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Darwinism in Economics and the Evolutionary Theory of Policy-Making

by

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Abstract. According to the advocates of a “Generalized Darwinism” (GD), the three core Darwinian principles of variation, selection and retention (or inheritance) can be used as a general framework for the development of theories explaining evolutionary processes in the socioeconomic domain. Even though these are originally biological terms, GD argues that they can be re-defined in such a way as to abstract from biological particulars. We argue that this approach does not only risk to misguide positive theory development, but that it may also impede the construction of a coherent evolutionary approach to “policy implications”. This is shown with respect to the positive, instrumental and normative theories such an approach is supposed to be based upon.

JEL: A1, B4, B52, D6

Keywords: Evolution, Selection, Darwinism, Ontology, Continuity Hypothesis, Evolutionary Theory of Policy-Making

1. Introduction

Evolutionary Economics is a rapidly expanding field of research that develops and applies a multitude of theoretical tools and empirical methods to explain processes of technological, organizational, institutional and commercial change (Nelson, 1995; Witt, 2008b). It still lacks, however, a conceptual “hard core”, i.e., an overarching meta-theoretical framework that, by specifying what exactly “evolution” means in the economic sphere, is able to guide and structure the further development of its toolkit and its research program more general. In joint work with several co-authors, Geoffrey Hodgson has now proposed just such a framework for the analysis of socio-economic change along the lines of a generalization of the basic Darwinian notions of variation, selection and retention to the socio-cultural sphere (Hodgson, 2002; Hodgson & Knudsen, 2006a, 2008b; Aldrich et al., 2008)¹.

This approach reaches well beyond earlier attempts to examine, without any ontological commitment, the *metaphorical* usefulness of these Darwinian notions to understand specific processes of cultural evolution (see, e.g., Campbell, 1965; Winter, 1964).² Given its far-ranging implications for the role of Darwinian thought in reshaping economics, for the way “evolution” is conceptualized in the cultural arena, and for the specification of the essentials of Evolutionary Economics proper, it is not surprising that this new, more ambitious proposition has provoked a lively debate, during which it has met with persistent skepticism (Witt, 2003a; Nelson, 2006; Cordes, 2006, 2009; Bünstorf, 2006; Vromen, 2007, 2008)³. While the controversy continues, with both sides drawing on ontological as well as pragmatic arguments and claiming the support of the founding fathers⁴ of Evolutionary Economics for their respective positions, it has completely neglected one aspect that should play a role in any debate about the future orientation of Evolutionary Economics, viz., its (still quite underdeveloped) *policy and welfare implications*. As the present paper will show, a misguided general framework may not only lead Evolutionary Economics’ positive-explanatory projects astray – it may also impede the construction of a general approach to welfare and policy implications that is compatible with these projects and plausible in its own right.

¹ see also Vanberg (2006), Stoelhorst (2008).

² The underlying general motivation remains the same, however. Following Nelson & Winter (1982: 11), Hodgson & Knudsen (2007: 358) concede to be “prepared to exploit any appropriate idea from biology that helps us to explain socio-economic reality”. A historical sketch of attempts (starting with Mandeville) to transfer concepts and tools from biology to economics and vice versa is given by Hodgson (2007b). The debate is, however, plagued by many mutual misunderstandings, perhaps best illustrated by the exchange between Cordes (2007b) and Hodgson (2007a); see also Knudsen (2004).

³ The debate is, however, plagued by many mutual misunderstandings, perhaps best illustrated by the exchange between Cordes (2007b) and Hodgson (2007a).

⁴ in particular the orientation of Veblen and (the late, “evolutionary”) Hayek is hotly contested (Marciano 2009), while Schumpeter’s aversion against the use of Darwinian precepts in economics is acknowledged even by proponents of GD (Hodgson, 1997).

According to the proponents of a “Generalized Darwinism” (henceforth GD)⁵, “complex (evolving and replicating) population systems” in both nature and culture exhibit a common ontological basis. More specifically, this ontological basis is characterized by the properties of variation, selection and retention. Any system where these properties are present and interact dynamically is said to display Darwinian evolution. Hence, the latter is argued to actually occur in both systems: Both natural and socio-economic evolution are Darwinian in key respects.⁶ As Hodgson et al. hasten to add, Darwin’s rather abstract concepts have to be complemented by (yet largely to be developed) domain-specific auxiliary theories and hypotheses in order to get a satisfactory explanatory account.⁷ The concepts themselves are thought to serve as heuristics that guide and structure further theory development in the realm of cultural evolution. Thus, GD contains not only ontological presuppositions, but also heuristic precepts and, hence, the contours of a research program.

Critics such as Witt (1999a; 2003a; 2004a; 2008a; 2008b) have however pointed out that in order to understand and explain processes of socio-cultural evolution, it is not necessary and may even be counter-productive to resort to these Darwinian principles. For they cannot be defined in any sufficiently abstract way to become truly domain-unspecific. Hence, applying the notions of variation, selection and retention to the realm of economic, technological and institutional change may necessarily imply *analogies* between, say, selection in the biological sense and *prima facie* similar-looking processes in the cultural arena. This may misguide the process of theory development: Critics have, e.g., pointed to the fact that in the sphere of socio-economic change, variation is not “blind” and selection is not something passively endured by the organism, but rather *actively* pursued. Moreover, in cultural evolution, the relative success of a “phenotype” does not depend on its capacity to reproduce, but rather on man’s cognitive and learning-based ability to vary genotypes and phenotypes *ex ante*, through his capacity to anticipate and even manipulate selection effects. Hence, it is not possible to clearly distinguish between genotype and phenotype (Cordes, 2006). While Hodgson et al. do not contest these differences, they simply deny their relevance for the question whether the “Darwinian triple” is useful and even necessary to explain sociocultural evolution.

⁵ As Hodgson and several coauthors explain (Aldrich et al., 2008: FN 3), the notion of “Universal Darwinism” (apparently first coined by Dawkins, 1983) they originally favored has now been abandoned since it “may misleadingly suggest that Darwinism covers everything.” Rather, Darwinian principles are now taken to “apply to complex population systems only” (*ibid.*). As will be seen in section 2, below, the contributions to GD make it clear that apparently *almost* everything can be re-described as involving the evolution of a “complex population system”.

⁶ The facts that (a) Darwin, when establishing his principles, was influenced by social philosophers such as, most importantly, Malthus, and (b) Darwin himself speculated about the evolutionary forces transforming morals and language are cited in support of this hypothesis; see, e.g., Hodgson (2007a, p. 265). Ironically, point (a) is also put forward by opponents of GD in support of *their* position (see below).

⁷ strictly speaking, these are not “Darwin’s” principles. Darwin’s own account of evolution actually consists of five theories (Mayr, 2001), viz., a theory that organisms are transformed over time, the theory of common descent, plus the (originally more disputed) theories of multiplication of species, gradualism and natural selection proper. The reduction of Darwin’s theories to the three “core principles” of variation, selection and retention/inheritance (“mechanisms for preserving and/or propagating the selected variations”) is due to Campbell, cf. e.g. Campbell (1974, p. 42).

Instead of thinking about socio-cultural evolution along Darwinian lines, Witt proposes to conceptualize it generally as involving the *self-transformation* of a system over historical time – a process which involves the emergence and dissemination of novelty and whose theoretical exploration is based on the assumption of an ontological *continuity* between biological and cultural evolution, where the results of the former support and constrain the processes of the latter. This alternative approach has accordingly been dubbed the “continuity hypothesis” (henceforth CH). While its general monistic ontology is compatible with GD, its conceptualization of evolutionary processes is at the same time more general – as it is not restricted to population systems – and more specific – as it stresses the endogeneity of change and conceptualizes the connection and overlap, but also the differences between pure biological evolution and cultural learning.

We will argue that apart from its pragmatic and particularly heuristic advantages that have already been described in the literature, the latter approach also makes it easier to construct a coherent approach to welfare and policy-making which would serve as a general framework to develop case-specific “policy implications” compatible with an evolutionary world-view. Such an approach does not yet exist⁸. It would allow us to adequately frame and eventually answer the following question: Given that an innovative evolutionary market game creates welfare, but also implies risks, losses and (for some people) even hardship, how much of these “costs” should we accept without “too much” constraining the creation of welfare? To examine this, we need an evolutionary concept of welfare. All of this of course presupposes that man is able to influence and channel evolutionary processes in order to solve societal problems. Put differently, it presupposes the human ability to “select” among a given set of problem solutions in an *active* way, but also (and more importantly) the ability to devise new solutions to problems of social interaction by deliberately manipulating the “selection environment”, by, e.g., pooling the instrumental knowledge necessary and organizing appropriate collective action.

Man’s option to deliberately shape his “selection environment” also has a normative dimension. While it is trivially true that “the outcomes of a selection process are necessarily neither moral nor just” (Hodgson & Knudsen, 2006a, p. 6), the meaning of notions such as “moral” and “just” cannot itself be taken to be the result of some prior selection process or even to reflect some understanding of “fitness” or “adaptive value”. Rather, the underlying principles and related criteria of welfare, justice or freedom are “artificially” created and re-created in a process involving genuine human reasoning, deliberation and bargaining. Hence, we argue that to the extent that any Darwinian metaphor carries with it residual biological connotations, it is in these politico-normative spheres that these connotations will misguide theoretical reflection most effectively.

This argument will be developed in five steps: In section 2, we describe the position held by the advocates of a “Generalized Darwinism” in more detail. Section 3 presents the main general objections against this approach within a purely positive research agenda. Section 4 then focuses more specifically on the difficulty to think about welfare and policy-making in an evolutionary framework and the need to stick to a non-Darwinian framework in order to cope with the issues involved. Finally, section 5 concludes.

⁸ see, however, Witt (2003b) for an outline of a possible route toward such a concept.

2. The position of “Generalized Darwinism”

In joint work with several co-authors, notably Thorbjørn Knudsen, Geoffrey Hodgson has recently elaborated upon the case for GD.⁹ His thinking is apparently influenced by authors such as Campbell (1965), Dennett (1994), and in particular Hull (1988). In a nutshell, this approach claims, first, that all social science should be committed to “detailed, cumulative, causal explanations” rather than functional “just so-stories”¹⁰. GD’s second claim refers to the specific causal-explanatory logic that is claimed to apply to all evolutionary processes: All such processes in both the natural and the cultural or socio-economic¹¹ realm are argued (i) to share the same basic ontological structure, viz., (ii) one that can *only* be described by the Darwinian scheme of an interplay of variation, inheritance (or retention) and selection. On the heuristic level, the Darwinian scheme is, then, not only claimed to provide a useful framework for describing these processes, but it is seen as the only framework that is able to do this. When talking about “evolutionary processes”, Hodgson and coauthors focus on phenomena of “complex evolving systems”, involving populations of heterogeneous elements that causally interact with each other. Given that they define Darwinism – quite broadly – as a “causal theory of evolution in complex population systems involving the inheritance of generative instructions by individual units and a process of selection of the varied population of such entities” (Hodgson & Knudsen, 2006a, p. 13), any attempt to explain such systems in both nature and society must *necessarily* rely on these three “core Darwinian principles” (ibid.). Since they emphatically reject any genetic reductionism¹², advocates of GD have to acknowledge that on a less abstract level the mechanisms and processes of change are “very different” both within and between different types of (natural and socio-cultural) systems. The general ongoing change in these systems is however argued to be “inevitably Darwinian”. In this section, this position will be reconstructed.

Hodgson & Knudsen (2006a) define their object of study as “complex systems”, involving populations of “entities of specific types” that are heterogeneous in “relevant respects”. These entities absorb both matter and energy and are able to process information about their environment. Being “mortal and degradable” and confronted with the “omnipresent problem of local and immediate scarcity”, they are engaged in a perpetual “struggle for existence” (ibid., p. 4)¹³. Finally, the entities are assumed to possess some capacity to “retain and pass on to others workable solutions to problems” they face in the course of their daily struggle (ibid.). Defined in such an extremely abstract way, Hodgson & Knudsen’s entities are argued to include not only “every biological species”, but also “human institutions” and business firms (ibid., pp. 4-5).

⁹ see in particular Hodgson & Knudsen (2006a; 2008), Aldrich et al. (2008), Hodgson (2002).

¹⁰ Hodgson (2002, pp. 260, 268-269). See Vromen (1995, ch. 5) for a subtle methodological critique of the inadequate functionalism involved in “just-so stories”.

¹¹ these adjectives will be used interchangeably in what follows.

¹² see, e.g., Aldrich et al. (2008) and Hodgson (2002, pp. 270-276). According to Hodgson, Darwinism is committed to “determinism” in one of three possible senses, viz., the ontological assumption that “every event has a cause” (ibid.).

¹³ italics in the original.

Hodgson & Knudsen (2006a) now argue that to adequately explain the way such a complex system evolves over time, the Darwinian principles of variation, inheritance and selection are necessary. In order to justify this claim, they first set out to define three core explananda that any theory of evolution should be able to confront. According to GD, then, such a theory must necessarily include an account of

- (i) how variety occurs,
- (ii) how “useful information concerning solutions to particular adaptive problems” – which may be carried, e.g., by social norms or business firm routines – “is retained and passed on” or “copied”,
- and finally and most importantly
- (iii) an account of the “fact that entities differ in their longevity and fecundity”.

As regards this last point, it is argued that only the *principle of selection* can explain why some entities or units are more successful (in terms of survival or imitation rates) than others. This principle is regarded as the prime legacy of Darwinism for the general explanation of evolutionary processes that generate “adaptive complexity” (Stoelhorst, 2008, p. 9). According to Hodgson & Knudsen (2006a, p. 6), selection is about how new variations are “tested in the real world”. The explanation is then based on the attempt to trace changing frequencies of posterior entities to their properties in some given environmental context.

The bulk of the argument in favor of GD is based on the rejection of the “self-organization” theory which Hodgson (2002, pp. 264-266) identifies as the most prominent rival to his own approach when it comes to providing a general account of “evolution”. According to Hodgson, self-organization is successful in explaining how undesigned social order emerges, but it is not sufficient to explain the “origin of species and of all complex biological phenomena” more general. Interestingly, in order to substantiate this point, Hodgson & Knudsen (2006a) argue that *within biology*, proponents of self-organization such as Kauffman (1993) do actually not see this approach as “an alternative to natural selection” (ibid., p. 7). For without selection, so the argument goes, it is impossible to explain the “move toward the emergence of *increasingly complex* structures” (ibid., italics added). Only an explanation using the principle of selection can show why a subset of self-organized units acquire “survival value” by becoming adapted to their environment¹⁴. According to Hodgson & Knudsen (ibid., p. 8), an approach focusing on self-organization, by concentrating on the way some entity develops “internally”, neglects both the way this entity itself has come about (as a result of some antecedent process of selection) as well as the interactions of the entity with its environment and the resulting process of adaptation. Thus, a distinction is drawn between, first, the emergence of an entity itself, second, the entity’s ensuing internal, “endogenous” or epigenetical changes¹⁵ and, third, the way this entity interacts with its environment over time (which may result from “exogenous” change and may lead to

¹⁴ on this, cf. the detailed argument by Stoelhorst (2008).

¹⁵ cf. FN 12 in Hodgson & Knudsen (2006a, p. 8), where the self-organization focus on internal change is related to Witt’s “confined” conception of evolution as a system’s “self-transformation over time”. More on this below.

adaptation). According to GD, only the second phenomenon can be covered by self-organization theories, while processes involving all three levels of phenomena can *only* be accounted for by Darwin's selection principle.

Put differently, self-organization theories are described by Hodgson & Knudsen (2006a, pp. 9-10) as being focused exclusively on the ontogeny of single organisms or "structures" such as firms. By contrast, GD is argued to also account for phylogenetic processes that involve the evolution of a whole population of entities within which selection occurs. Phylogeny denotes a more general process in that it necessarily also incorporates ontogenetic processes on a lower level: "From the point of view of the overall evolutionary process, complete evolutionary descriptions require a phylogenetic account of the selection of ontogenetically developing units" (ibid., p. 10). Any model of some evolutionary process is argued to be incomplete without an account of why some entities or "structures" are more successful ("survive longer") than others. For Hodgson & Knudsen, this is the key explanandum requiring explanation in terms of selection forces.

At this point, the meaning of "selection" deserves some closer scrutiny. Through the lens of GD, selection operates in a rich array of phenomena including "conscious choices, competitive pressures, market forces, or environmental constraints", all operating on "habits, customs, technologies, institutions, regions and even whole economies" (ibid., p. 10). GD now proposes to generalize the notion of selection quite radically in order to allow it to include human intentionality. This problem is related to the task to incorporate, first, "artificial selection" and, second, "Lamarckian" evolution.

The American institutionalist J.R. Commons (1934) famously objected to this broad application of the notion of selection by arguing that institutional change involves *artificial* rather than "natural" selection. Artificial selection implies humans deliberately controlling the selection process by manipulating the "criteria or environment of selection"¹⁶. To this intuitively plausible point the proponents of GD respond by redefining the notion of "selection" itself in a way sufficiently abstract to include those processes that Commons called "artificial"¹⁷: They argue that "the human doing the selection is also a product of natural evolution" - in particular her "dispositions, aims and criteria" are to be seen as resulting from "processes of cognitive and cultural evolution" (Hodgson & Knudsen 2006a, p. 11). As the latter are seen as being based on the operation of "selection" proper, Commons' distinction is rejected.

The notion of selection is also explicitly defined in a way that allows to incorporate the "Lamarckian" idea that acquired characters are inherited (Hodgson & Knudsen 2006a, pp. 12-13). This is usually referred to as a typical feature of socio-cultural, as opposed to purely natural, evolutionary processes, since the former are also based on the purposeful change of behavioral traits by creative agents¹⁸. Hodgson & Knudsen now argue that,

¹⁶ Hodgson & Knudsen (2006a, p. 11).

¹⁷ see in particular Knudsen (2004).

¹⁸ see, however, Hodgson & Knudsen (2006b) on the pitfalls of a Lamarckian perspective on cultural evolution.

first, Darwin himself had actually accepted the possibility that acquired traits can be inherited (thus making it plausible to subsume such a phenomenon under the umbrella of “Darwinism”¹⁹). Second, they maintain that Lamarckism cannot itself answer the tricky question why in general, *non*-beneficial acquired characters are *not* passed on to the next generation. In order to explain this, it again needs to refer to some Darwinian selection process. Thus, Lamarckism is argued to be a less general account of evolution than Darwinism proper. Again, analogously to the argument concerning “artificial” selection, Hodgson & Knudsen argue that the human capacities involved in the Lamarckian account are to be seen as the product of an anterior process of selection: “Insofar as organisms are purposeful, this capacity too has evolved through natural selection” (ibid., p. 13). Hence, they claim that Darwin’s three principles “do not themselves exclude the possibility of acquired character inheritance” (ibid.).

The final issue in the quite intricate argument for Generalized Darwinism concerns the many obvious *differences* between the phenomena and mechanisms involved in natural and socio-economic evolution on a somewhat less abstract level. Obviously, analogues to DNA, sexual recombination or genes are hard or even impossible to find in places such as the market, the firm, the law or the political arena. Mechanisms involved in generating variety or transmitting information are dissimilar, often even extremely so. Even to the casual observer, anything akin to “selection” in the economic sphere works quite differently than natural selection among phenotypes. From a methodological viewpoint, it is now quite revealing to see that Hodgson & Knudsen (2006a) readily acknowledge all this²⁰, only to simply declare it *irrelevant* for their argument: “Darwinism is more general and is not tied to these particulars” (ibid., p. 14), meaning that “the transfer of Darwinian principles from biological to social evolution does not imply that the detailed mechanisms of selection, variation and inheritance are similar” (ibid., p. 15)²¹. Accordingly, Hodgson & Knudsen maintain to be able to neutralize any objection that points toward such differences by redefining the Darwinian core principles in ever more abstract terms in order to strip off any domain-specific biological content (Vromen 2008). As we have seen, Darwinism in the very specific sense it is then used by GD is argued to accommodate Lamarckism, intentionality, “artificial selection”, “selection” that occurs within the life of a single “socio-economic unit” (such as, e.g., a learning individual or a firm), even creative choice (Hodgson 2002, p. 276) and any variation and “inheritance” mechanism whatsoever: “As long as there is a population with imperfect inheritance of their characteristics, and not all of them have the potential to survive, then Darwinian evolution will occur” (ibid., p. 270).²²

¹⁹ It does not appear to be necessary to engage in Darwinian exegesis at this point, since the question could also be left open whether Darwin himself was a “Darwinist” in the sense of GD.

²⁰ see also, e.g., Hodgson & Knudsen (2008a, p. 49): “Nothing in social culture remotely corresponds to the DNA code”.

²¹ see also Hodgson (2007, p. 270), Aldrich et al. (2008, p. 580) and Stoelhorst (2008, p. 22): “Whether or not the mechanisms that operate in economic and cultural evolution function in ways that are analogous to the ways they do in biology is an interesting question, but irrelevant to debating the explanatory power of generalized Darwinism as such”.

²² see also Hodgson & Knudsen (2006a, p. 16).

This “irrelevance hypothesis” may come as a surprise at this point, given GD’s explicitly stated aim to use Darwinism not just as a framework that is in need of additional auxiliary theories to explain any real-world phenomena (this is trivially true), but as a framework that is able to *inspire, frame* and *organize* further theory development in evolutionary economics, i.e., to provide heuristics for future research.²³ Let’s however accept this separation for the sake of the argument for the remainder of this section.

In order to demonstrate the constructive potential of GD in the field of theory development, Hodgson and Knudsen have in fact left the abstract heights of ontology in order to apply GD to real-world explananda, in particular in the realm of market competition, firm growth and industry evolution. In order to obtain operational units of analysis, they generalize the biological concepts of genotype and phenotype and borrow the notions of *replicator* and *interactor*. Both kinds of entities are argued to occur in both biological and economic evolving systems. In particular, they are meant to also capture the phenomenon of Lamarckian evolution, which is argued to occur when traits are acquired (through learning or adaptation, say) and are “encoded in an instruction set that is passed on to the next generation” (Hodgson & Knudsen, 2007, p. 356). Such an instruction set is called a “replicator”. Hull (1988, p. 408) defines this term – which is originally due to Dawkins (1976) – as “an entity that passes on its structure largely intact in successive replications”²⁴. This term, then, denotes any entity that carries instructions which can be passed on to the next generation of entities by some form of more or less faithful copying or reproduction. By contrast, an interactor is an entity that “interacts as a cohesive whole with its environment in such a way that this interaction causes replication to be differential” (ibid.).²⁵ These entities manifestly *express* the replicating information. In the biological domain, paradigmatic examples for these two kinds of entities are genes (as replicators) and individual organisms (as interactors). According to Hull (1988, pp. 409-410), “selection” can then be characterized as involving the interplay of both replicators and interactors in such a way that the differential success of interactors causes differential survival on the part of the relevant replicators. Lamarckism would then imply that the instruction set contained in the replicator is modified in the course of the interactor’s adaptation to its environmental conditions. Only after this modification has taken place it is transmitted. Thus, we have the first important heuristic following from GD: When studying socio-economic phenomena, the theorist should watch out for replicators and interactors.

According to Hodgson & Knudsen (2004a), in the economic domain habits and routines can usefully be described as replicators, with firms playing the role of interactors. While they do not follow Nelson & Winter’s (1982) famous suggestion that routines of firms can be described as analogs to genes, they do however see a similarity in the sense that both genes and routines are replicators. Thereby they suggest that it is the more or less faithful copying (“inheritance”) that characterizes these entities. The analysis gets more

²³ see, e.g., Hodgson & Knudsen (2006a, p. 16).

²⁴ earlier, Dawkins (1976) described replicators as being characterized by their „longevity, fecundity and copying-fidelity”; cf. also Hull (1989, pp. 95-98) and Hodgson & Knudsen (2008a) for a detailed discussion of the term’s semantic history.

²⁵ italics in the original.

complicated, though, when it is acknowledged that what may emerge as an interactor at one level of phenomena might act as a replicator at another level: “Human individuals can be seen as interactors (with their genotypes as replicators), but individual preferences or ideas can be regarded as replicators at a higher level of cultural transmission” (Hodgson & Knudsen 2008a, p. 49). Apart from business firms and single individuals, GD also sees “social groups or institutions” as interactors (*ibid.*).

3. Main objections

At the outset, it is essential to stress that the adequacy and usefulness of a position such as “Generalized Darwinism” is difficult to discuss. GD covers a set of fundamental metaphysical, in particular ontological (“everything is causally connected to everything else”,...) ²⁶ and closely related methodological statements (“explanation of how complex systems evolve requires use of the Darwinian triple”,...), combined with pure definitional propositions. As statements of this kind can neither be proven by logic nor falsified by empirical evidence, they can only be criticized on the somewhat “weaker” grounds of their practical adequacy and usefulness in structuring and guiding future research in Evolutionary Economics ²⁷. The controversy about GD and CH has to be understood in light of the importance of the way metaphors and analogies are used to *frame* the perception of scientific problems. As Hodgson (2002, p. 263) puts it, “[m]etaphor in general has a deeply constitutive and subterranean presence in science... by helping to form analogies, the influence of metaphor is neither superficial nor merely preliminary”.

Most attention has been given to the heuristic role of GD’s concepts in guiding the theorist’s attention and in shedding more light or less on particular real-world phenomena that are deemed essential as explananda for Evolutionary Economics. Hence, the discussion is ultimately about *pragmatic* pros and cons only, given some pre-specified analytical purpose. Accordingly, GD’s adequacy in guiding *positive* research will be discussed in this section, while its adequacy in guiding the construction of welfare and policy arguments from an evolutionary point of view will be examined in section 4.

GD’s most fundamental precommitments are rarely contested by evolutionary economists, including those that tend to oppose GD on other grounds. Most importantly, this concerns the basic assumption that there is a need for an abstract, i.e., domain-unspecific conception of “evolution”. It’s precisely the way to get there that is hotly debated. There is also a general consensus regarding the general “Darwinian world-view”, epitomized by a “naturalistic” belief in ontological monism, i.e., the assumption that “both change in the economy and change in nature belong to connected spheres of reality” (Witt, 2008b). Any reductionist monism is also widely rejected (Witt 2008a, Hodgson & Knudsen, 2006a). Moreover, there is agreement about the separate ²⁸ ontological assumption which posits a general *causal* link between all levels and parts of empirical reality, in particular between the spheres of non-human nature and culture, and

²⁶ on the criteria qualifying statements as “metaphysical”, cf. Popper (1989, ch. 11).

²⁷ see Vanberg (2006, p. 199).

²⁸ cf. Vromen (2008) on the differences and independence between these ontological precepts.

the corresponding methodological emphasis on the search for commonalities at the level of homomorphic structures of reality²⁹, coupled with the focus on causal (rather than functional) explanations. All this appears to be by and large uncontroversial.

The argument starts, however, with GD's assertion that processes of natural and socio-cultural evolution share a very specific ontological structure, viz., one that allows and prescribes the application of Darwin's principles in order to be explainable. Thus, this very specific position directly implies a certain stance on the heuristic level, i.e. on how theoretical problems should be framed to induce meaningful hypotheses. As we will see shortly, the specific ontological position underlying this heuristic stance does not necessarily follow from a general commitment to ontological monism; in particular, a monistic ontology can be more complex in order to allow for a subtle, yet clear distinction between the realm of pure biological and socio-cultural evolution.

3.1. The problem of analogy

The most important and most straightforward objection that has been aired against all attempts, including GD's, to transfer concepts from biology to economics concerns the problematic use of *analogies*. It is argued that GD necessarily leads to the construction of analogies between socio-cultural and biological phenomena that may look plausible at first sight but that are actually misleading. Before the advent of GD, this argument had already been leveled at attempts to make metaphorical use of biological concepts in economic theorizing. Nelson & Winter's (1982) approach to model firms as a kind of "phenotype", with their routines, blueprints, business conceptions and the like working as "genotypes" is a case in point. Since the firm's "genotypes" are, however, almost never stable, the analogy to a genetic program governing the ontogenesis of an organism breaks down. As Penrose (1952) has argued, firms can anticipate problems and creatively adapt not only their own "genotype", but also their "selection environment" (Witt, 1999b).

Put more generally, given that what most obviously distinguishes cultural evolution from biological evolution is its much faster pace, it remains unclear where in the economic domain one may find a "selection environment" that would be sufficiently stable and "given" to allow for the generation of systematic results over time³⁰. As Witt (1996, p. 709) puts it, it is in particular man's capacity "to anticipate unfavorable systematic outcomes of 'external' selection processes, if there are some, and to change the very basis of those processes by 'internally' selecting different kinds of behavior through...cognitive problem solving" which makes it implausible to postulate any continuity of selection processes in the realm of cultural change. Human agents are not helpless when exposed to risky environmental changes – they are able to anticipate the

²⁹ cf. Witt (1996, p. 709). This is based on the methodological meta-project of "Consilience", espoused by Wilson (1998), where he defines the related quest for a "unity of knowledge" as implying the "jumping together" of knowledge by the linking of facts and fact-based theory across disciplines to create a common groundwork of explanation".

³⁰ cf. Rosenberg (1994, p. 396): "Economic environments seem to change from day to day. If they do, then there is never enough time for the type most adapted to one environment to increase in its proportions relative to other types."

unfavorable effects of market forces and to find creative solutions by way of “internal” selection, i.e., by cognitively guided behavioral adaptations (Witt 1999, p. 288). Given that the environment of economic systems is typically characterized by many variables that change simultaneously, no equivalent to “natural selection” can be expected to push traits of a given population in some direction in systematic ways (Witt 2004a.).

As we have seen, Hodgson & Knudsen (2006a, p. 15) deny that GD necessarily implies any statement about similarities (hence analogies) between “detailed mechanisms of selection, variation and inheritance” in the realms of biological and sociocultural evolution. They argue that there is a categorical difference between *analogy* and *generalization*, and that Darwinian principles can indeed be defined such that they easily encompass phenomena such as “artificial” selection, Lamarckian inheritance of acquired traits, and most cultural processes and mechanisms that are phenomenologically very different from anything known in non-human nature. Thus, any criticism pointing towards such real-world differences is deemed “irrelevant” (Hodgson, 2007a). Or is it? While it is certainly logically possible to redefine Darwin’s principles in a sufficiently broad and abstract manner such that any of the phenomena described above are covered, however loosely (and, hence, any straightforward or *direct* analogy is avoided³¹), it may be asked whether this step is also useful and convincing. In order to discuss this and qualify Hodgson & Knudsen’s “irrelevance hypothesis”, three kinds of objections against GD should be properly distinguished.

First, regarding any of the three Darwinian categories (variation, selection, retention) in isolation, one may show that things work out (very) differently in the socio-economic domain as compared to the biological domain. This is not difficult to see. To start with variation, it can safely be taken to be “blind” in nature. This holds not only for undirected genetic mutation, but also for the more important recombination of genetically coded information (cross-over) which uses “background knowledge” of past successful adaptations. Even though the latter may be described as containing a higher degree of directedness (viz., towards relatively higher degrees of local adaptedness), it is still perfectly “blind” in the sense of being completely pre-programmed. There is, then, still a large difference to what “variation” means in the socio-economic realm. Humans act on knowledge they have acquired and choose strategies accordingly – in this sense, their choice behavior is not “blind”, but informed, if imperfectly so. Based on this knowledge, humans recombine given elements in a way that is much more *directed* than is the case in genetic cross-over. Following evolutionary epistemologists such as Campbell (1987), Vanberg (2006: 202) argues, though, that human behavior is still “blind” in a quite different sense: In an evolving economy, humans cannot *predict* with certainty whether their “conjectural trials” will finally be successful. Within an evolving economic system, any increase in human knowledge will be the result of some fumbling and guesswork. This is uncontroversial. The lack of predictability concerns, however, the level of aggregate results of individual actions (the “social order” resulting from one or many bilateral or multilateral interactions), not the level of the basis of individual action itself. Hence, to put it in Darwinian language, the unpredictability results essentially from the

³¹ *indirect* analogies may be implied whenever some concept is “generalized” in order to cover several scientific domains; otherwise the generalization would be arbitrary. More on this below.

operation of some mechanism of “selection”, rather than from some features of “variation” itself. On the individual level, where variation is introduced, there can hardly be any doubt that human behavior is not “blind” in the *same* way as the behavior of non-human animals. Humans may not see precisely where their steps may lead them, but they are able to take them with some clear purpose, aspirations, attitudes, beliefs, positive expectations, normative expectations and ideas about how to proceed when the action fails in mind: “In cultural evolution in general, and in economic evolution in particular, the causes of novelty generation are not independent of the wants and longings of individuals” (Witt & Cordes, 2007, p. 325). Moreover, it may be argued that it is precisely around these concepts, i.e., *within this difference in the degree of “blindness”* that most interesting research questions of Evolutionary Economists are located (see below). From an evolutionary viewpoint, the ability to actively create new ways of solving problems may reach far beyond collective action, however, to include any individual creative behavior. Hence, biological variation and cultural “variation” differ in essential respects.

Relatedly, “selection” works quite differently in both domains: In cultural evolution, no analog for the two levels of genotype and phenotype can be identified (Winter, 1964). While in non-human nature, evolution operates through the selection of phenotypes and the ensuing selection for genotypes (Sober, 1984), at the core of cultural evolutionary processes human agents *choose* deliberately and purposefully between alternative behavioral strategies, products, ideas, technologies, etc. To call this “selection” may induce one to disregard important characteristics: These choice processes do not trigger progressive evolutionary adaptation and adaptive complexity, because they do not involve replication or the succession of generations (Cordes 2007a, p. 140). Should there arise adaptive complexity, it may have many different causes that are non-reducible to any overarching process of “selection”. For neither is the agents’ socio-economic environment sufficiently stable nor is there anything resembling a stable “germ plasma” in order to allow for the gradual buildup of adaptive complexity.

Finally, as regards the principle of “retention”, critics of GD tend to emphasize the fact that in processes of socio-economic change, it is only in exceptional cases that knowledge is transmitted almost perfectly and faithfully, i.e., in the same way as genetically codified information where genetic variation derives from slight modifications in the “blueprint”, making the emergence of novelty part of a “programmed automatism” (Witt 2004a, pp. 138-139). Moreover, this automatism makes sure that genetic knowledge is interpreted, expressed and replicated “*uno actu*” (ibid.). By contrast, cultural knowledge is argued to be coded and stored in a way that excludes any automatism. Rather, intelligent human beings perform these different functions, based on differing motivations, expectations, purposes and with different degrees of success in the course of their interactive encounters. Humans choose whom to imitate. Consequently, cultural “genotypes” are not transmitted with the aim to produce ideally perfect replica; their transmission is rather motivated by a multitude of other considerations which may be summarized by the learning agent’s desire to find solutions to certain problems (Vromen, 2007).

Insofar as the differences between biological and cultural knowledge transmission are seen as decisive, there can be, then, nothing that could convincingly be described as “replicator” (such as genes in the biological realm) in the socio-economic arena. This concerns in particular the concept of firm “routines” that have often been classified as replicators. Not surprisingly, Hodgson & Knudsen (2004a) concede that the replication of routines differs fundamentally from the replication of DNA, say. The former is far more complex, difficult, and indirect than the latter. Routines are extremely heterogeneous entities. What is more, their replication may be highly context-dependent. There are many different mechanisms of replication, depending on the firm’s situation, size, structure, success and market environment more general. Moreover, in this domain it is quite hard to identify the equivalent to a clear-cut “generation” (Bünstorf 2006: 518f.). All these aspects are glossed over by the abstract and universal notion of replication (ibid.).³²

The second set of objections concerns the *relationship* between the three Darwinian principles. It can be shown that in socio-economic evolution, these principles cannot be taken to work independently from each other. If in the cultural domain, “variation” is argued to be introduced intentionally and purposefully, on the basis of some subjective anticipation of its effects, then it is evident that “selection” directly feeds back to processes of variation. Variation and selection are thus interdependent. If, on the other hand, the replication or “inheritance” of some piece of information is motivated by the desire to find solutions to problems posed by the “selection environment” (by the desire to manipulate this environment, say), then processes of inheritance and selection cannot be neatly separated (Vromen 2007). Rather, selection is constitutive of the process of replication. Finally, in the socio-cultural realm variation is also often caused by (imperfect) retention. Thus, none of the three Darwinian principles can be regarded as distinct in the cultural domain.

3.2. The “irrelevance hypothesis”

Proponents of GD concede that on the level of “detailed processes and mechanisms”, any analogy construction would be misleading. It is obvious that when regarded in isolation, processes of “variation”, “selection” and “retention” differ too much between the domains of biology and culture to display any but the most superficial similarity. Thus, GD would need to demonstrate that Darwin’s three principles can indeed be stripped off of any domain-specific, viz., biological connotation, in order to avoid any analogy. It seems, though, that even if GD would succeed in achieving this, some “indirect” analogies could not be avoided. Contrary to what Hodgson (2007a) asserts, analogy and generalization cannot be properly kept separate. For notwithstanding the well-known

³² Interestingly, GD would in fact not need to make itself vulnerable by building practical applications around the controversial “replicator” concept – as Vromen (2008, p.17) argues, “there can be evolution by natural selection without entities that satisfy Hull’s definition of ‘replicator’. It is enough for evolution through natural selection to occur if offspring resemble (in the relevant respects) their parents more than other organisms in the population”.

influence of social philosophers such as Smith and Malthus on Darwin's thought³³, his three principles were not coined in some abstract trans-disciplinary space, but *within biology*. First and foremost, they were targeted at explaining non-human biological phenomena. Consequently, as Vromen (2008, p. 10) puts it, "if all it takes for some...concept to be based on an analogy is that a connection involving more or less formal similarities is made between different domains of discourse..., then [GD's] proposal is based on an analogy." Moreover, as Hodgson and his coauthors stress time and again, the meta-theoretical framework of Darwinism is supposed to *inspire, frame* and *organize* the development of auxiliary theories in Evolutionary Economics, i.e., to provide operational heuristics for future research³⁴. It is hard to see how such a role could be played by a set of principles that is perfectly abstract (Vromen 2007, pp. 19-21). In fact, in their "defence" of GD Aldrich et al. (2008, p. 588) agree on a very abstract methodological level that "generalization should not go as far as to become vacuous". Hence, "indirect" analogies can hardly be avoided when a general framework of "evolution" is established. Given the key role played by these analogies, their origin is crucial.

Related to this, there is the problem of the interdependence of variation, selection and retention in the cultural sphere. If these pillars of any Darwinian explanation are not independent from each other, at least in the case of the overwhelming majority of "typical" explananda, then this may indicate that they are simply not *sufficiently abstract* to establish a truly over-arching concept of evolution. Apparently, such a concept cannot be based on postulating a dynamic interplay of variation, selection and retention, since the mechanisms represented by these principles cannot be properly distinguished and identified within real-world processes of change. If this is the case, then it follows that these principles still seem to carry too much domain-specific baggage.³⁵

Hence, the first and second set of objections cannot be dismissed as totally "irrelevant". Rather, the differences between processes and mechanisms in cultural as opposed to biological evolution are relevant in at least two senses: First, they constrain the range of possible "lower-level" theories that will be derived from GD's putatively abstract principles in the future. The controversy on "replicators" and "interactors" is exemplary of this. To be sure, the objections also constrain the ontological content of the Darwinian principles that Hodgson et al. are able to defend (Vromen 2008), thus making it increasingly unlikely that the planned research program will produce convincing and interesting contributions in the future. Second, the differences should themselves be seen

³³ cf. Browne (2006, pp. 43f., 56, 67) who stresses the influence of Malthus' "struggle for existence" ideas and, more general, of "industrial analogies" and the specifically Victorian "competitive, entrepreneurial, factory spirit" on Darwin's thought. As Marx put it in a letter to Engels: "It is remarkable how Darwin recognizes among beasts and plants his English society with its division of labor, competition, opening up of new markets, 'inventions', and the Malthusian 'struggle for existence'" (cited in Guha, 1994, EN 1). See also Ghiselin (1995) and Marciano (2009).

³⁴ see, e.g., Hodgson & Knudsen (2006, p. 16).

³⁵ If, on the other hand, GD is taken to imply the narrow concept of „generative selection“ as proposed in Hodgson & Knudsen (2004b), where selection is defined as the entirety of one-period changes in *both* replicators *and* interactors, then variation is strictly attributed to imperfect replication only and no interdependence between replication and (competitive, say) interaction is admitted. Cf. Bünstorf (2006, pp. 516-517) and Hodgson & Knudsen (2008, p. 60).

as explananda: Why is it, e.g., that cultural evolution proceeds so much faster than evolution in nature? Tellingly, advocates of GD hold Darwin's principles to be suitable for generalization beyond the domain of biology exactly because variation, selection and retention operate in different ways also within nature. In particular, they may also involve intentionality, sometimes even relatively fast change. Quoting Darwin himself, they emphasize, e.g., that "animals possess some power of reasoning. Animals may constantly be seen to pause, deliberate and resolve".³⁶ As to the issue of speed, they argue that "some bacteria evolve quickly, and very rapid biological replication and mutation can occur with viruses".³⁷ They conclude that "[t]he differences of mechanism *within* the biological world are as impressive in some ways as the differences between the biological and the social".³⁸

It is, however, a non-sequitur to jump from this set of observations to the conclusion that Darwin's principles apply to cultural evolution as well. First, even if there are a lot of differences within the natural world concerning, e.g., how selection works, this does not imply that a principle of "selection" that covers these heterogeneous natural mechanisms also covers similar-looking mechanisms in the cultural domain. After all, both proponents and critics of GD agree that biological and cultural evolution are *distinct* processes. Intentionality in nature may still mean something entirely different than intentionality in human culture; the reason why bacteria and viruses evolve so fast may have nothing to do whatsoever with the reason why certain human technologies, say, evolve quite quickly. Second, it may be much more *interesting* to enquire into the reasons why processes and mechanisms involved in observable change differ so much between the two domains. Large parts of the literature supporting GD are devoted to explaining the differences between, say, reproduction of haploid as opposed to diploid organisms rather than focusing on the much more relevant (to the economist) question of why exactly cultural information is "replicated" in such a distinct way.

To conclude, objections concerning (lacking) similarities on the lower level of "detailed processes and mechanisms" appear to be relevant, at least in an indirect way. They will certainly be highly relevant, as soon as GD starts to step down from the abstract heights of its allegedly "domain-unspecific" principles and to engage in applied practical research. So far, the "irrelevance hypothesis" can be returned to its senders: By trying to show that their principles are truly domain-unspecific, Hodgson et al. have emptied them "from virtually all of their content" (Vromen 2008, p. 19). Such a "watered-down" version of GD may indeed be practically irrelevant for the scientific purposes its authors have in mind.

3.3. The Continuity Hypothesis

As we have seen above, with respect to the most basic ontological presuppositions, CH and GD are compatible with each other (Vromen, 2008). CH however does not

³⁶ cf. Hodgson & Knudsen (2008, p. 60).

³⁷ (ibid., p. 63).

³⁸ (ibid., p. 64).

presuppose that processes of “evolution” in nature and culture are similar in any meaningful sense. On this basis, it goes on to specify exactly in which sense Darwinian theory is relevant for understanding economic behavior and change. Its ontology turns out to be richer than is the case with GD (Vromen, 2008, p. 15).

Beyond the fundamental assumption of ontological monism and the causal interconnectedness of natural and cultural evolution, advocates of CH claim that evolution in both the biological and the cultural realm can be characterized as involving the emergence and dissemination of novelty. This is taken to be a common property of evolutionary processes in different domains of reality. Hence, it is an ontological claim that directly challenges GD’s specific ontology. CH’s specification of the ontology of evolutionary processes then gives rise to a generic concept of “evolution” as the “self-transformation over time of a system under investigation“ (Witt, 1993, p. 91). The basic elements of this self-transformation are argued to be the “endogenous creation of novelty and its contingent dissemination” (Witt, 2008b). The “genuinely evolutionary feature” of institutions, technologies, language, the law, scientific theories or any set of ideas is “that they are capable of transforming themselves endogenously over time”, i.e., that they are able to create novelty (ibid.). Thus, it is the *endogeneity* of change that is seen, in a basic Schumpeterian vein, as the feature of evolutionary processes that the economist should focus on.³⁹ Endogeneity is based on the generation and dissemination of novelty.

CH postulates a linkage between biological and cultural evolution that is much more specific than anything GD has to offer on this subject. Ongoing processes of socio-economic change are argued to be weakly, but persistently influenced by the products of antecedent genetic evolution (Witt, 1999b); due to the relatively slow pace of genetic evolution, the latter are assumed to be “given” for the purpose of economic theorizing. The two processes meet, that is, particularly in (certain parts of) the human genetic endowment. As Witt (2008b, p. 550) puts it, “[t]he mechanisms by which the species have evolved in nature under natural selection pressure, and are still evolving, have shaped the ground for, and still influence the constraints of, man-made, cultural forms of evolution, including the evolution of the human economy.” This does, however, not imply that there is any similarity between these two processes: “[T]he mechanisms of man-made evolution that have emerged *on* that ground differ substantially from those of natural selection and descent.” (ibid.)⁴⁰ In particular, the former appear to be much more complex than the latter.

What distinguishes cultural evolution from biological evolution is exactly the role played by human creativity, insight, social learning and the capacity to imitate. According to CH, after their ground has been laid by the products of genetic evolution, these have established mechanisms that provide for problem-solutions (“adaptations”) that are generated and tried out much faster and in a much more volatile fashion than problem-solutions in the realm of non-human nature. They have allowed humans, now situated in a state of affluence unique to the history of man, to vastly extend their behavioral

³⁹ This is of course inspired by Schumpeter’s pioneering work on Evolutionary Economics.

⁴⁰ emphasis in the original.

repertoire, far beyond genetically encoded dispositions and capacities, as well as far beyond any need for behavioral traits to contribute to an increase in “adaptive fit”.

The way genetically programmed basic wants, dispositions and mechanisms of non-cognitive learning continue to shape economic behavior has been explored in several studies that apply the CH framework without, of course, resorting to any notion of variation, selection, or retention. It is beyond the scope of the present paper to dig deeper into these issues (but see Witt, 2001, 2004a; Bünstorf, 2006). These theories examine, e.g., the question how consumer preferences change, how individuals acquire new idiosyncratic wants on the basis of (universally shared) basic needs, why new goods and services are continuously consumed although basic wants are mostly satiable, or to understand historical changes in patterns of consumption or of production

Hence, CH delimits the range of explananda where Darwinian theories can suitably be applied. In this sense it is more general than GD. The explanatory capacity of theories of “natural selection” appears to be limited. They are able to explain the “natural origins of, for example, human learning, intentionality and deliberative behavior, but they are ill-suited to grasp the dynamics of cultural evolution that is based on these evolved capabilities” (Cordes, 2006, p. 539)⁴¹. As the way people deliberate about the question on which normative basis, under which conditions, and with the use of which kind of tools *policy* should intervene in the process of economic evolution is part of this “dynamics of cultural evolution”, these gaps of GD will be discussed again in the following section.

4. Policy and Welfare in an evolving economy

Advocates of CH believe that the Darwinian triple of variation, selection and retention does not capture what is specific and interesting about cultural and economic evolution. Their focus is on human creativity, imagination, intentionality and the specific human capacity to learn. These are of course also essential aspects in any discussion on the possibility and desirability of economic *policy-making*. This refers to attempts, supported by collective action, to solve problems of societal interaction by deliberately shaping the institutional framework underlying economic evolution. Since economic evolution may not only generate desirable outcomes, but also “spontaneous disorder” in the eyes of the individuals affected (Buchanan, 1977), there is a need for (ideally procedural) welfare considerations. We take it to be evident that policy-making should be guided by those considerations. Hence the need to discuss the possibility to theorize about policy-making and welfare in terms of an overarching conceptual scheme.

The issues involved here can be roughly classified according to the key questions that have to be answered. Notice that in an evolving economy, policy-making has to be conceptualized as a “learning process”, since neither policy problems nor policy problem solutions can be assumed to be “given”. In such an evolving setting, three questions have to be examined:

⁴¹ cf. also Witt and Cordes (2007, p. 321).

- (1) How do the participants in the political arena (policy-makers and voters) learn about new political problem solutions over time?
- (2) Is there a need to worry about the purposeful design of new political problem solutions (i.e., new rules of the market game) at all?
- (3) How do we find out what “welfare” means in an evolving economy?

These questions by and large reflect John Neville Keynes’ (1917) well-known classification of positive (explanatory), instrumental and normative statements.⁴² Question (1) evidently belongs to the positive branch of economics, while question (2) is of an instrumental and question (3) of a normative nature.

Before we start exploring these issues and the way they may (presumably) be dealt with in light of the framework offered by GD, notice that we do not aim to argue that any proponent of GD (or CH, for that matter) has already dealt with these questions in a satisfactory or unsatisfactory way. So far, Evolutionary Economics has hardly started to tackle the problem of the welfare implications of economic evolution (Witt 2003b). We do however wish to argue that any evolutionary theorist who approaches these issues risks committing certain fallacies, and that GD and CH differ in seducing him or her to commit them. What is at issue here is our claim that as a theoretical framework applied to the problem of policy implications in an evolving economy, GD will lead theory development astray.

4.1. Policy Learning: The positive dimension

As regards the first, descriptive-explanatory question, it should be noted that from an evolutionary perspective, the process of economic policy-making is essentially to be seen as a collective (and partly institutionalized) process of learning. The agents involved in the process of policy-making are assumed to have limited knowledge about policy problems and possible instruments to solve these problems. Over time, however, their knowledge constraints may change (Witt 2003b). At the same time, it is essential to account for the fact that policy problems are not simply “given”, but are creatively constructed in a complex process involving selective societal communication that is subject to agenda setting effects. Separate interest groups and “political entrepreneurs” attempt to influence the process of opinion formation, aiming at attribute particular meaning to political issues.

While a detailed examination of the mechanisms involved in this process is far beyond the scope of the present paper, we wish to show that a GD perspective may tend to distort the analysis. This is most clearly visible when it comes to modeling the learning process itself. Presumably, a theorist guided by the GD framework would model it as a process of *selection*, where those policy measures or institutional problem solutions that have

⁴² Keynes proposed to distinguish between positive economics, normative economics (closely related to “applied ethics”) and the “art of political economy”, i.e., instrumental statements that take some goal as given and contain a hypothesis about the most effective means to reach it.

proved successful in the past will have a higher probability of being applied to new policy problems than those measures that have fared less well. Technically, a policy measure or rule design would be modeled as a replicator, i.e., to quote Hull (1988, p. 408), as “an entity that passes on its structure largely intact in successive replications”. As a replicator, the policy measure or rule design would carry “instructions” which would be copied or reproduced in order to be useful for the next “generation” of political problem solvers.

This way to model things, however, risks overlooking the creativity involved in any process of policy-making that operates under the difficult epistemic conditions of an evolving economy. It is clearly not sufficient to assume that a given policy-maker or political entrepreneur who attempts to approach a policy problem will just “copy” those problem solutions that have proved to be superior in the past. Rather, choosing in light of her own personal interests, she will take several problem solutions and “mix” them in such a way as to promote her own self-interest. At the same time, though, different “authors” of former political problem solutions will try to influence this mixing process. The resulting problem solution will in any case reflect an irreducible combination of a multitude of influences (Cordes 2009). Thus, it is implausible to assume that there is one unit of selection that could be clearly delineated. It is this creativity on the part of the choosing policy-maker that appears to be neglected by approaches following the GD heuristic. From an evolutionary point of view, however, creativity is an essential part of the *explanandum* of economic theorizing. More importantly, a GD perspective risks overestimating the probability that new political problem solutions will be efficient, as they are modeled as resulting from the copying of formerly “successful” problem solutions. A GD model does of course not rule out the possibility of inefficiency, but by using the concept of replicator, it frames the whole process of learning in a way that lends itself easily to such an interpretation: Over time, successful problem solutions will prevail, regardless of the institutional structure of the political process. As Stoelhorst (2008, p. 18f.) points out, cultural mechanisms of “replication”, involving highly directed variation, only serve to increase the chances of (local) adaptive fit to occur, thereby effectively aggravate what, from our viewpoint, appears to be a shortcoming of the whole approach. For it may well be that policy’s capacity of problem-solving just keeps pace with the problems man has created in the meantime (Witt 1999b: 293).

4.2. Do we need to worry about policy intervention?

What can economic policy-making do? Does it make sense to offer advice to policy-makers or to the public at large? These questions would be meaningless if the economic system could be assumed to bring about, by itself, the solution to any societal problems that may arise. In that case, there would simply be no need to engage in instrumental policy advice, since policy-making (beyond the minimal state) would be redundant at best and positively harmful at worst. As Kerstenetzky (2000, 2007) demonstrates by taking Hayek’s work as a case in point, evolutionary economists may not be immune against such an “evolutionist” attitude. Does GD make a difference in this regard?

We will argue that the GD framework may lead the theorist that subscribes to the variation-selection-retention scheme to systematically downplay the option and to underrate the desirability of individuals to shape and manipulate their “selection environment” by means of purposeful institutional design. This risk is directly related to the comparative advantage that GD’s conceptual scheme has in the eyes of its advocates: They argue that it is ideally suited to explain the increasing complexity, functionality and “adaptedness” of those entities that have passed evolution’s “test of time” (see section 2, above). Thus, “the principal ambition of a Darwinian theory of evolution is to explain adaptedness” in an endogenous way, i.e., without any presupposition of pre-adaptedness (Vanberg 2006: 199; Stoelhorst 2008: 9f.). This is, of course, most clearly visible in the process of biological natural selection.

It is, though, strikingly implausible to postulate the absence of “pre-adapted” entities such as, for instance, designed rules, in the process of cultural evolution. On the contrary, cultural evolution (and economic evolution in particular) is not only necessarily constrained by pre-existing structures of rules, but it also proceeds on the basis of injections, as it were, of “designed novelty” (Vanberg 1994). Its basic heuristic orientation may easily induce GD theorists to gloss over these facts.

By contrast, a theoretical framework inspired by CH would not run the same risk. Rather than downplaying the presence of designed (policy) inputs within the process of cultural evolution, it would start by stressing the open-ended character of any evolving system and, hence, its capacity to transform itself. This capacity may be impaired for a variety of reasons, or it may involve generating outcomes that are deemed undesirable by the individuals affected. In those cases, the purposeful design of institutional problem solutions would obviously be required.

What is more, purposeful interventions may not only be conditionally acceptable. Within an evolving system where instrumental knowledge about the working properties of alternative policy measures and rules is scarce, they may also be a necessary (and probably the only) means available to acquire new knowledge of this sort (Kerstenetzky 2007). Creative and experimental intervention should, thus, be conceptualized as a “learning process”, whose success, however, depends on the appropriate constitutional framing (Vanberg 1994). To put it succinctly, “ignorant men cannot be but creative” (Kerstenetzky 2000: 173). This holds for market participants such as firms facing difficult environmental conditions as well as for the public at large that confronts conditions of “spontaneous disorder”.

Related to the risk of downplaying the role of “pre-adapted” rule design, a GD framework may lead the theorist to overestimate the problem-solving capacity of the economic system. Since the whole analytical apparatus is geared towards explaining the emergence of “adaptive fit”, it may be difficult to resist the temptation to predict an internal tendency to correct biases and inefficiencies. Notwithstanding the fact that neither biological nor cultural evolution *necessarily* result in anything resembling “adaptive fit”, it is evident that the vision motivating this generalized perspective on evolutionary processes starts from some idea about the character of the (temporary)

outcomes that can be expected to emerge in the course of evolutionary processes. What is more, notions such as “adaptive fit” or “evolutionary fitness” have a latently normative flavor. This will be the subject of the following sub-section.

4.3. The normative dimension

What *should* policy do? What does “welfare” mean in an evolutionary setting? How can we find out? These are the key normative issues to be clarified when we aim at examining the process of policy-making. The notion of evolutionary “success” or “progress” opens up very delicate issues (Ghiselin 1995). While it is almost trivially true that given the open-ended character of evolutionary processes, their results are not necessarily “good”, “best” or “optimal” in any meaningful sense and can even be disastrous (Hodgson & Knudsen 2008b: 57), the much more interesting question concerns the way the outcomes of these processes may plausibly be evaluated.

From an evolutionary perspective, it is evident that normative reasoning cannot start from some “given” external policy goal. Advocates of GD and CH agree that economic evolution is a non-teleological, open-ended process. This may complicate normative reasoning, but it does of course not imply that welfare considerations become obsolete. For the process of cultural evolution generates *internal* (rather than external) goals, criteria, values and norms that evolve over time and shape the individuals’ personal subjective judgments about the normative attributes of the social order they happen to find themselves in. Consequently, some individuals affected by a given social order may rather perceive it as a “spontaneous disorder” (Buchanan 1977: 27–30). Assuming that we do not disregard these perceptions entirely – i.e., we do not dismiss the principle of normative individualism – we then face the problem of how to conceptualize welfare.

As far as we know, the values and norms that shape the individuals’ negative perceptions are unique to the human species. It is essential to note the threefold nature of their moral core: To paraphrase Hayek, morality is the product of instinct, culture and reason. On the one hand, the fact that it is rooted in man’s biological origins and genetic endowment is certainly an essential tenet of any evolutionary approach to welfare. On the other hand, these values and norms are also shaped in complex ongoing processes of cultural evolution, involving processes of conscious deliberation (“reason”). It seems that an evolutionary perspective easily leads theorists to neglect this last part of the story.

To be more specific, theorists may be misled into (i) confounding primitive functions and contents of morality with contemporary ones, and (ii) disregarding the crucial role played by the specifically human faculty of autonomous reasoning when conflicting values have to be made compatible in the course of public deliberation. The contributions by Hayek (1988) and Wilson (1998), two eminent evolutionary thinkers, may illustrate the point. In his “Fatal Conceit”, Hayek argues that “as with every organism, the main ‘purpose’ to which man’s physical make-up as well as his traditions are adapted is to produce other human beings ... There is no real point in asking whether those of his actions which do so contribute are really ‘good’, particularly if thus it is intended to inquire whether we *like*

the results.” (Hayek 1988: 133)⁴³. In a similar vein, Wilson (1998: 246) tells us that ethics has “always increased the survival and reproductive success of those who conformed to tribal faiths”. If “always” is here meant *not* to cover the present, then this statement is hardly contentious. From this Wilson however concludes that the substance of ethical precepts can still be reduced to their functional background in pre-historic times. This is, evidently, a non-sequitur.

Hayek’s and Wilson’s arguments show how important it is to be clear about the precise nature of the *linkage* between biological and cultural evolution, particularly in the context of human morality, values and norms: “Our genetic heritage gives us a biological base on which to build our values, but a base is only a base” (Dennett 1997: 67). This “base” is certainly “relevant” for current deliberation on moral and, ultimately, normative policy matters, but it is so in a more subtle sense than is suggested by Wilson (and Hayek, for that matter). “Adaptive fit” cannot be translated in a straightforward manner into any of the normative goals that modern human beings may find attractive. To illustrate, modern happiness research shows that the tendency to accumulate consumer goods with strong extrinsic attributes, while certainly explainable by an urge to increase and display “fitness”, at the same time decreases subjective well-being, a much more important goal in life (Ng 2006).⁴⁴ In the course of cultural evolution, humans have developed a variety of cherished goals that have no relationship whatsoever to the primitive aim of reproduction. To quote Dennett (1997: 66), it would be “naive to suppose that the process of natural selection has somehow endorsed our pursuit of happiness as the proximal mechanism for maximizing our genetic fitness.” Our values and preferences are not “fitness-enhancing” in any sense. What is more, they are highly diverse. These facts are closely related to the vast extension of man’s general behavioral repertoire, as soon as cultural evolution released itself from the narrow confines of genetic evolution (see above, section 3.3).

Given the multitude of partly conflicting and contradictory preferences and values, normative reasoning is ultimately not a matter of understanding the norms our ancestors complied with, but a matter of free will and reasoned deliberation. The range of acceptable or “consentable” moral judgments is certainly restricted by our common moral heritage. But this restriction is easy to overemphasize. Put differently, a balance has to be struck between normative “tradition” and “reason” (Kerstenetzky 2007), allowing for the possibility to critically reflect on the “wisdom of culture”, to make for “better” rules and constitutions and to “invent traditions” (Popper 1987). It is exactly the “element of cultural indeterminacy”, due to human inventiveness and creativity that makes moral discourse meaningful (Gordon 1981: FN 19). The principles and related criteria of justice, welfare and freedom that guide policy-making are “artificially” created and re-created in a process involving genuine human reasoning and deliberation, using capacities of creativity and foresight. Apparently, GD does not offer a suitable conceptual framework to come to terms with these issues. CH seems to fare better, precisely because

⁴³ italics in the original.

⁴⁴ Ghiselin (1995) suggests interpreting “fitness” as the increase in “useful technological innovation”, without however daring to equate “useful” with “good” in any sense.

it is able to shed light on the subtle linkage between biological and cultural (including moral) evolution.

Apart from the issue of how to think about human morality, the GD framework may lead to a second problem that is, again, closely related to its focus on the “adaptive fit” or “fitness” of the products of evolutionary processes. Arguing along the lines of these latently normative notions may lead theorists engaged in the normative assessment of a system’s pattern of outcomes to overrate the system’s own “quality”, to the detriment of the quality of life of the individuals living in the system (Sen 1993). If the focus is on maintaining a certain systemic feature, then there is a strong a priori argument against any attempt to deliberately change or manipulate the course of evolution. It may, e.g., be argued that any such attempt would be futile anyway or would lead to perverse consequences by destroying the “wisdom of culture” (Hirschman 1991). It may be argued that the late Hayek was led, by its endorsement of a Darwinian perspective on cultural evolution, to such conclusions, when stating, e.g., that given the way more “successful” norms displace inferior norms over time, it would be meaningless to ask whether the individuals themselves agree to the results, since “in any case, our desires and wishes are largely irrelevant” (Hayek 1988: 134). On the basis of his group selection argument, Hayek was gradually induced to interpret evolutionary “success” in terms of group efficiency alone, i.e., efficiency detached from individual benefits (in terms of subjective well-being, say) or even detached from any recognizable normative standard whatsoever (Vanberg 1994: 183). Hence, the Darwinian way to think in terms of “adaptedness” lead him, in the realm of cultural evolution, to effectively subscribe to untenable Panglossian conclusions.

In contrast to this, Witt (2004b: 44) argues that, since processes of economic evolution are ultimately brought about by autonomous human intelligence, we cannot escape the issue of “legitimization”, i.e., the question whether and under which conditions the evolution shaped by human intelligence is “desirable”. Hence, human intelligence should take “responsibility” for the overall results that man-made evolutionary processes produce, even if within a spontaneous order, this “production” is highly indirect by being mediated through several “invisible hands” (being the “result of human action, but not the execution of any human design”, as Ferguson had it). If we accept this point of view, then it seems that notions such as “adaptive fit” or “fitness” do not give much guidance. As Dennett (1997: 66) puts it, “Mother Nature doesn’t care whether we are happy – but we care”. While our contemporary mixed bag of preferences and values has an evolutionary history, it is also quite a long one. Hence, current values differ from those of our stone-age ancestors, and even where they do not, they play an altogether different role, and perform different functions, for us than was the case for them.

5. Concluding Remarks

The debate about whether GD or CH offer the more appropriate conceptual framework for Evolutionary Economics is only about to start. After surveying the main issues of this ongoing controversy, the present paper has focused on a problem that has so far been

neglected: How can we deal with the policy and welfare problems raised by processes of economic evolutionary change? While CH stresses the fact that human intentionality, cognition, insight, imagination, creativity and social learning make socio-economic evolution much faster and more volatile than biological evolution, it may be added that it is exactly these factors that also constitute the complexity of the policy and welfare implications of economic evolution.

We have argued that to the extent that any Darwinian metaphor carries with it residual biological connotations, it is in these politico-normative spheres that these connotations will misguide theoretical reflection most effectively. In particular, it seems that the basic analytical apparatus provided by GD faces the risk of leading normative theorizing astray: From a GD perspective, the efficiency of the process of policy learning may be systematically overrated, the role of “pre-adapted” rule design may be neglected, the problem-solving capacity of the economic system itself may be assessed too optimistically, and the autonomy of the modern values and norms that guide contemporary welfare considerations may be underrated.

From this one may conclude that in an evolutionary setting, policy and welfare issues can best be approached on the basis of a generic conception of “evolution” as proposed by the “Continuity Hypothesis”. This approach aims at inspiring and organizing a research program that examines all facets of novelty, i.e., the way it is generated, the way it disseminates, as well as its meaning and its (welfare) implications. By contrast, the notion of “evolution” proposed by GD fails to deliver the conceptual and theoretical basis on which a convincing concept of evolutionary “policy implications” can be devised.

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