PAPERS on Economics & Evolution

1106

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The *Papers on Economics and Evolution* are edited by the Evolutionary Economics Group, MPI Jena. For editorial correspondence, please contact: evopapers@econ.mpg.de

ISSN 1430-4716

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Competition as an Ambiguous Discovery Procedure: A Reappraisal of Hayek's Epistemic Market Liberalism

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revised version May 2011

abstract

Epistemic arguments play a significant role in Hayek's defense of market liberalism. His claim that market competition is a discovery procedure that serves the common good is a case in point. The hypothesis of the markets' efficient use of existing knowledge is supplemented by the idea that markets are also most effectively creating new knowledge. However, in his assessment Hayek neglects the role of new technological knowledge. He ignores that the discovery procedure induces not only price and cost competition but also competition by innovations. Thence he overlooks the ambiguity that follows from the unpredictability of the consequences of innovations. This fact is shown to challenge the epistemic foundations and the stringency of Hayek's version of market liberalism.

JEL code: B25, D80, O33, P16, Q55

Keywords: competition, innovation, liberalism, knowledge, self-organization, Hayek

*) Thanks go to Naomi Beck, Junichi Himeno, Stanley Metcalfe, Christian Schubert, Manfred E. Streit, Viktor Vanberg, and Gerhard Wegner for very helpful comments on an earlier draft.

1. Introduction

Among the attempts to formulate a comprehensive liberal political and economic philosophy, the contribution of F.A.Hayek is probably one of the most ambitious ones since J.S.Mill. Hayek revives, and elaborates further, an idea that he traces back to Scottish social philosophy. This is the idea of a spontaneous order of the economy (Hayek 1963, 1967). It focuses on a liberal market regime, i.e. an institutional setting in which the agents are free to contract and can enjoy the fruits of, and have to bear responsibility for, their efforts in the form of private property. Under such a regime, a vast network of voluntary exchanges emerges by which the productive activities of the involved agents are spontaneously coordinated to their mutual advantage. Hayek blends this idea with a much younger intellectual current, namely an evolutionary theory. By this theory he tries to explain the historical success of the "extended order" of the markets with a kind of second order spontaneous emergence hypothesis.

Hayek's elaborate liberal philosophy has its sources in his wide spanning intellectual interests. They result in mutually dependent arguments taken from economics proper, legal philosophy, epistemology, and politics. Attempts to give an encompassing account of Hayek's social philosophy are therefore rare (Kukathas 1990, Gray 1998), and no effort in that direction will be undertaken here. What can more easily be identified are two overarching lines of reasoning in Hayek's rectification of market liberalism: the epistemic line of reasoning and the evolutionary or selectionist line of reasoning.

The evolutionary line of reasoning is based on a theory of natural selection among group or entire economies (if sufficiently homogenous). They compete with each other on the basis of specific sets of rules of conduct. Their rules of conduct are more or less conducive to the emergence of extended markets. Accordingly, they result in different levels of specialization, productivity, and gains from trade, implying a "selection" advantage in terms of economic resources and/or population growth. This line of reasoning occurs at a rather late stage of Hayek's work when he was already in his 60s (Hayek 1971). It has faced considerable opposition, culminating in the verdict that his "bold and radical attempt at a systematic or architectonic comprehensive liberal philosophy fails" (Gray 1993, p.2). Indeed, the underlying group selection hypothesis is presented in a sketchy and not fully articulated form that can be criticized for several reasons (Gray 1998, Vanberg 1986, Hodgson 1991, Witt 2008, Marciano 2009).

In contrast, the epistemic line of reasoning has been challenged much less (see, however, O'Neill 2006). It is more deeply rooted in Hayek's thought and articulated in more detail since his elaboration of the "knowledge problem" (Hayek 1937). His insistence in Hayek (1945) that the activation of distributed individual knowledge and the processing of information is the strength, if not the very epistemic function, of free markets has earned him much approval. Given that socialist planning utterly fails on this account, the epistemic argument was an important contribution to the socialist calculation debate of the time. For Hayek's liberal philosophy it has, however, a much broader relevance.

The epistemic function of the price mechanism is the logical prerequisite for Adam Smith's invisible hand metaphor, i.e. the assertion that, in the market process, individual interests are coordinated spontaneously to result in an unintended order benefitting all. Hayek later associated the invisible hand metaphor with the notion of self-organization. He

claims that the notion was understood by the Scottish moral philosophers long before it was discovered in the sciences as a phenomenon occurring in nature. However, Hayek does not give a full account of the theory of self-organization. It is not clear therefore whether he was fully aware of the implications of this theory for his liberal philosophy. The epistemic line of reasoning in Hayek's rectification of market liberalism still awaits a thorough discussion.

In the present paper some steps in that direction will be undertaken. The focus will be on several problems that become particularly significant in, and can be discussed exemplarily for, Hayek's (1978a) influential paper on competition as a discovery procedure. Unlike his earlier reflections on the coordination of *existing* knowledge that is dispersed in the economy, the focus of that paper is on how the order of the markets accounts for *newly* emerging knowledge. The creation of novelty is indeed a pervasive feature of free markets. But, as will be argued, this fact raises doubts about the stringency of Hayek's version of market liberalism.

The plan of the paper is as follows. Section 2 discusses in more detail the use that society makes of existing knowledge and the generation of new knowledge, both in relation to competition in free markets. Section 3 elaborates on the notion of self-organization in the economy. The notion addresses the interplay of self-regulating processes, represented by processes price and cost competition, and temporarily self-augmenting processes. The latter are shown to correspond to an important part of competition as a discovery procedure, namely innovation competition. But Hayek chooses not to include innovation competition in his reflections. In Section 4 this neglect is argued to result in an unbalanced assessment of the popular quest for "social justice" suggesting redistribution of income generated under a liberal market regime. Hayek takes the quest as a mere camouflage for rent-seeking interests. Once the effects of innovation competition are accounted for, however, a different interpretation arises. Section 5 turns to another implication of innovation competition, and explains how it relates to growing environmental concerns and the "greening" of politics. These developments are sometimes conceived of as a challenge by market liberalism. As will be explained, they indeed imply a dilemma that is difficult to resolve. Section 6 concludes.

2. Different Kinds of Knowledge and Competition

Hayek's (1937) first explicit attempt to address the knowledge problem is firmly rooted in the contemporary theoretical debate in economics on the role of the price mechanism for coordinating free markets. Can competitive price variation bring about a situation in which all economic agents are able to coordinate their individually optimal plans so that they can be realized? This is, of course, the question of whether a general equilibrium will be reached in a competitive process of simultaneous revisions of individual plans in the markets. The neoclassical theory of the time had presupposed an answer to the affirmative. But it had not investigated whether and how the asserted process of convergence to market equilibrium works. Hayek argues that a precondition can be identified that seems necessary (though not sufficient) for attaining an equilibrium. Prices can fulfill the epistemic function of transferring information in the market if, and only if, the agents know the constraints which become binding for them at the currently quoted prices. Accordingly, if the notion of equilibrium is to have any empirical relevance, then this hinges upon how agents obtain and process the knowledge on what become binding for them in equilibrium.

What looks like a prelude to expanding the theory of the price mechanism by empirical hypotheses on individual learning and knowledge acquisition is, however, not followed by anything like that. Instead, Hayek gives his argumentation a turn that is indicative of his politically motivated interest in the knowledge problem (which can indeed be discussed without addressing the empirical conditions of the agents' knowledge acquisition). He makes the connection to the socialist calculation debate in which he and Mises (1936) were the protagonists of market liberalism (albeit putting forth different arguments, see O'Neill 2006; see also Boettke 1998). Referring to that debate, he focuses on the question which organization of the economy – decentralized markets vs. central planning – most efficiently makes use of economically relevant knowledge distributed in society.

A most explicit answer to this question is articulated in Hayek (1945). It is the decentralized system of competitive markets that is more efficient in using the dispersed information (whatever the learning and adjustment processes may be). The reason given is that in decentralized markets relevant information can be activated and processed highly selectively in parallel. This is much more efficient than the centralized information processing that is necessary for an organization of the economy based on central planning. In such an economy all information has to pass the bottleneck of the planning agency before an encompassing plan can be set up and the corresponding prices be calculated (if possible at all).

However, it is not only the lack of efficiency in information processing that Hayek attacks. From the point of view of his liberal ideals an even more annoying fact is that the different ways of organizing the processing of economic information – centralized or decentralized – also come with a very different answer to whose ends or preferences the use of knowledge is subjected to. Are these the separate ends of the members of society autonomously deciding on their values and purposes in all their variety? Or are these the goals of the central planning agency, in the best case reflecting that agency's views of, and judgements on, individual ends? Needless to say that liberal philosophy would find the latter situation indefensible.

Hayek's focus in these earlier reflections is on information contained in, and conveyed through, competitive prices. He deals foremost with scarcity of resources and comparative advantages in making productive use of them. The dispersed knowledge thus activated and used is the knowledge that already exists in society. But the very process of price and cost competition forcing adjustments on the market participants also generates new knowledge. In elaborating on the competitive market process as a "discovery procedure" Hayek (1978a) focuses on a particular kind of new knowledge. This is *situational* knowledge about what goes and what does not go. What is discovered is which individual plans can be carried out, given the prevailing scarcity conditions, and which ones must be disappointed. This new knowledge is "situational" in the sense of being specific to the particular adjustment context.

The very idea of discovering knowledge suggests, however, that it is not only situational knowledge that is newly emerging in markets. There is also the possibility of discovering new knowledge about hitherto unknown resources, technologies, products, market outlets, i.e. economically relevant innovations which may be called new *technological* knowledge. Indeed, the very aim of many businesses is to create private knowledge that is good for gaining a competitive advantage by means of new products,

services, technologies, resource, and commercial practices. The result of these parallel efforts is innovation competition in addition to mere price and cost competition. It may be noted in passing that, with its efficient use of dispersed situational knowledge, price and cost competition can rightly been considered an important reason why free markets surpass central planning. Yet, the new technological knowledge coming out of innovation competition may be the even more momentous feature of free markets in the long run.

New technological knowledge and innovations had always been center stage in Schumpeter's writings. In fact, at the time when Hayek published his version of competition as a discovery procedure, innovation competition (or "Schumpeterian competition" as it was then called, see Kamien and Schwartz 1982) had become a hot topic. Nonetheless, Hayek chooses to ignore this essential feature. He explicitly states that he does "not consider .. the undoubted role competition plays in the advance of technological knowledge" (ibid., p. 188). Both his inspiration and his message are still seem pretty much constrained by the socialist calculation debate. With hindsight to that debate his narrow portrayal of competition as a discovery procedure is a new and original way of expressing earlier epistemic concerns. But it does not go beyond that.

3. The Role of Self-Organization in the Economy

Hayek's (1978a) paper on competition as a discovery procedure is based on two lectures which he gave shortly after his tenure at the University of Freiburg in Germany 1962 to 1967. During these years, Hayek had read widely on new developments in systems theory, cybernetics, and the biophysics of self-organization and emergence of order. These readings may have lead him to realize that the spontaneous order arising from the interactions in free markets is a case of "emergence" in the sense of the theory of self-organizing systems by R. Ashby, H. von Foerster, and N. Wiener. Based on this insight, he claimed intellectual precedence for the discovery of the idea of self-organizing systems for Scottish social philosophy: "The 'invisible hand' that regulated prices to a nicety is clearly this idea. In a free market, says Smith in effect, prices are regulated by negative feedback" (Hayek 1978a, p. 184). Thus, Hayek identifies competitive price adjustments with a self-regulating process occurring in the self-organizing system of free markets.

In the light of his grasp of this phenomenon in terms of the generalized theory of self-organizing processes it may come as a surprise, however, that Hayek does not go beyond Smith. He confines himself to reassuring the self-regulation part – price competition – alone. In contrast, the theory of self-organizing systems distinguishes two kind of non-linear dynamic patterns (see Jantsch 1980). One of them are the self-*regulating* processes (negative feedback). The other pattern are temporarily self-*augmenting* processes (positive feedback). The former stabilize given states of order, whereas the latter can destabilize them beyond a critical threshold and are then instrumental in making the transition to new states of order. (In the transition between the old and the new state of order an instability is passed, a phenomenon called phase transition in physics.) These patterns are also present in the economy which is a self-organizing system. This means that there are not only the self-regulating processes of price competition which feed on existing knowledge and generate new situational knowledge. There are also (temporarily) self-augmenting processes. They are represented by what was called innovation competition in the previous section.

When the market participants adjust their economic activities and account for the situational knowledge newly emerging from price and cost competition, this tends to reduce profit margins and to eliminate existing profit opportunities. But agents who have been accustomed to earning profits are likely to look for ways that restore profit opportunities. In the perspective of self-organization theory this attitude explains how, by innovation competition, self-regulating features of the market process may turn into self-augmenting ones. If agents are successful in their search for innovations, new profit opportunities are opened up through new technological knowledge. By way of imitation the new knowledge may diffuse through the economy. If so, the new production technologies and/or goods and services may eventually seize the market, if not giving rise to entirely new markets. This part of economic self-organization, driven by the emergence of new technological knowledge, triggers temporarily de-coordinating effects. By out-competing preceding – now inferior – products, technologies, and resources, innovation competition disrupts the equilibrating tendency of price and cost competition.

In a sense, this is the destructive side of innovation competition, dubbed the "perennial gale creative destruction" by Schumpeter (1942, Chap. 7). It can hit hard the competitors of the innovator(s). This consequence is sometimes characterized by the euphemism of "pecuniary externalities" of innovations. Moreover, by the very fact that innovative products, production processes, and resource uses are new, it is not possible to anticipate all their implications and consequences. They therefore always contain an irreducible risk of turning out to also causing technological externalities in the form of more or less severe damages to health or to the environment. In view of these features, the results of innovation competition may appear concomitants of market liberalism that are not as unambiguously welcome as the results of mere price and cost competition. Hayek decides to ignore them. But they necessitate modifications which will turn out to challenge the substance of his liberal philosophy.

4. "Social Justice" and the Libertarian Puzzle

Consider an economy with by and large free markets. In such an economy, competition and the discovery procedure it implies should result in what is "in some sense a maximum or optimum" (Hayek 1978a, p. 183). Nevertheless, Hayek deplores, public opinion often does not unconditionally approve the results of free market competition. Particularly the resulting distribution of income and the living conditions are often criticized. "Social justice" is claimed to call for corrections, i.e. redistributive government interventions. Now, the notion of "social justice" can be given different meanings. While it is often meant to be a quest for improving the lot of the miserable, Hayek identifies it with something very different. He thinks of a specific kind of rent seeking: "the protection of certain groups against the necessity to descend from the absolute or relative material position which they have for some time enjoyed" (ibid. p. 186, see also Hayek 1976, pp.139-142). [1]

[1] Income redistribution in the name of "social justice" has many times been attacked by Hayek as not being based on a sound notion of justice (see, e.g., Hayek 1976, Chap. 9; 1978b). He claims that such a notion of justice weakens or even destroys the incentives to adopt (the most) modern commercial methods, reduce the ability to invest, and hamper the allocative efficiency of the markets. Hayek's own conception of justice is thus instrumental to satisfying the criterion of maximal productivity. This criterion also underlies his notion of a good society (see, e.g., Hayek 1976, p. 132) and, as Gray (1998, p.158) claims, his entire

To descend in income or status is indeed something which the rules of the game in a free market society imply as a possibility. It is particularly likely to occur as a result of fierce innovation competition. The popularity which the quest for "social justice" often enjoys in public may well be a reaction to being threatened by such decline and its disastrous consequences. To be sure, "social justice" is often also claimed by interest groups as a camouflage for their rent seeking activities – many of them justly nourishing libertarian resentments against "the welfare state". However, in many democracies there is a broad consent endorsing transfer payments. In the name of "social justice" they are meant to protect against, or compensate for, poverty, loss of employment, degrading job qualifications etc. (see Boeri et al. 2001). Such occasions of bad fate often result from "the necessity to descend". If the transfers were merely the result of successful rent seeking activities of comparatively small groups with little voting power, how can it then be explained that in many countries a majority of voters reveal a political preference for them?[2]

Such a preference that corrects, as it were, the results of free markets points to a puzzle for libertarians (see Wegner 2008, Chap.1, and 2009). Procedurally, the exercise of political liberty results in a majority of citizens casting their votes in favor of a legislation that conflicts with what liberalism in Hayek's substantive sense would prescribe (namely the free play of the markets effecting a maximum of welfare). Wegner explains the apparent inconsistency by a failure on the part of the voters to foresee the consequences of their own political choices. In a world of complex political contingencies, imperfect foresight, and low incentives for tracking political processes such an explanation cannot be rejected on a priori grounds. However, if the full range of consequences of innovation competition are acknowledged, quite a different conclusion can be drawn from the observed voting behavior. Voters may then have a specific reason to support such transfer payments. They recognize that, in an innovative economy, they cannot foresee whether they themselves will be the ones who will have to descend as a result of someone else's future innovation.

All evidence shows that innovation competition greatly fosters economic growth. Yet, as a matter of fact, innovation competition regularly also produces losers. It forces some market participants "to descend from the absolute or relative material position which they have for some time enjoyed", to repeat Hayek's words. Specific investments made before the innovation was known may be devalued or even lost. Capital owners may face losses of expected returns. Labor may face losses of expected income from human capital investments. The burden of these negative pecuniary externalities of innovations is distributed very unevenly over the members of society. For the economy as a whole, the gains from innovation competition usually exceed what the competitors lose from pecuniary externality. Nonetheless, this outcome is not unambiguous. The resulting growth of *average* per capita income and a growing income for *all* members of society are two different pairs of shoes.

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political philosophy.

[2] Public choice theory suggests that rent seeking activities of small minorities can succeed because of insufficiencies in the decision making of representative democracies. However, the assumptions entering these explanations do not fit the case where transfer payments are explicitly endorsed by a majority of voters, see Mueller (1989, Chap. 23) for a discussion.

A growing income for all is likely to occur (if at all) only in the longer run – which for some agents may be too late to compensate them for losses they suffer in the meantime. Innovation competition accompanied by pecuniary externalities is therefore not necessarily desirable for everyone. From the point of view of the individual member of society, the benefits have to be assessed against the uncertain prospect of being either on the winner side or on the loser side. The subjective conclusion drawn can be expected to differ, depending on the individuals' risk preferences. If it were possible to insure oneself against the risk of suffering losses from someone else's not yet known innovations, the actual risk preference could be inferred from the demand for insurance policies. Yet, for good reasons, such insurances are not available.

If the assessment is left to democratic voting, the majority decision is likely to be affected by the risk preferences of the voters (Witt and Schubert 2008). Politics can then be expected to come up with alternative proposals which do, or do not, imply restrictions on innovation competition or certain compensations for suffering pecuniary externalities. In this way competition for votes leads to policy measures that account for the actual risk preferences of a majority of voters. A complete ban on innovation competition has high costs in terms of foregone average growth chances in the future. It can be conjectured that it is therefore unlikely to find majority consent. On the other hand, it is also difficult to imagine that a completely libertarian regime (without any compensatory measures) would find majority support in a society, except it is a highly risk-friendly one. [3] Indeed, in many democracies the majority of voters take a middle position. They endorse innovation competition while at the same time showing a rather consistent tendency to support transfer payments and subsidies in case of poverty, loss of employment, degrading job qualifications, etc. (though much less so in case of capital losses). The occurrence of such cases is highly correlated with the pecuniary externalities of large scale innovativeness in an economy.

Transfer payments of this kind are partly tax financed and partly paid out of a compulsory, and usually government run, insurance. These publicly organized forms would not have to be chosen, if there were private insurance markets for threats involved by unknown pecuniary externalities of future innovations. Hayek's neglect of innovation competition seems to blind him to this circumstance and probably explains his one-sided view of the quest for "social justice" as mere rent seeking. In their role as owners of factors of production, voters will be exposed to unpredictable personal outcomes of innovation competition. At least in part, their support for the quest for social justice may reflect a failure of free markets to serve their risk-averse preferences. Where a majority of voters is risk-averse, their voting power enables them to bring the results of market liberalism closer in accordance with their preferences by endorsing welfare transfer payments. [4]

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[3] Historical instances of a complete ban on innovation competition occurred in non-democratic political societies. It basically served there to protect powerful interest groups from the consequences of innovation competition as in the case of the medieval artisan guilds in Europe or in historic India (Jones 1987).

[4] Following a claim already made by some classical liberals, Hayek (1979, pp. 54-56) endorses public assurance of a mere subsistence level, mentioning in particular "those who for various reasons cannot make their living in the market, such as the sick, the old, the physically or mentally defective, the widows and orphans". He refers to broad public support in modern democracies for income transfers in case of such risks. For this restricted

5. Technological Externalities, Individual Autonomy and the Innovation Dilemma

Innovation resulting from competition as a discovery procedure can also cause negative *technological* externalities. While in the case of pecuniary externalities (under freedom of contract) the sum of private gains from an innovation usually exceeds the sum of private losses, this can be dramatically different in the case of negative technological externalities. The social costs can by far exceed the sum of the private gains of the agents who profit from an innovation. [5] Moreover, these excessive costs often only turn out with a considerable time delay. Examples are abundant (Tenner 1996). A paradigmatic case is chlorofluorocarbon gas, a major chemical innovation. It was introduced as a cheap and easy way to process multi-purpose lubricant, refrigerant, fire-extinguishing agent, insulator, and aerosol propellant – not least for hair spray. Only years after its large scale market penetration it turned out to play a crucial role in the Earth's stratospheric ozone layer depletion. It will take years, if not decades, before the ozone layer will recover. By now it also becomes apparent that the gas contributes significantly to the greenhouse effect.

Following Coase (1960), the inevitable threat of yet unknown negative technological externalities of innovations means that there are inherent, irreducible transaction costs. They make private negotiations about the internalization of the social costs impractical. From the epistemic point of view of market liberalism, negotiations between the agent(s) causing an external effect and the agent(s) suffering from it would be the most efficient way of aligning private and social costs in the two parties' decision making. If such negotiations cannot be organized, the implication of the Coase theorem is that government intervention should enforce an internalization of the social costs that comes as close as possible to what the parties would have negotiated. Measures to do so are, for example, cost correcting taxes and/or the creation of quasi-property rights in emission vouchers.

However, in the case of yet unknown consequences of innovations of the kind considered here, these measures do not work. Both theoretical knowledge and past experience provide no sufficient basis for predicting or even quantifying potential future external effects and potential damages. Yet, what cannot be predicted cannot be taxed, traded, or prohibited. (And when the consequences are revealed, substantial damage may already have emerged before the measures are implemented.) Simple as this insight is, it implies a dilemma for market liberalism with respect to the assessment of innovation competition.

The dilemma arises from two basic normative postulates of liberal philosophy formulated already by Mill (1993). The first postulate acknowledges the autonomy of

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set of risks he thus accepts public approval as an argument. In contrast, it has been suggested here, based on a risk preference hypothesis, for the broader set of risks including some of those resulting from unpredictable pecuniary externalities.

[5] The extent to which potential consequences of new products and techniques are unknown hinges on their "degree of novelty" (Witt 2009) that can vary. For example, a simple product differentiation in the form of a new design or of adding a known feature cannot be compared in this respect to the introduction of an entirely new material or a new systemic innovation involving complex interactions between several technologies. For expository convenience the term innovation refer here to new products and techniques of the latter kind.

individual preferences and/or decisions as the constitutive norm of freedom. The second postulate recognizes the need to protect the freedom of others, defined in terms of negative rights, that set limits to individual autonomy. Both postulates together define, and set limits to, the freedom that the members of society can enjoy in face of the omnipresence of potential conflicts of interest (see also Berlin 1969 and Buchanan 1991).

Now consider an agent, a producer say, who discovers a new material or a technology with systemic features. Assume that it is rated a profitable innovation. If an innovator's autonomy of decision making is not constrained, the producer is likely to introduce the innovation. At that point in time it cannot reliably be predicted, however, whether, and if so to what extent, the innovation will cause negative technological externalities in the future. Since, by definition of technological externalities, such damages, if they occur, will not be fully internalized by the innovator, the social costs will exceed the private costs. For all individuals who have not endorsed the innovation, but who will have to bear their share in the social costs, the innovation implies an infringement of their negative rights, if a damage occurs.

On the one hand there is, thus, the liberal value of the individual's autonomy to undertake an innovation. On the other hand, there is the claim to negative rights of others to protect their autonomy from potential, but yet unknown, damages caused by the innovation. Where should the limits of the innovator's autonomy be drawn? If market liberalism is meant to imply that the individual freedom to innovate should be favored, this may in a yet unknown extent infringe upon the freedom of others from being affected by unforeseen damages. If this is to be avoided by strictly guaranteeing the negative rights, innovations (of the kind we are considering here) would factually have to be prohibited. [6] Potential innovators will then be deprived of their autonomy to decide. It is precisely on epistemic grounds that, from the point of view of market liberalism, no *ex ante* decision on how to weigh the conflicting claims can be made.

The dilemma has considerable significance at a time in which large scale environmental stress and degradation, waste, and exhaustion of common resources are increasingly conceived of as massive technological externalities of earlier innovations. In a sense this is the ugly side of large scale innovation competition that has led to technological progress, economic growth, and an unprecedented standard of living for a large fraction of the world population. Hayek's epistemic market liberalism rightly claims the credit for the accomplishments for the competitive market process. However, Hayek fails to recognize the ambiguous nature of competition as a discovery procedure. By choosing to neglect the fact that not only new situational knowledge but also new technological knowledge is generated, the unpredictability of potential future social costs of innovations evades his attention. As in the case of the ignored pecuniary externalities, his unbalanced perception of the discovery procedure induces him to underrate the role of political liberalism also with respect to technological externalities.

If not by discretionary case to case jurisdiction, the innovation dilemma is in practice decided at the political level. Shall the innovator's freedom be constrained *ex ante*, and if so to what extent, to protect the negative rights of others and save them their share in yet

[6] The reason is that the full range of their consequences cannot be predicted and, as Witt (1996) has argued, the incentives to keep down the social costs once a negative external effect is discovered are limited.

unknown social costs of innovations? The answers that are given to this question in the political process differ considerably. In many countries, priority tends to be given to the innovators' liberties at the expense of attenuated negative rights protecting other members of society. However, with the "greening" of politics in several of the more advanced economies a new tendency seems to gain ground. Because of the dilemma that market liberalism faces in regard to innovations, such a tendency cannot be rated incompatible with liberal values. It can rather be taken as an expression of a changing risk preferences prevailing among voters (see Witt and Schubert 2008).

When the assessment of the non-quantifiable externality threats is left to the voters in a democracy, competing proposals can be expected to be launched in the political arena. In this way, political competition tends to approximate the preferences that a majority of voters have with respect to the innovation dilemma. A complete ban on innovation competition has found no majority consent so far. However, the rise of the "green" political movement in recent decades clearly points to an increasing aversion in society against the potential threats of technological externalities arising from systemic innovations such as nuclear power, genetic engineering, deep-sea oil drilling and so on. Market liberals, such as Hayek, may favor different political preferences. However, they cannot contend that liberal values lend normative support exclusively to their preferences.

6. Conclusions

In Hayek's ambitious attempt to formulate an encompassing liberal philosophy, epistemic arguments play a significant role in vindicating market liberalism. It has been shown, however, that his epistemic reasoning is strongly motivated and inspired by the question of whether socialist central planning can work. The results of Hayek's reflections on the role of knowledge in society also do not go beyond what was already up when he took sides with Mises in the socialist calculation debate. When elaborating on competition as a discovery procedure, Hayek extends his views on the coordination of existing, dispersed knowledge to the question of newly emerging knowledge. Yet, he confines his discussion to "situational" knowledge (relating to market opportunities). He neglects "technological" knowledge (relating to new technologies and products) and the much more momentous consequences it has in the long run.

The neglect corresponds to a one-sided account of the competitive process in modern economies. While the beneficial role of price and cost competition is recognized, the role of the more ambiguous innovation competition is ignored. The correlate in Hayek's social philosophy is a characteristic incompleteness in his interpretation of the notion of self-organization. He identifies it with the idea of an unintended, spontaneously emerging order of the markets. This idea deals with self-regulating capacity of the price system in free markets. However, self-organizing systems are in an important way also characterized by self-augmenting processes. These processes temporarily disrupt the self-regulation features. In the economic context these self-augmenting processes express themselves in the destabilizing effects of innovations, ultimately based on the emergence of new technological knowledge. When the disruptive effects are ignored, a problematic part of competition as a discovery procedure, namely innovation competition and its consequences, escape from attention.

As it turned out, the neglect impairs the projected vindication of market liberalism.

Hayek's castigation of the quest for "social justice" as an infringement of the results of free markets is a case in point. With his disregard of innovation competition Hayek misses the point that free markets fail to provide an institutional account the risk preferences prevailing in society. Innovation competition is always connected with pecuniary externalities that represent yet unknown threats for personal wealth and income. In view of these threats a majority of risk-averse members of society may well vote in favor of redistribution measures and political interventions into the markets that are at odds with market liberalism. Hayek's approach offers no explanation for this libertarian puzzle, i.e. the dissent between political and economic liberalism. By recognizing the pitfalls of innovation competition, social security measures and transfer payments become intelligible as a collective insurance solution implemented by majority voting under a liberal political constitution in many countries, *because* free markets fail to provide them on the basis of private insurance contracts.

Probably even more momentous for assessing Hayek's market liberalism is the neglect of potential negative technological externalities of innovations. By their very nature these effects are unpredictable and can therefore not be prevented. They are politically significant in times of environmental concerns and challenges from the "green" movement. It was shown that a dilemma arises in determining whether and to what extent, from the point of view of market liberalism, limitations on innovativeness are adequate or even necessary. On the one hand, there is the immediate liberal value of respecting the innovator's autonomy in deciding on whether or not to introduce an innovation that appears profitable. On the other hand, there is the unpredictability of future social costs of the innovation. It does not allow to pre-specify whether and to what extent the innovator's freedom needs to be constrained by virtue of the negative rights that protect the autonomy of others.

It is precisely for epistemic reasons that market liberalism cannot resolve the dilemma. Under a liberal political constitution, the decision on *ex ante* constraining innovativeness is left to the voters and their risk preferences. In an increasing number of countries the result seems to be the "greening" of politics. When market liberals oppose this tendency this opposition is based on own political preferences rather than liberal values.

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