
Editorial

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1 Introduction

The recent multidimensional crisis that has affected most of the countries in the world has amplified the process of degradation of work conditions and social fragmentation. In this context, the current challenge consists in promoting *green growth* towards a low-carbon economy. However, making economic growth and development compatible with stabilising climate and with a sustainable environmental footprint will require a drastic shift towards clean development and green, low-carbon economies. This will imply a great transformation of activities as far reaching as the transformation brought about by the so-called Industrial Revolution. This transformation process addresses the critical issue of *quality* with respect to the economic activities, resources and capital goods.

Nowadays, the environmental requirement which was seen as a constraint is viewed as a strategic stake and an economic opportunity. Despite the negative impacts of the 2008 crisis, the green transition process is well underway, as is illustrated by the diversity of sectors (eco-mobility, eco-construction, eco-design, renewable energies, smart grids, etc.) and the variety of economies concerned by the green transition process (emerging countries, industrialised countries and developing countries). This change process requires some conditions. Firstly, it involves technological changes like process innovation but also disruptive innovation (digital research, eco-innovations) stemming from a variety of sectors and disciplines. Secondly, it refers to the substitution of products by services and finally to organisational changes in the production and exchange systems. The low carbon strategy at the organisational level deals with a corporate social responsibility approach orientated towards sustainable development and well-being goals. Social stakes constitute some challenges within the process of green transition when it comes to consider environmental inequalities related to energy issues (precarious energy), pollution issues (professional and health risks), and eco-innovation issues (acceptability, appropriation, use and diffusion). Environmental policies suppose to ensure a consistency in the integration and the articulation between multiple stakes (environmental, social and economic). These aspects lead to address the policy issue for designing and promoting some technological solutions compatible with the preservation of environment, economic growth, well-being and quality of life (Sen, 1985, 1999).

2 Economic growth and the environment: an old dilemma and some new critical issues

The rationale for *green growth* and ‘clean’ development has mostly been presented as a win-win situation for the environment and for economic development. However, the current literature on economic growth and the environment shows that the environmental preservation can be consistent with a sustained economic growth if certain conditions are met.

Modern growth theories (Aghion and Howitt, 2009) show not only that environmental preservation is potentially compatible with positive economic growth but also, and more importantly, that failure to achieve sustainability may become an obstacle to a sustained economic growth. A lack of sustainability may involve several costs to society. In this respect, Lopez and Toman (2006) identify three critical issues:

- 1 the environmental degradation directly impacts the well-being of people, so that the welfare benefits of economic growth can be underestimated
- 2 in countries where growth itself significantly depends on natural resources, ecological deterioration negatively affects economic growth at least over the *medium run*
- 3 for countries where growth is not directly resource-dependent, economic growth may be feasible, at least over the *short run*, but the depreciation of natural capital may, in the *long run*, lead the economy to reach some *critical environmental thresholds*, which would compromise the health of important parts of society (Douguet and Schembri, 2007)

- 4 environmental degradation may imply significant social-equity impacts, since the costs of the environmental degradation are not evenly shared among groups of society.

Moreover, the *qualitative* content of the green growth through the use of technologies and resources implies investment in human resources by enlarging the opportunities for skills formation and training for both higher levels of qualification and low skilled workers. In 2008, a report called 'Towards decent work in a sustainable low-carbon world', published by the International Labor Organization was specifically dedicated to green employment. In this report, green employment is concerned with "a more sustainable economy and society to preserve environment for the present and future generations and to guarantee all to the individuals (...) the conditions of greater equity and integration" (ILO, 2008). Then the green transition to a sustainable development perspective could be achieved only if it guarantees, for the individuals, a *security* and a 'power of resilience' throughout both their professional trajectory and lifelong education gathering both generic and specific skills (Nicolas et al., 2008, 2011). Lifelong education refers to the professional security over time and the reinforcement of the individual *capabilities*. Lifelong education requires an analysis of activities in terms of competences and an assessment of the assets generated by the professional experience translated into both informal and formal activities. Regarding the sustainability issue, the approach of human resources by lifelong education is a common reference to both fair transition and capability of resilience.

In this respect, an economics of quality should question the concept of sustainability by studying the compatibility conditions between environmental preservation and economic development. In 2003, Arrow et al. (2003) defined the concept of sustainability as a non-declining welfare in the future. In this meaning, wealth, which can be considered as a source of welfare, should be maintained over time. Moreover, since the seminal work of Fisher (1906), the notions of capital asset and wealth are intimately related. In the current economic literature on sustainability, four forms of capital assets are identified, all contributing to human welfare through supporting the production of goods and services in the economic process: physical capital, human capital, natural capital and social capital (Barbier and Pearce, 2000; Barbier and Markandya, 2012). Moreover, all four forms of capital also contribute directly to human welfare independently of their contributions through the economic process.

It is then the total capital stock that determines the range of economic opportunities, and thus well-being. Then a country must decide how best to use its capital stock today to increase current economic activities and well-being, and how much it needs to save or accumulate for tomorrow, and for the well-being of future generations. However, it is not simply the aggregate stock of capital that may matter but also its composition, in particular whether present generation is using up one form of capital to meet the needs of today.

As a result, the transition to a green growth regime requires that the nature of the interrelationships between physical, intangible and natural assets, must be questioned. This discussion focuses on three guidelines in connection with the notion of sustainability: the ability to invest in physical capital; training and employment; trust and reputation. Firstly, the concept of sustainability implies that the path and related limit-conditions of the so-called net adjusted investment in physical capital must be

accurately treated. In addition, this concept allows a glimpse of the dynamics of maintaining and enhancing the reputation as the expression of a form of investment. This issue remains important in light of the recent literature that develops around social responsibility of organisation by defining reputation, derived from the socially responsible investment, like an intangible asset, then it can be shown that the philanthropic behaviour is not always the expression of a gift, but that of an activity subject to the requirement of economic efficiency (Sugden, 1982).

Moreover, structural transformations linked with the transition to a green and inclusive growth regime should also require a particular attention with reference to the interactions between employment, environmental preservation and growth. In effect, green transition implies substantial changes in jobs, human resources and skills formation of the workforce. This transition can be viewed as a *creative destruction process* which refers to an approach more inclusive and multidimensional of the deep transformations affecting the systems. The transition process associated with the endogenous character of the mutation contributes to question the content of the potential development paths.

In this special issue, Adjo Amekudzi, Meleckidzedek Khayesi and C. Jotin Khisty develop an interdisciplinary framework to evaluate risks and opportunities in relation to the notion of sustainability. They assess the *sustainable development footprint* for 35 different countries by measuring the capital composition of these countries.

At the organisational level, the mutation implies to integrate some principles of social corporate responsibility (whose guidelines are set by ISO 14001, ISO 26000) in both decision-making and implementation strategies (Kitzmueller and Shimshack, 2012): respect for human rights, i.e. elimination of all forms of discrimination and child labour (Ballet et al., 2013), relations and working conditions (working practices, social dialogue, working conditions, safety, health, human capital development and skills), environment (prevention and pollution reduction, sustainable use of resources), ethical practices (trust, transparency, socially responsible investment), sustainable consumption, (awareness and consumer education, improvement of living conditions, reducing social inequalities), local development (planning, development, etc.). The issue of environmental, economic and social performance (Friedman, 1970; Ambec and Lanoie, 2008) is a set of reflections about the valuation of assets and sustainability.

In this perspective, Yan Zhu focuses on social corporate responsibility in China. The author precisely identifies the possible causes inhibiting Chinese companies from sustainable development. The analysis is based on a survey conducted among business managers in South China. The latter shows that some cultural factors like Confucianism and some institutional barriers are the key inhibiting factors in building sustainable organisations in China.

3 The investments in the so-called backbone assets and the provision of public goods

Green transition to a new regime of economic growth requires investments in backbone assets, i.e. infrastructures and other forms of capital good on which additional investments can be made for manufacturing and delivering goods and services. These backbone assets can reveal the same properties as public goods or allow their production. Consequently, the underinvestment in these backbone assets can be considered as a cause

of environmental degradation and a failure to promote and implement a green growth regime. Since in many respects the environment can be defined as a public good, the low priority assigned by governments to supply public goods involves a tendency to both exhaust natural resources and deteriorate the assimilative capacity of the environment. Moreover, Lopez and Toman (2006) report that weaknesses in legal systems and financial markets, underinvestment in human and social forms of capital, corruption and rent-seeking behaviour often exacerbate the failure to achieve sustainability. They are treated as complementary issues.

As noted by these authors, human capital appears to be another important non-environmental under-supplied collective good. The literature shows high and persistent rates of return over time for investment in education, R&D, and other forms of human capital and knowledge-enhancing investments. However, we do argue that the underinvestment in human capital may significantly affect the potential for sustainability. As discussed earlier, structural change linked with the transition to a green and inclusive growth regime, is one of the most important factor for sustainability. A large amount of clean inputs and the production of clean outputs are generally knowledge and human-capital intensive. Moreover, this structural change can be delayed by the slowness of investments in human capital and related knowledge assets.

This potential can be impacted not only by the insufficient provision of public goods but also by the *composition* of public goods provided by the governments. In this respect, the composition of public goods tends to give priority to large physical infrastructure (roads, dams, etc.) while neglecting social collective goods, such as welfare and social-security services. These choices in terms of investments, and thus of public goods composition, also relate to the question of the substitutability between environmental and non-environmental forms of capital that provide public goods.

In this context, Emna Omri, Nouri Chtourou and Damien Bazin analyse the concept of 'green recovery' with respect to the current economic crisis that should be grasped by governments as an opportunity to reduce carbon dependency and put economies on a path of green growth. The main aim of their article is to review a selection of responses to the double crisis by international institutions and to focus on the achievements made in the renewable energy sector since the use of fiscal stimulus packages.

At the international level, competition among countries to attract *foreign capital* can be another important motivating factor for such environmental degradation. The literature on the so-called pollution-haven hypothesis is an interesting illustration (Schembri and Petit, 2009). Although there are few studies really showing that subsidies and tax exemptions have indeed played an important role in affecting the location of foreign investment, there is increasing empirical evidence demonstrating that the fiscal costs of these efforts to attract foreign investment are significant. The consequences for host countries that decide to change some of their policies are becoming increasingly more serious.

More precisely, Julien Ciucci, Dominique Prunetti and Marie-Antoinette Maupertuis focus on transboundary pollution and trade by using the new economic geography approach. They examine how environmental damage could act as a spreading or an agglomeration force. They provide an extension of the core-periphery model by examining some new stable equilibrium configurations and some partial agglomeration equilibria.

4 The evaluation of investment policies/rules for the transition towards a green and inclusive growth

The economics of quality also refers to the important notions of vulnerability and resilience, which are common in the literature. The notion of vulnerability can be defined as a situation in which the economy cannot make free policy choices or has to make these choices at an economic or political cost which might be collectively unbearable. Then, the problem for policy makers is to compare the implications for economic growth of several policy trajectories with more (or less) *ex ante* actions, in the form of precautionary or preventive strategies, and thus less (or more) levels of reactive or *ex post* adaptation. Whether efforts are concentrated in time or not has implications for *growth* because rapid *transitions* are more difficult to adjust to. Moreover, differences in timing point out to another key notion which can be significant for the comparison of policy trajectories: the notion of *resilience*.

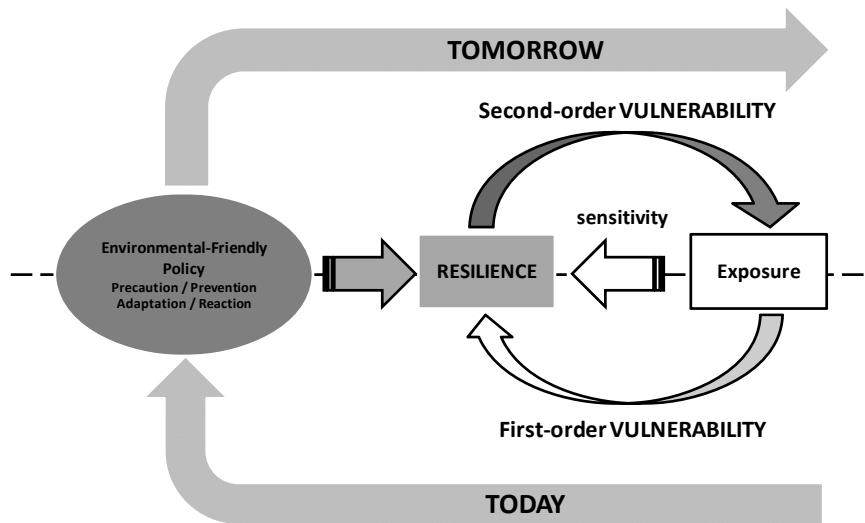
The concept of resilience includes two important features. Firstly, change is not continuous and gradual, but is punctuated by the sudden reorganisation or recomposition of the assets portfolio. This often occurs after long periods of apparent stability, and often after some exogenous perturbation of the corresponding system. Secondly, the latter do not have single equilibria. Indeed, different equilibria define functionally different states of a system and characterise its structure and diversity. Thirdly, the dynamics and stability of systems vary nonlinearly with their scale. In other words, resilience focuses on the properties of the system further away from any stable or asymptotically stable state (Perrings, 1998). In this respect, resilience can be defined as a measure of the perturbation that can be absorbed before the system crosses an unstable manifold, and converges on another equilibrium state. It is interesting to note that measure of resilience is then defined both for an initial state (*history-dependence*) and for a specific direction of change (*path-dependence*). It follows that the closer the system is to the limits of local stability, the less resilient it is to perturbation in the direction of the local stability's boundaries. With reference to the notions of sustainability and green growth, the first point to make is that resilience appears as a property of the joint dynamics of both natural capital and man-made capital. This joint dynamics can be predictable only if the system retains its resilience. However, the so-called development process through the conversion of natural capital and the accumulation of man-made capital moves the system away from such stable equilibria, towards the boundaries of the surrounding basin. The new equilibrium can still respect the requirement for sustainability, while becoming unstable and thus losing resilience (Perrings, 1998, 2006).

This property is interesting when we focus on climate or more generally environmental-friendly policies. In dynamic systems theory, we refer to dynamic systems under hysteresis and the so-called *transition phase* that occurs when the parameters describing the relevant forces of the system pass across some *critical thresholds*. In this respect, the issue of the multiplicity of equilibria and the associated endogenous pollution emissions pathways matter as the determinants of the policy burden. The short run development choices can create *long-term lock-ins*, such as the type of energy infrastructure to invest in (Shukla, 2006). These choices have a significant impact on energy trends, social progress and environmental quality. They can appear as efficient with respect to short run problems, reducing the current vulnerability and strengthening the resilience of the country. However, in the long run, these policy choices might appear

as obstacles for an efficient response to new problems in relation to a changing context over time.

Clearly, an economics of quality should deeply study the nature of the dynamic interactions between vulnerability and resilience, taking into account the conditions for a *coincidence of the time frame* for addressing environmental degradation, economic development and sustainability.

Figure 1 Economics of quality and the dynamic interactions between vulnerability and resilience



Source: The authors

In this respect, the special issue focuses on energy infrastructure choices that would allow an economy to be more resilient with respect to potential crises or shocks, but can also create lock-ins for how human, technological and physical capital is deployed. The *lock-in* generates *path dependence*, which is latent in the short-run. However, in the long-run, the change initiated by these policy choices becomes more obvious. Then it can be too late and expensive to shift from the current path to another. In other words, environmental-friendly infrastructure choices are feasible in these countries that are presently creating the backbones. However, if they take time to align infrastructure choices towards low energy intensity and environmental-friendly pathway, this delay could create adverse lock-ins in the future.

In this perspective, Mouez Fodha studies the long-term consequences of nuclear waste storage within a general equilibrium framework. The objective of his article consists in determining the conditions for which the storage of waste, and thus the transfer of externalities towards the future, can be optimal. These conditions could explain the implementation of intergenerational externalities, justifying an intertemporal not in my back yard behaviour.

By taking the critical issue of the so-called Dutch disease in relation to the exploitation of natural resources, Benedetto Rocchi, Chiara Landi, Gianluca Stefani, Severino Romano and Mario Cozzi focus on the oil extraction issue in Italy (Basilicata Region). The article consists in evaluating the socio-economic impacts of the allocation of royalties from oil extraction on regional development. The authors stress on growth as

well as on equity impacts of the allocation of royalties and on the consequences in terms of competitiveness of the regional economic system.

References

- Aghion, P. and Howitt, P. (2009) *The Economics of Growth*, Massachusetts Institute of Technology, Cambridge, USA.
- Ambec, S. and Lanoie, P. (2008) 'Does it pay to be green? A systematic overview', *Academy of Management Perspectives*, Vol. 22, No. 4, pp.45–62.
- Arrow, K., Dasgupta, P. and Mäler, K-G. (2003) 'Evaluating projects and assessing sustainable development in imperfect economies, environmental & resource economics', *European Association of Environmental and Resource Economists*, December, Vol. 26, No. 4, pp.647–685.
- Ballet, J., Bhukuth, A. and Radja, K. (2013) 'Street boys and girls: a case study in Mauritania', *Child Abuse Review*, Vol. 22, No. 6, pp.398–407.
- Barbier, E. and Markandya, A. (2012) *A New Blueprint for a Green Economy*, Earthscan, Routledge, London, UK.
- Barbier, E. and Pearce, D. (2000) *Blueprint for a Sustainable Economy*, Earthscan, Routledge, London, UK.
- Douguet, J-M. and Schembri, P. (2007) 'Sustainable agriculture and water quality control: a structural approach', *International Journal of Sustainable Development*, Vol. 9, No. 2, pp.246–276.
- Fisher, I. (1906) *The Nature of Capital and Income*, Cosimo Publication (2007), New York.
- Friedman, M. (1970) 'The social responsibility of business is to increase its profits', *The New York Times Magazine*, 13 September.
- International Labor Organization (ILO) (2008) *Green Jobs: Towards Decent Work in a Sustainable Low-Carbon World*, Report, Geneva.
- Kitzmueller, M. and Shimshack, J. (2012) 'Economic perspectives on corporate social responsibility', *Journal of Economic Literature*, Vol. 50, No. 1, pp.51–84.
- Lopez, R. and Toman, M. (Eds.) (2006) 'Sustainable development: towards a broader policy agenda', in *Economic Development & Environmental Sustainability*, Oxford University Press, Oxford, UK.
- Nicolas, A., Radja, K. and Schembri, P. (2008) 'Which professionalizing education programmes for which sustainable development?', *Industry and Higher Education*, June, pp.161–167.
- Nicolas, A., Radja, K. and Schembri, P. (2011) 'Vulnerability and training-employment relationship: the French case', *Journal of Qualification*, June, EUCEN, CEDEFOP, European Union.
- Perrings, C. (1998) 'Resilience in the dynamics of economy-environment systems', *Environmental and Resource Economics*, Vol. 11, Nos. 3–4, pp.503–520, Kluwer Academic Publisher.
- Perrings, C. (2006) 'Resilience and sustainable development', *Environment and Development Economics*, Vol. 11, No. 4, pp.417–427, Cambridge University Press.
- Schembri, P. and Petit, O. (2009) 'Clean technology transfers and north-south technological gap: an important issue for environmental policies', *International Economics*, Vol. 120, No. 4, pp.109–130.
- Sen, A. (1985) *Commodities and Capabilities*, Oxford India Paperbacks, New Delhi, India.
- Sen, A. (1999) *Development as Freedom*, Oxford University Press, Oxford.
- Shukla, P.R. (2006) 'India's GHG emission scenarios: aligning development and stabilization paths', *Current Science*, Vol. 90, No. 3, pp.384–395.
- Sugden, P. (1982) 'On the economics of philanthropy', *Economic Journal*, Vol. 92, No. 366, pp.341–350.