Heterodox environmental economics: theoretical strands in search of a paradigm

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1. Foreword

This Special Issue is composed of papers that start from different theoretical points of view and yet share a critical approach to the conceptual foundations of standard[1] environmental economics and policy. Do their Authors agree in considering their work as a contribution to "heterodox environmental economics"? I do not know. I only know that they kindly accepted to submit a paper to a Special Issue about this subject.

Heterodox environmental economics is mainly based on non-mainstream economic theories; in particular it refers to two classic strands of economics (and to their recent revival and cross-fertilization): institutional economics and Schumpeterian economics. Heterodox environmental economics is therefore part of the economic discipline and it does not have the ambition – as is the case of ecological economics – to bring a "common perspective that 'transcend' those that are standard in the two disciplines [economics and ecology]" (Stagl and Commons, 2005, p. 5). At the same time – and unlike mainstream environmental economics – heterodox environmental economics benefits largely from results coming from other social disciplines and from natural sciences. This is why some of the contributors to this Special Issue are economists and some others are not.

This introduction is mainly aimed at trying to answer to the following questions. Has heterodox environmental economics already become a paradigm? Is it possible to find a coherent set of theoretical concepts upon which such a paradigm is founded? Does a

[1] Standard, mainstream and orthodox are used here as synonymous attributes of economics.

community of researchers who share a heuristic and problem-solving approach exist? Or should we conclude that heterodox environmental economics is still nothing but an intersection between different disciplines or, at best, a bunch of theoretical strands making use of common concepts and visions ?

Before answering, we will analyse the distinctive features of orthodox environmental economics; then we will briefly show how non-mainstream economics deals with environmental matters.

1. Orthodox environmental economics is market-centred and static

Orthodox environmental economics considers the environment as a major source of market failures, both because most environmental resources should be considered as public or common goods and because most economic activities generate negative environmental externalities. After Coase's seminal theoretical work one should add another cause of market failures: environmental externalities are often generated by the missing or inadequate attribution of property rights on environmental resources. Whether it proposes green taxes, marketable emission permits or new environmental markets – the only aim of orthodox environmental policy is to restore the market functioning by removing those imperfections (Baumol and Oates, 1988). This means that the spontaneous interaction of selfish individuals offering and demanding goods and services is implicitly considered by orthodox environmental economics as the optimum economic and environmental mechanism. In other words: orthodox environmental economics is market-centred.

Deepening the analysis of orthodox environmental economics, another relevant feature appears. Economic incentives – both those spontaneously emerging from the market and those artificially induced by environmental policy – stimulate economic agents, not

only to establish the optimum level of their activities, but also to adopt the technology which maximizes net economic and environmental benefits. But this is possible only if all economic agents are perfectly informed about technological alternatives that are already developed and ready to be adopted. In such a vision innovation becomes nothing but the search for economic and environmental efficiency: technological expectations are always confirmed ex-post and there is no room for strong uncertainty; more exactly, technology is exogenous and the market is always in equilibrium (Amendola and Gaffard, 1988).

The equilibrium approach is strengthened by the way orthodox environmental economics deals with institutions and preferences: consistently with neoclassical economics, both are exogenous too. Environmentally relevant changes in institutions and preferences do not come out of the market: they are the result of processes that are not considered into the analysis. Things seem to change when orthodox environmental economics meets new institutional economics. Starting from Williamson's re-discovering of seminal contributions from Coase, institutions are no longer completely exogenous: they depend both on exogenous variables (such as individual preferences and power relationships) and on market-derived transaction costs. Thus, even after this last theoretical update, orthodox environmental economics remains market-centred and static.

2. Non-mainstream economics and the environment

The market-centred and static approach of orthodox environmental economics has been criticized by non-mainstream economics, in particular by institutional economics and evolutionary theories of innovation.

2.1. Institutional economics and the environment

Institutional economics[2] dates back to Veblen's and Commons' contributions and it is today experiencing a revival, mainly due to North's studies (Vanderberg, 2002). In this theoretical approach, studying the processes of institutional conservation, innovation and change is crucial to understanding the functioning of the economy. Institutions are not exogenous, nor they derive from the market; institutions co-evolve with other endogenous variables (such as values, individual preferences and power relationships) and the market is just one institution among others (Hodgson, 2000). Moreover, "markets and other economic institutions do more than allocate goods and services: they also influence the evolution of values, tastes, and personalities" (Bowles, 1998: p. 75). A perverse effect of the endogenous change of motivations and preferences is that altruistic and cooperative attitudes can be "crowded out" by a cultural environment biased towards selfish attitudes; policies are affected too, given that individual responsibility may be driven away by economic incentives (Bazin et al., 2004; Bowles, 2008; Frey, 1997).

Institutional economists deeply and thoroughly criticize the spontaneous order and market failure metaphors that are at the heart of orthodox environmental economics (Bromley, 1998 and 2007; Gowdy, 2004 and 2005). In particular, the very weak (if not illogical) conceptual foundations of the standard treatment of both environmental externalities and internalization policies are stressed (Vatn and Bromley, 1997). Starting from Coase's demonstration that externalities are the result of

[2] Institutional economics is sometimes called 'old' institutional economics to avoid any confusion with 'new' institutional economics. Because of its recent revival it is also called 'classical' institutional economics or 'alternative' institutional economics. Here we will simply call it 'institutional economics'.

interdependencies that are not compensated in the market because of transaction costs, Calabresi (1991) shows that any public intervention aimed at reducing externalities and/or transaction costs will give place to redistributive effects[3]. This means that the Pigouvian distinction between allocative and distributive effects of environmental policies is false and that conflicts about environmental resources will not find an optimal solution through standard welfare economics (Paavola, 2007).

Institutional economics is also having a significant influence on two theoretical and applied fields of environmental economics: resource regimes and environmental evaluation.

Resource regimes are institutional structures established to regulate access to resources and their use; obviously they are very important in the case of local and global natural commons (Vatn, 2005: ch. 10). Institutional economics provides a positive and normative approach to resource regimes that goes far beyond the still so influential "tragedy of the commons"; indeed, in spite of Hardin's analysis, open access and private ownership should not be considered as the only alternative regimes: collective property is to be included too, in the form of both common and state property (McCay, 2002; Ostrom, 1990)[4]. But the re-conceptualization of resource regimes is carried further: property entitlement is just one of the many endogenous elements (others being: basic values and preferences, powers and interests, transaction costs, etc.) of evolving environmental governance solutions (Paavola, 2007). Arguments in favour of a multi-level and cooperative institutional setting – able to combine international agreements,

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[3] In addition, Vatn and Bromley (1997) highlight that externalities are – by definition – the result of interdependencies, nevertheless they are used in a theoretical and political framework where it is assumed that agents behave independently.

[4] Once and for all the community of social scientists should acknowledge what Hardin wrote thirty years after his seminal paper: "To judge from the critical literature, the weightiest mistake in my synthesizing paper was the omission of the modifying adjective 'unmanaged'. In correcting this omission, one can generalize the practical conclusion in this way: A 'managed commons' describes either socialism or the privatism of free enterprise. Either one may work; either one may fail: 'The devil is in the details'. But with an unmanaged commons, you can forget about the devil: As overuse of resources reduces carrying capacity, ruin is inevitable. With this modification firmly in place, 'The Tragedy of the Commons' is well tailored for further interdisciplinary syntheses." (Hardin, 1998: p. 683)

global communication and citizens' involvement – are emphasized when looking for an effective way of governing global environmental issues (Vatn, 2007).

Institutional economics considers environmental evaluation as an institution too: a "value articulating institution" that is conditioned by the incommensurability of conflicting values (Vatn, 2005: ch. 11 and 12). This is why multidimensional tools (such as multi-criteria analysis) should be preferred to monetary ones (such as cost-benefit analysis). Moreover, deliberation – i.e. allowing some form of direct participation of citizens, stakeholders and experts – is to be included into the evaluation procedure, both to ease the mutual understanding between involved parties and to avoid the risk that powerful interests "capture" "black-box" evaluation techniques. These considerations have led to the diffusion of participated multi-criteria procedures, that is, using some form of collective deliberation to open up the policy debate, and a multi-criteria technique to close it and to arrive at final recommendations (Stagl, 2007).

Summing up, one should say that institutional economics considers both resource regimes and environmental evaluation as institutions which, if well set, may effectively manage distributional conflicts about environmental matters, by facilitating collective learning and sharing.

2.2. Evolutionary theories of innovation and the environment

Joseph Schumpeter founded his economic theory on the Darwinian metaphor of the innovation-driven variation and selection of heterogeneous firms. Evolutionary theories of innovation start from here to elaborate a new conceptualisation of the technology-economy relationship that one may roughly summarize in three points (Freeman, 1982; Lundvall, 1992; Nelson and Winter, 1982; Silverberg et al., 1988): 1) Technology, firms' performances and market structure are all endogenous features of genuinely

dynamic incremental innovation processes. 2) Incremental innovation processes take place through a network of relationships involving not only firms, but also other actors, such as: research centres, universities, financial institutions, public bodies, etc. 3) Cumulative and systemic learning processes are at the heart of technological and economic path-dependence and lock-in phenomena; unlocking can take place only as a result of radical innovation processes which involve technological and economic variables.

Such a conceptualization is applied to environmental matters too (Kemp and Soete, 1991; Berkhout, 2002): unsustainable technologies are the result of lock-in in existing techno-economical systems[5]. The lock-in explanation is considered valid for energy (Jacobsson and Lauber, 2006), mobility (Hoogma et al., 2002) and – in a more general way – for high-carbon technologies (Unruh, 2002). New – and more sustainable – technologies will only emerge as the result of unlocking: i.e. of a radical shift into a new system (Sartorius, 2006). These considerations have a relevant normative side-effect: the standard comparison of environmental policy tools is no longer valid because of its static-bias; every tool is to be used if it can ease economically and technologically uncertain transition processes from existing to new systems (Kemp, 1997: ch. 12 and par. 13.4).

More generally speaking, environmental policies take the form of innovation policies aimed at triggering systemic change and at making it viable: technological and economical "niches" must be strategically managed to back the riskier initial steps of promising new "green" systems; cumulative technological and economic learning can be helped by an appropriate combination of technology-push, demand-pull and regulatory policies (Hoogma et al., 2005); monetary and fiscal policies must create a

[5] Techno-economical system and techno-economical regime are synonymous concepts, the former being more used in innovation literature and the latter in its applications to environmental matters. The same applies to the concepts of socio-technical system and regime.

macro-economic "climate" which is able to sustain those public and private investments that are needed to create a new system (Amendola and Gaffard, 1998)[6].

In recent years, different efforts have been made to reconcile institutional economics and evolutionary theories of innovation (Geels, 2004; Nelson, 2002; Pelikan, 2003)[7]. Consistently with these contributions, "socio-technical" systems are considered the result of dynamic processes in which three structural factors co-evolve: technologies, institutions and values (van den Bergh and Stagl, 2003). Such a theoretical integration has a relevant impact on environmental economics and policy too (Smith et al., 2005): on the technological side, where "socio-technical" transitions must be managed to undertake the co-evolution of technical and environmental systems (Kemp and Rotmans, 2005); on the institutional side, where resistance to transition towards more sustainable technologies increase when suppliers of existing systems dominate public agendas (Walker, 2000); and on the environmental side, where a better management of natural resources must be "related to adjustments and adaptations that emerge within the socio-economic systems in terms of altered institutions, technologies, policies, perceptions and behaviours" (Rammel et al., 2007: p. 17).

Summing up: more sustainable "socio-technical" systems will emerge only with an effective management of co-evolutionary processes which involve coherent changes in institutions, technologies and values.

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[6] It must be stressed that – as in any other evolutionary innovation policy – a trade-off is created between "betting" on one single technological option, that could lead to an unprofitable – and irreversible – choice, and the simultaneous opening of several niches, that could lead to an excessive dispersion of resources. Such a trade-off can be effectively managed only trough an adaptive management based on in-itinere monitoring of emerging costs and opportunities (Rammel and van den Bergh, 2003)

[7] Actually institutions were already implicit in Freeman's and Lundvall's studies about innovation processes and national innovation systems. And it should not be forgotten that Schumpeter himself was very much interested in economic institutions (Nelson, 2002).

3. Is heterodox environmental economics already a paradigm?

Yes and no; both answers are valid. From a scientific point of view, heterodox environmental economics is already a paradigm; but from the sociological point of view it is not one yet.

One could give an affirmative answer because some common conceptual foundations are shared by all theoretical strands that we considered here. The main reference is to a multidimensional systemic approach (instead of market-centred) where three sets of endogenous variables (institutions, technologies and values) are explicitly considered to understand the existing environment-economy relationships. Such a co-evolutionary approach (instead of static) is used both to explain unsustainability as the result of socio-technical path-dependence and lock-in phenomena, and to consider environmental policy as the unlocking of existing socio-technical systems and the adaptive management of the transition process towards more sustainable ones. The explicit consideration of powers and interests, the preference for deliberation (instead of evaluation) and the assumption of ethical pluralism (i.e. the coexistence of different motivations to act: altruistic and selfish, cooperative and competitive, etc.) are other relevant conceptual "bricks" of heterodox environmental economics.

At the same time, one could give a negative answer because a community of researchers defining themselves 'heterodox environmental economists' still does not exist. Nevertheless, there are some facts that should be considered to evaluate the social state of the art of the heterodox environmental paradigm: 1) The Dutch 'transition' school and the group of innovation researchers based at the Science and Technology Policy Research Unit (SPRU) of the University of Sussex form a stable scientific network[8]; 2) Still the SPRU has attracted some ecological economists too; 3) Many scholars of the

[8] See also Kemp's paper in this Special Issue.

Dutch-SPRU network have stable scientific connections with institutional economists and with researchers of other disciplines involved with environmental institutional matters. Can these facts be considered as the social core of a nascent paradigm? Time will tell.

I only hope that this Special Issue will contribute to establishing heterodox environmental economics in Italy too.

References

Amendola, M. and Gaffard, J.L. (1988). *The innovative choice: an economic analysis of the dynamics of technology*. Basil Blackwell, Oxford

Amendola, M. and Gaffard, J.L. (1998). *Out of Equilibrium*. Clarendon Press, Oxford

Baumol, W.J. and Oates, W.E.. (1988). *The theory of environmental policy (2nd)*. Cambridge University Press, Cambridge (UK)

Bazin, D., Ballet, J., Lioui, A. and Touahri, D. (2007). *Green Taxation and Individual Responsibility*. Ecological Economic 63 (4), 732-739

Berkhout, F. (2002). *Technological regimes, path dependency and the environment*. Global Environmental Change 12, 1–4

Bowles, S. (1998). *Endogenous Preferences: The Cultural Consequences of Markets and other Economic Institutions*. Journal of Economic Literature 36 (March), 75-111

Bowles, S. (2008). *Policies Designed for Self-Interested Citizens may Undermine «The Moral Sentiments»: Evidence from Economic Experiments*. Science 320 (June), 1605-1609

Bromley, D.W. (1998). *Searching for sustainability: the poverty of spontaneous order*. Ecological Economics 24, 231-240

Bromley, D.W. (2007). *Environmental regulations and the problem of sustainability: Moving beyond «market failure»*. Ecological Economics 63, 676-683

Calabresi, G. (1991). *The pointlessness of Pareto: carrying Coase further*. Yale Law Journal 100, 1211-1237

Common, M. and Stagl, S. (2005). *Ecological Economics. An Introduction*. Cambridge University Press, Cambridge (UK)

Freeman, C. (1982). *The Economics of Industrial Innovation.* Pinter, London

Frey, B.S. (1997). *A Constitution for Knaves Crowds out Civic Virtues.* The Economic Journal 107 (443), 1043-1053

Geels, F.W. (2004). *From sectoral systems of innovation to socio-technical systems. Insights about dynamics and change from sociology and institutional theory*. Research Policy 33, 897–920

Gowdy, J. (2004). *The Revolution in Welfare Economics and Its Implications for Environmental Evaluation and Policy*. Land Economics 80 (2), 239-257

Gowdy, J. (2005). *Towards a new welfare economics for sustainability*. Ecological Economics 53, 211-222

Hardin, G. (1998). *Extensions of the Tragedy of the Commons*. Science 280 (5364), 682-683

Hodgson, G.M. (2000). *What Is the Essence of Institutional Economics*. Journal of Economic Issues 34 (2), 317-329

Hoogma, R., Kemp, R., Schot, J. And Truffer, B. (2002). *Experimenting for Sustainable Transport: The Approach of Strategic Niche Management*. Routledge, Oxford

Hoogma, R., Weber, M. and Elzen, B. (2005). *Integrated Long-term Strategies to Induce Regime Shifts towards Sustainability: The Approach of Strategic Niche Management*, In: Towards Environmental Innovation Systems, eds Weber, M. and Hemmelskamp, J., Springer-Verlag, Berlin

Jacobsson, S. and Lauber, V. (2006). *The politics and policy of energy system transformation—explaining the German diffusion of renewable energy technology*. Energy Policy 34, 256–276

Kemp, R. (1997). *Environmental Policy and Technical Change: A comparison of the Technological Impact of Policy Instrument*. Edward Elgar, Cheltenham

Kemp, R. And Rotmans, J. (2005). *The management of the co-evolution of technical, environmental and social systems*, In: Towards Environmental Innovation Systems, eds Weber, M. and Hemmelskamp, J., Springer-Verlag, Berlin

Kemp, R. and Soete, L. (1992). *Greening of technological progress*. Futures (June), 437-457

Lundvall, B.A. (ed.) (1992). *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, Pinter, London

McCay, B.J. (2002). *Emergence of Institutions for the Commons: Contexts, Situations and Events*. In: The Drama of the Commons, ed. Olstrom, E., National Academy Press, Washington (DC)

Nelson, R. (2002). *Bringing institutions into evolutionary growth theory.* Journal of Evolutionary Economics 12, 17–28

Nelson, R. and Winter, S. (1982). *An evolutionary theory of economic change.* Harvard University Press, Cambridge (MA)

Ostrom, E. (1990). *Governing the commons. The evolution of institutions for collective action*. Cambridge University Press, Cambridge (UK)

Paavola, J. (2007). *Institutions and environmental governance: A re-conceptualization*. Ecological Economics 63, 93-103

Pelikan, P. (2003). *Bringing institutions into evolutionary economics: another view with links to changes in physical and social technologies*. Journal of Evolutionary Economics 12, 237–258

Rammel, C., Stagl, S and Wilfing, H. (2007). *Managing complex adaptive systems — A co-evolutionary perspective on natural resource management*. Ecological Economics 63, 9-21

Sartorius, C. (2006). *Second-order sustainability – conditions for the development of sustainable innovations in a dynamic environment.* Ecological Economics 58, 268-286

Silverberg, G., Dosi, G., Orsenigo, L. (1988). *Innovation, diversity and diffusion: a self-organization model*. Economic Journal 98, 1032-1054

Smith, S., Stirling, A. and Berkhout, F. (2005). *The governance of sustainable socio-technical transitions*. Research Policy 34, 1491–1510

Stagl, S. (2007). *Emerging Methods for Sustainability Valuation and Appraisal*. Final Report, SDRN - Sustainable Development Research Network

Unruh, G.C. (2002). *Escaping carbon lock-in*. Energy Policy 30, 317–325

van den Bergh, J.C.J.M. and Stagl, S. (2003). *Coevolution of economic behaviour and institutions: towards a theory of institutional change*. Journal of Evolutionary Economics 13, 289–317

Vanderberg, P. (2002), *North's institutionalism and the prospect of combining theoretical approaches.* Cambridge Journal of Economics 26 (2), 217-235

Vatn, A. (2005). *Institutions and the Environment*. Edward Elgar, Cheltenham

Vatn, A. (2007). *Resource regimes and cooperation*. Land Use Policy 24, 624-632

Vatn, A. and Bromley, D.W. (1997). *Externalities – A Market Model Failure.* Environmental and Resource Economics 9, 135–151

Walker, W. (2000). *Entrapment in large technology systems: institutional commitment and power relations*. Research Policy 29, 833–846

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