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Sustainable Globalisation

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Abstract - Though the recent process of globalisation of international markets succeeded in sustaining the economic growth of the countries that actively participated in this process, the available empirical evidence suggests that it was accompanied by a world-wide increase of environmental degradation and economic inequality. Therefore, there is a growing concern that these features of the globalisation process may jeopardise its social and environmental sustainability.

Both environmental and social dimensions of sustainability played a central role in the definition of sustainable development as originally suggested by the Brundtland Commission. The ensuing literature, however, focused almost exclusively on the environmental aspects of sustainability.

This paper intends to develop the original, more comprehensive, approach to sustainable development in order to get a deeper understanding of the role that globalisation played and could play in achieving social and environmental sustainability. In particular, it is here investigated how the process of globalisation may affect the relationship between per capita income on one side and inequality (Kuznets curve) or environmental deterioration (environmental Kuznets curve) on the other side.

From the analysis carried forward in the paper, some remarks are drawn on a few basic conditions for sustainable globalisation.

Keywords: globalisation, sustainable development, inequality, environment, Kuznets curve, environmental Kuznets curve.

JEL Classification: F02, F18, F43, O13, O15

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1 Introduction

World markets have become more and more integrated in the last decades. This process, that started long ago (at least since the Industrial Revolution), has experienced a strong acceleration in recent years by profiting of new ICT infrastructures such as TV channels, communication satellites, Internet and so on. The available empirical evidence, however, seems to suggest that the rapid growth of global markets has been accompanied by a world-wide increase of inequality and environmental degradation. This trend raises the question whether the process of globalisation may jeopardise the social and environmental sustainability of development. As a matter of fact, these two dimensions of sustainability played both a crucial role in the definition of sustainable development as originally suggested by the Brundtland Commission (WCED, 1987, p.43): "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". In this view the concept of sustainable development is based on an ethical principle of equity in the distribution of income, wealth and control of resources between generations that must logically be extended to the distribution within each generation. In the original definition of sustainable development, therefore, inequality and environmental deterioration are conceived as equally important and interdependent obstacles to sustainability that must be removed, or at least mitigated, in order to achieve it. In the ensuing debate on sustainable development, however, the focus concentrated on its environmental aspect as if it were fully independent of the social condition of sustainability.

In this paper we intend to resume the original, more comprehensive, approach to sustainable development to get a deeper understanding of the influence that the recent process of globalisation may have on inequality and environmental deterioration. In particular, it is argued that the positive statistical correlation between the recent process of globalisation on one side, and inequality and environmental deterioration on the other side, is unlikely to be spurious since it may be explained on the basis of specific causal mechanisms. Since both the approach and the theme to which it is applied are very broad, in this paper we only aim to suggest a very preliminary and tentative outline of a conceptual framework that may be

utilised to address these crucial and complex issues in order to clarify which are the basic conditions that could make globalisation sustainable.

The structure of the paper is as follows. Section 2 aims at clarifying the rational foundations of the growing concern for inequality and environmental deterioration, pointing out that similar ethical and economic arguments underlie these two problems. We then analyse in section 3 how globalisation may affect social and environmental sustainability on the basis of a critical survey of the literature on the Kuznets curve and the environmental Kuznets curve. In section 4 we initiate a preliminary exploration of the basic conditions of environmental sustainability trying to clarify the causal constraints underlying the environmental Kuznets curve. In the last section some concluding remarks are tentatively drawn on a few crucial conditions for sustainable globalisation that emerge from the paper.

2 The ethical and economic foundations of sustainability

The recent growing concern for inequality and environmental degradation has sound ethical and economic foundations. From the ethical point of view, the worries for inequality and environmental degradation have a common root in the crucial ethical principle of equal ex ante opportunities for each citizen. Ex post inequality is not necessarily a problem *per se*: in a meritocratic society it is in principle acceptable that more active and productive people have higher rewards. Rich people, however, often had higher opportunities than poor people did (e.g. easier access to higher education), so that the difference in productivity (and earnings) was affected by the difference in initial opportunities. Inequality between citizens, therefore, cannot be light-heartedly accepted when it reflect differences in ex ante opportunities. Similarly, sustainable development should be interpreted in its broadest sense as development that gives "equal opportunities" to all generations. This does not mean that we have to guarantee every generation exactly the same level of income and wealth, but only the same set of initial options (Chichilnisky, 1997, Vercelli, 1997). Both inequality and environmental degradation, therefore, can be criticised from the ethical point of view, as they violate the fundamental equity principle of giving every agent the same opportunities.

The increasing level of inequality and environmental degradation, however, may be a matter of concern also for economic reasons, since both have potential adverse consequences on the performance of an economy. There are compelling theoretical arguments that strongly support the preceding assertion. In particular, the actual performance of a rational agent strictly depends, ceteris paribus, on the extension of her opportunity set. A wider opportunity set may include superior options that improve the utility of the decision-maker as well as her performance. Since inequality often implies a restriction of the opportunity set of the lower part of the distribution of agents, it reduces also their potential contribution to social economic efficiency and wealth. In addition, the condition of equal initial opportunities is a necessary condition for fair competition that implies more efficiency and a better performance for the economy as a whole. It is clear that a constrained opportunity set excludes from market competition people that may have superior specific skills whose exploitation would improve the performance of the market. It is well known that among poor people who could not afford a good education there are potentially excellent scientists, technicians, managers, etc.; no doubt a proper valorisation of these under-exploited resources would improve the efficiency and the performance of the economy. Apart from this general argument, there are further specific reasons for believing that inequality and environmental deterioration may worsen the performance of a market economy.

As several works have pointed out (e.g. Alesina and Perotti, 1996, Benhabib and Rustichini, 1996), high levels of inequality may cause social and political tensions that often have negative effects on income growth.[1] Socio-political unrest, in fact, threatens property rights, and therefore tends to discourage investment in the country. Anger about inequality, moreover, may lead to riots and strikes that tend to reduce the average number of working hours and thus the total production of the economy. It is interesting to note that social tensions of this kind are more likely to rise in a period of recession than of prosperity. When the economy grows, in fact, the poor may be also better off, but in a recession they are likely to suffer relatively

[1] Social and political instability is only one possible way in which inequality may affect economic growth. See Barro (1999) for a discussion of other theoretical effects of inequality on economic growth.

more than the rich. The poor, in fact, lose less money than the rich, but they may lose their jobs. Hence, poverty may somehow enhance the negative effects of inequality on economic growth: the higher the number of the poor and the lower their living conditions, the higher will be their anger about inequality.

Similarly, environmental degradation might have adverse effects on production by increasing workers' health problems and thus reducing their productivity. Ecological degradation, moreover, reduces land productivity in the long run. This may give rise to a "poverty-environment trap" since the poor often rely on natural resources as their only source of income: environmental degradation tends to worsen the conditions of the poor, which -in turn- leads them to exploit natural resources even more to secure their day-to-day survival.

Summing up, both ethical and economic reasons should induce public opinion and policy authorities to worry about social and environmental problems. But does current globalisation enhance these problems, or it potentially lowers them? To answer this question, the next section examines the potential indirect impact of globalisation on inequality and environmental degradation through income growth.

3 Globalisation and the Kuznets curves

After World War II globalisation has experienced an impressive acceleration that stimulated a hot debate on its new features and implications. Empirical evidence suggests that this rapid increase of market integration was correlated with a worldwide increase of inequality and environmental degradation.

Combining inequality within and across countries, Bourguignon and Morrisson (2000) observed that the Theil coefficient of global inequality has risen since 1960. Similar results were found for other measures of inequality: Dikhanov and Ward (2001) found that the Gini coefficient for the world income distribution increased by about 6% between 1988 and 1993. Milanovic (2001), moreover, found a polarisation between those at the top end of the world distribution (with more than $11,500 a year) and those at the bottom (less than $1,500 a year) with relatively few people in between.

A similar long-term correlation between the modern process of globalisation of international markets and environmental degradation is quite evident. Global warming, the thinning of the ozone layer, the loss of biodiversity, the depletion of natural resources, the widespread deforestation and desertification are examples of global environmental deterioration that emerged and worsened while the process of globalisation accelerated after the 2nd World War. We believe that the existence of a general correlation of this kind is quite uncontroversial so that, for the sake of brevity, we do not need to document it here.

The correlation between increasing globalisation of markets on one hand and increasing inequality and environmental degradation on the other hand, however, does not imply neither the existence of a causal nexus between them nor its inevitability. In order to assess these issues it is useful to consider the indirect effects that globalisation may have on inequality and the environment through an increase in per capita income. We consider first the available evidence and then its causal interpretation.

Most recent studies (e.g. Dollar and Kraay 2001, Lindert and Williamson 2001) show compelling empirical evidence that economic growth, and therefore (given the demographic growth) income per capita, increases with the degree of openness. An increase in per capita income, in turn, may have an impact on inequality and environmental deterioration. This point was the object of a long-lasting debate in the literature. Kuznets (1955) was the first to notice a typical pattern in the empirical evidence supporting the hypothesis that inequality tends to increase at early stages of growth and then tends to decrease later on. This inverted-U shaped relationship between per capita income y (measured on the horizontal axis) and income inequality (measured on the vertical axis) was discussed by an extensive literature that called it 'Kuznets curve' (from now on KC).

At the beginning of the 1990s, several empirical studies found a similar bell-shaped relationship between per capita income y and an index of environmental degradation: either D that measures global environmental degradation,[2] or d_y that measures the 'intensity of environmental

[2] We may define D as an index that aggregates the basic environmental conditions of sustainability that jointly measure to what extent pollution exceeds the assimilative capacity of the environment and the exploitation of renewable resources exceeds their natural growth (Atkinson et al., 1999).

degradation' (i.e. environmental degradation per unit of output), or d_p that measures per capita environmental degradation. This curve was called 'environmental Kuznets curve' (from now on EKC) underlining the analogy with the KC.

These two curves taken together seem to suggest prima facie that the process of globalisation may contribute to both social and environmental sustainability in the long run. By increasing per capita income of the participating countries the process of globalisation may help them approach the turning point of the curves and thus eventually reduce inequality and environmental degradation.

The recent literature, however, gives only a very faint and limited support to the hypothesis that the KC and the EKC are sufficiently sound and fairly general empirical regularities.

Both curves were fairly supported by early studies[3] so that they became very popular and were taken by many scholars as established empirical regularities of the economy. Later contributions, however, started to question the evidence in favour of the curves and pointed out possible drawbacks of the empirical analysis. Some authors (Anand and Kanbur, 1993) found that different inequality indices may give different results. The same applies to environmental quality indices: the existence of an EKC found a good support for local air-pollutants (e.g. Grossman 1995, Cole et al., 1997) but not for global pollutants (such as CO_2) that have a limited direct impact on population (Shafik 1994). For water quality the evidence is more mixed, with studies achieving conflicting results on the shape, position and peak of the curve according to the different indicators that have been used.[4] Other authors (Papanek and Kyn 1986, Fishlow 1995) argued that income explains only a small part of the variance of inequality across countries. Similarly, some contributions in the environmental literature (e.g. Unruh and Moomaw, 1998, Kaufman et al., 1998, Suri and Chapman, 1998) have started to question the emphasis on income growth to explain environmental degradation and argued that other explanatory variables should be included in the models beyond per capita income. Several works

[3] See, for instance, Ahluwalia (1976) and Robinson (1976) for the KC, Panayotou (1993) and Shafik (1994) for the EKC.

[4] See Borghesi (1999) for an extensive critical survey on the EKC literature.

(Clarke, 1992, Li, Squire and Zou, 1998), moreover, claimed that the KC applies well to cross-country studies, but not to time-series analysis, therefore it does not necessarily describe the evolution of single countries over time. A similar critique emerges in the environmental literature where the few single country studies currently available on the EKC reach very sceptical results even in the case best supported by cross-country studies (see, for instance, Vincent, 1997). Even if the empirical evidence is consistent with the EKC hypothesis for a category of variables (in terms of D, d_y or d_p), moreover, this does not imply that it is also consistent with it for another category of variables. In particular, if the EKC fits well the relationship between d_p and y, this will imply a linear downward sloping relationship between d_y and y.[5]

From this short survey of the available evidence we may draw the conclusion that it gives only a very limited support to both Kuznets curves.

We have now to consider what causal interpretation may be attributed to the KCs whenever they are corroborated by the empirical evidence.

The main explanation given to both the KC and the EKC curves is based on the growing concern for sustainability exhibited by economic agents when their per capita income is sufficiently high. At low income levels environmental degradation and inequality tend to rise since people are willing to accept increasing environmental degradation and inequality in exchange for higher consumption. However, as individuals achieve higher living standards, they care increasingly more for the quality of the environment and the distributive fairness of the societies they live in. Therefore, in this view, at sufficiently high income levels the government is induced to introduce egalitarian and environmental policies under the pressure of public opinion (e.g. egalitarian movements like trade unions or ecological movements such as green parties or NGOs). This intervention tends to reduce inequality and pollution in the country, thus pushing the economy towards the decreasing portion of the KC and the EKC.

The increasing mobility of information that characterises the current phase of globalisation rapidly spreads images of social injustice and environmental

[5] This point, surprisingly overlooked in the literature so far, can be easily verified by assuming an EKC in d_p (i.e. $d_p = ay + by^2$ where $a>0$, $b<0$) and multiplying both sides of the relationship by $1/y$, which yields: $d_y = a + by$.

disasters that may occur even in much distant countries. This phenomenon, that is likely to make people more aware of world-wide social and ecological problems than in the past, tends to create a "global" pressure of public opinion for intervention in favour of sustainability. It has been noted, in fact, that while most of the people concerned with these issues come from industrialised countries, they express concern for inequality and environmental problems occurring in the South of the world. This "global" pressure might lead to intervene on inequality and environmental degradation at an earlier stage than expected on the basis of the two curves.[6] If so, their turning points may occur at a much lower income level (measured on the x-axis) than it happened with industrialised countries in the past. The turning points, moreover, might also be lower (as measured on the y-axis) since an earlier intervention may prevent inequality and environmental degradation from growing as much as in the past.

Public opinion can influence environmental quality not only through the political system, but also through the market: a concerned consumer demand contributes to shift production and technologies towards less polluting activities, while a concerned saver may prefer ethical funds that channel savings towards investments more consistent with long-run sustainability. This positive impact of globalisation on the environment, however, crucially depends on the actual capacity of globalisation to increase competition that favours the emergence of new consumption and saving options fully consistent with sustainability. If higher concentration comes along with globalisation (as occurs in some sectors), then the previous reasoning might be reversed and environmental-friendly consumers might end up with less opportunities to express their preferences. More in general, empirical evidence suggests that in the last decades the positive causal mechanism based on public opinion pressure was overwhelmed by a few negative causal mechanisms. In the first place, the free circulation of labour, that always exerted a powerful equalising influence, was progressively limited in most countries. On the contrary, the free circulation of capital was in the same period greatly enhanced but, contrary to the theoretical expectations,

[6] Note that "global" public opinion pressure can push Northern governments to help the South. The most recent agreements for implementation of the Kyoto Protocol, for instance, have established that some industrialised countries may bear the burden of introducing ecological policies in developing countries.

this produced a tendency to transfer capitals towards the most developed countries that greatly increased inequality (the so-called 'Lucas paradox'). In the second place, fully deregulated capital markets produced a progressive shortening of the time horizon of economic agents. This brings about an overvaluation of current costs and benefits and an undervaluation of future costs and benefits that tends to bias decisions against sustainability.

In the third place, the regulation of international markets for capital and goods was progressively reduced to their mere de-regulation that was managed, since 1995, by the WTO through procedures considered by many observers insufficiently accountable and participatory (see, e.g. Wallach-Sforza, 1999). This led to the systematic cancellation of many pre-existing constraints to international trade that had been introduced to ensure environmental and social sustainability, even when they had been agreed upon by previous multilateral agreements (ibidem). The interpretation by WTO of environmental, social, humanitarian, and sanitary constraints as non-tariff barriers was in many cases highly questionable and led to the disruptive practice of substituting the pre-existing standards with much looser standards, so triggering a downwards competition between nations.

These and other negative causal mechanisms[7] tended to shift upwards, i.e. in an unfavourable direction, the KCs, or more in general the relationship between per capita income on one side, and inequality and environmental deterioration on the other side. We have to conclude that the negative correlation between globalisation and sustainability does not seem to be a spurious correlation since there are many specific causal mechanisms that may explain it. Therefore, even when we are able to detect a KC or an EKC we cannot rely on them, and therefore indirectly on the process of globalisation, to achieve sustainability. This does not imply, however, that globalisation is necessarily inconsistent with sustainable development since the unsustainability of the recent process of globalisation mainly depends on a dangerous but modifiable mix of structural policy failures in international markets: missing regulation (e.g. for assuring sustainability), indiscriminate deregulation (sweeping away sound sustainability constraints), and

[7] A more detailed analysis in reference to the most recent phase of globalisation may be found in Vercelli (2001)

excessive regulation (keeping unjustified barriers to trade and obstacles to labour mobility).

We have to study, therefore, which are the conditions of sustainable globalisation to orientate our policy interventions. In the next section we intend to move the first tentative steps in this direction.

4 Globalisation and environmental sustainability

In this section we aim at beginning a first tentative exploration of the conditions for environmental sustainability. This may be done only through a thorough identification of the specific causal mechanisms that connect globalisation with sustainable development. In this section we will limit ourselves to a very preliminary causal analysis strictly rooted into the EKC literature.

To this end, we may identify four basic causal mechanisms: technological, economic, demographic and cultural mechanisms. The diffusion of mechanisation since the industrial revolution increased the exploitation of natural resources utilised as inputs in the industrial production, as well as the deterioration of their quality as a consequence of pollution. Afterwards, new waves of technological innovation have raised new environmental problems along with new opportunities for solving them.[8] The ensuing acceleration of economic growth progressively increased the size of industrial activity that determined a progressive environmental deterioration but also in many cases a progressive increase of per capita income. This allowed also a progressive increase in the world population that proved to be a crucial factor of environmental deterioration. Finally, the new cultural values introduced by the industrial revolution and progressively spread all over the world by free markets considered nature as a mere means for satisfying human needs rather than a value in itself as in many pre-industrial cultures.

The logical nexus between these four causal mechanisms may be clarified by means of two elementary identities. The basic identity is the following:

$$(1) \qquad D = P\, y\, d_y$$

where D measures the global environmental degradation,[9] P measures the world population, $y = Y/P$ measures per capita income, and $d_y = D/Y$ measures the intensity of environmental degradation. The last two factors may be summarised by a fourth factor through the following identity:

$$(2) \qquad d_p = y\, d_y$$

where d_p measures per capita environmental deterioration. These two identities define four factors that help to understand the nexus between the four causal mechanisms mentioned above: P represents the demographic factor, y (given P) the economic factor, d_y the technological and cultural factor, and d_p the nexus between the economic factor and the preceding factor. The cultural and technological factors mentioned above are implicit in these aggregate indexes and may be separated and made fully explicit only through a disaggregated analysis that goes beyond the scope of the present paper.

The above identities, by definition, are unfit for a causal analysis but fix important constraints that any causal analysis has to comply with. A proper analysis of this kind could start from an equation of the following kind:

$$(3) \qquad D = aP + by + cd_y + fz$$

where the variables are measured in their logarithms and z represents a vector of relevant exogenous variables, while a, b, c, and f are empirical coefficients.[10]

An empirical causal analysis of this kind requires extensive evidence on the empirical correlations between the above indexes in order to assess to what extent they may be interpreted in genuine causal terms. This empirical background analysis is almost completely absent in the literature. We have to rely, therefore, on the causal analysis of the empirical findings in the Kuznets curves literature, briefly discussed and assessed in the preceding section.

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[8] For the last wave under the heading of New Economy see Vercelli (2001).

[9] See retro note 2.

[10] Although equation (3) is derived from identity (1), the coefficients a, b, c may have a value different from 1 because of the introduction of exogenous factors.

Among the three versions of the EKCs (in terms of d_y, d_p and D) the one in terms of total environmental degradation is the most consistent also in the long run with global sustainability, that is, with sustainability for the earth as a whole.[11] As D increases at least some of the index sooner or later is bound to violate the conditions of environmental sustainability, either because it exceeds the specific assimilative capacity of the environment or because the exploitation of a certain renewable resource exceeds its natural growth. In order to realise a sound process of sustainable globalisation, therefore, total environmental degradation D should not increase over time. To this end we may derive from (1) the following identity:

$$(4) \qquad \dot{D} = \dot{y} + \dot{d}_y + \dot{P}$$

where the dot above each variable indicates the logarithmic derivative (i.e. the rate of growth) of the variable. It is clear from this identity that the global environmental deterioration tends to increase ceteris paribus with per capita income unless the sum of demographic growth and degradation intensity is negative. Therefore, we may set the following condition of long-run global sustainability:

$$(5) \qquad \dot{y} \leq -(\dot{d}_y + \dot{P})$$

In other words, global environmental deterioration does not increase if and only if degradation intensity and/or the demographic growth are sufficiently negative to offset the (ceteris paribus) negative effect of per capita income growth. Since we know that both the world aggregate per capita income and the world population tend to increase within the post-war process of globalisation, the only chance of realising a process of sustainable globalisation relies on a reduction of deterioration intensity sufficient to offset the negative implications of demographic growth and of rising per capita income.

[11] Total environmental degradation, in fact, is what matters when we look at the carrying capacity of the whole planet.

This is what already happens in many countries and economic sectors as a consequence of technological change and cultural evolution that reshape the structure of economic activity in a direction more consistent with economic sustainability. However, the velocity of reduction of degradation intensity is, generally speaking, clearly insufficient to stabilise environmental degradation and must be accelerated through apt policies. These policies would shift downwards, i.e. in a more favourable direction, the relationship between D and y. This may be clarified through equation (3) where D depends on y and

$$aP + cd_y + fz$$

are shift factors.

A reduction of the demographic pressure and/or of the degradation intensity would shift downwards the relationship between D and y.

The relationships examined above may shed some light also on the conditions of sustainable globalisation within a more disaggregated approach. In particular, we may better understand why industrialised countries rather than developing countries seem to follow an EKC. In the industrialised countries demographic growth is about zero, and the technological and cultural mechanisms that tend to reduce degradation intensity may be sufficient –for certain indexes– to reduce aggregate degradation. In the developing countries, on the contrary, demographic growth is typically quite sustained while the reduction of environmental degradation is rather slow for technological and cultural reasons, and this may explain why there is no empirical evidence of a negative correlation between per capita income and environmental deterioration.

We may now try to summarise the main effects of globalisation upon the sustainability of the process of world development. The process of globalisation:

- increases the rate of growth of income and per capita income of the countries that actively participate in this process. This tends to increase ceteris paribus the environmental deterioration in these countries and at global level.
- spreads the technological knowledge and know-how of the most advanced economies and this may contribute to reduce the environmental deterioration intensity.

- spreads the cultural values of the most industrialised countries. This may have negative effects as it may encourage consumerism and an indiscriminate exploitation of natural resources, and positive effects as it may encourage the adoption of measures of demographic control and more concern for the environmental implications of economic activities.

We may conclude that the causal relationship between globalisation and global environmental degradation is quite complex and ambiguous. While so far there was a clear prevalence of negative causal effects for most indexes of environmental degradation, especially in developing countries, it is possible to reinforce the positive effects and reduce at the same time the negative effects of globalisation on the environment through appropriate policies meant to implement a robust process of sustainable globalisation.

5. Concluding remarks on a few basic conditions for sustainable globalisation

In this paper we have considered the impact of the recent process of globalisation on the sustainability of the world development in the light of the literature on the KC and EKC. Though both the KC and the EKC received little empirical support, whenever the KCs are found consistent with the empirical evidence, this seems to suggest prima facie that the process of globalisation may render the world development more sustainable by pushing the world economy towards the decreasing part of the bell-shaped curves, and by shifting the curves downwards. The causal interpretation of the empirical evidence briefly surveyed in the paper, however, seems to be on the whole inconsistent with these optimistic conclusions. In particular:

- The process of globalisation pushes developing countries upwards along the rising part of an hypothetical KC and EKC, i.e. in the direction of diminishing sustainability, while there is often no clear-cut evidence that it is possible to rely on a peak beyond which a healthy descent may start.
- Even when the empirical evidence supports the existence of a peak, this may be reached if and only if the average income growth is higher than the average population growth for a sufficiently long time. Since the average income growth is relatively low in most countries, this implies that their demographic growth must be kept under strict control.

- In developed countries the intensity of environmental deterioration diminishes in many cases, mainly when environmental damages cannot be transferred elsewhere, but this is generally insufficient to diminish also the aggregate value of environmental deterioration.
- The recent evolution of the rules that regulate the globalisation process did not help to corroborate its sustainability. An indiscriminate deregulation of world trade is progressively sweeping away also many environmental and social constraints introduced by international institutions, countries and multilateral agreements. Such deregulation contributed to accelerate the rate of growth of the participant countries but undermined its sustainability.

Summing up, the causal interpretation here sketched of the available empirical evidence suggests that the current globalisation process is eventually unsustainable unless we introduce new institutions and policies able to govern it. In particular, we should both extend and regulate current globalisation to make it sustainable. A further and more coherent extension of international market integration might reduce the income gap between countries and regions that take part to the globalisation process and those excluded from it. In particular, developed countries should remove their trade barriers to the imports from developing countries.[12] This is particularly important in two specific sectors, agriculture and textile industry, that account respectively for about 15 and 20 percent of developing countries' exports, and represent important sources of their economic growth. In addition, developed countries should lower the obstacles to the free circulation of labour that have undermined the equalising effects of free markets for production factors.

A more generalised and consistent deregulation of world trade, however, is insufficient to assure the sustainability of world development. The regulation rules of international markets should be radically reformed by establishing a minimal but efficient active regulation of international markets (Vercelli, 2001). Such regulation should be managed in a non-bureaucratic and accountable way and assure the active and democratic

[12] While some developing world regions (e.g. Eastern Asia, Eastern Europe, Mexico) have increased their market share in the industrialised countries, this share has halved between

participation of all countries to the decision process and its application. In any case, the process of deregulation should preserve and progressively upgrade the environmental and social standards that buttress the sustainability of world development, trying to trigger an upward competition between nations.

The regulation process mentioned above should include among its crucial targets that of coordinating and promoting active policies that strengthen the sustainability of development. Among these policies we may recall here those that promote higher education levels. These policies are extremely important to reduce inequality, particularly in the recent phase of globalisation that is characterised by increasing mobility of information and unparalleled speed of its world-wide diffusion. Inadequate education (e.g. lack of digital know-how) may prevent access to such information and thus also to the opportunities that it creates.[13]

The policy measures briefly mentioned above are just tentative examples of interventions that may contribute to implement the conditions of sustainability that we tried to clarify in the paper. It is our hope that a further clarification of the conditions of sustainable globalisation may help policy makers to agree on a package of measures meant to reform the process of globalisation in the direction of its long-run sustainability. To this end the approach here tentatively sketched must be developed in many directions. First of all, the conditions of sustainable globalisation should integrate in a more satisfactory way the conditions of environmental sustainability with those of social sustainability (that have been here only hinted at). Secondly, the conditions of sustainability must be disaggregated from the sectoral and spatial viewpoint in order to separate and better understand the impact of the technological and cultural evolution. Finally, extensive empirical work should identify all the relevant causal mechanism underlying the influence of globalisation on sustainable world development and give sound estimations of their structural parameters.

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the 1980s and 1990s for the 48 world least developed countries (mainly African and Southern Asiatic countries).

[13] Thus, for instance, people who are not able to use computers or have no access to the world-wide web are excluded from the opportunities that Internet creates. Inequalities in education thus generate unequal access to the new opportunities.

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