strict linkage between globalization, health and inequality across countries. In all these examples, in fact, the governance of globalization and its direct impact on public health raises potential trade-offs and conflicts of interests between the North and South of the world that are likely to increase, the higher is the level of inequality across countries.