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The Case of (Micro-)Economics

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Monism in Modern Science

The Case of (Micro-)Economics

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Abstract

This elaboration starts by deciphering modern science as a social subsystem being loosely coupled to the rest of society (section 2.1). Additionally, the way in which modern (monistic) economics was generated within this subsystem will be sketched (section 2.2). This will be contrasted with the views that this monism would have been eroded in recent times due to imports from other sciences into economics. Conclusions as regards the necessity as well as the mode of pluralism will be drawn from this discussion (section 2.3). Picking up the disputable complexity reductions involved in the dominating (monistic) approach in economics other ways to deal with complexity inherent in the economy will be dealt with in section 3. Here a stepwise exit from the established standard approach in economics is suggested for the microeconomic syllabus consisting in the first step of an introductory pluralistic course and in the second step of a heterodox advanced course. Conclusions and perspectives resulting from such an approach are discussed in the final section.

Keywords: Monism, science, microeconomics, pluralism, neoclassical economics

JEL categories: A10, A12, A 14, A20, B20, B59, D00

1. Introduction

Taking into account the features of the modern science of economics it is not self-evident to postulate pluralism even if there should be a consensus about a dominating school of thought. What is going on in economics is – at least to a large part – determined by the economists themselves and they possibly agree that a dominant paradigm makes the participation in the scientific discourse easier. Hence, it seems to suggest itself that postulating pluralism needs a foundation that comes from outside like ethical or even political considerations. In this contribution I will not (at least not immediately) pursue this argument; instead pluralism will be legitimized by analysing the social practices in the science of economics itself. In this view pluralism is an auto-correction of scientific procedures required in specific situations for purposes defined within economics. It will be argued that generating and diffusing radically new economic knowledge is a task of modern science (like economics) and that in specific situations this can only be guaranteed by pluralism. This pluralism has to be competitive in that it tries to confront and overcome the established knowledge.

For deciphering the specificity of modern sciences (in general and especially economics) as well as for figuring out such a pluralism in terms of concepts, methods, and syllabi modern complexity theory offers helpful heuristics. The basic idea which can be used for both tasks is that in complex systems there are self-generated procedures for reducing the very large potential state space by building sub-parts the elements of which are densely related whereas the sub-parts as a whole are coupled in a loose manner. This idea of "near-decomposability" (Simon 1996) can be used as a heuristic for understanding social subsystems in modern societies like science or the economy. But because the internal relations in economics as a science are based on the construction and diffusion of knowledge mainly within science there is not necessarily a correspondence (isomorphism) between the features of the economy and the knowledge about the latter circulating in economics. To (re-)establish this correspondence (isomorphism) contrary to the simplifications being actually dominant in modern economics is the main feature of the heterodox part of pluralism in economics.

Correspondingly this elaboration starts by deciphering modern science as a social subsystem being loosely coupled to the rest of society (*section 2.1*). Additionally, the way in which modern (monistic) economics was generated within this subsystem will be sketched (*section 2.2*). This will be contrasted with the views that this monism would have been eroded in recent times due to imports from other sciences into economics. Conclusions as regards the necessity as well as the mode of pluralism will be drawn from this discussion (*section 2.3*). Picking up the disputable complexity reductions involved in the dominating (monistic) approach in economics other ways to deal with complexity inherent in the economy will be dealt with in *section 3*. Here a stepwise exit from the established standard approach in economics is suggested for the microeconomic syllabus consisting in the first step of an introductory pluralistic course and in the second step of a heterodox advanced course. Conclusions and perspectives resulting from such an approach are discussed in the *final section*.

2. Economics as a modern science

2.1 Features of modern science in general

The asserted features of science in modern societies strongly depend on the way society itself is conceptualized. Depicting it as a network of activities ($A_1 \ldots A_n$) the basic explanatory variants of a dominant dependent variable, of a dominant independent variable, and of complete interdependence may be distinguished (cf. fig. 1). It can be expected that in these cases the role and feature of science (comprising one or several of these activities) differ considerably.

X	A1	A2	A3	A4	A5	A6
A1	0	0	0	0	0	1
A2	0	0	0	0	0	1
A3	0	0	0	0	0	1
A4	0	0	0	0	0	1
A5	0	0	0	0	0	1
A6	0	0	0	0	0	0

X	A1	A2	A3	A4	A5	A6
A1	0	0	0	0	0	0
A2	0	0	0	0	0	0
A3	0	0	0	0	0	0
A4	0	0	0	0	0	0
A5	0	0	0	0	0	0
A6	1	1	1	1	1	0

X	A1	A2	A3	A4	A5	A6
A1	1	1	1	1	1	1
A2	1	1	1	1	1	1
A3	1	1	1	1	1	1
A4	1	1	1	1	1	1
A5	1	1	1	1	1	1
A6	1	1	1	1	1	1

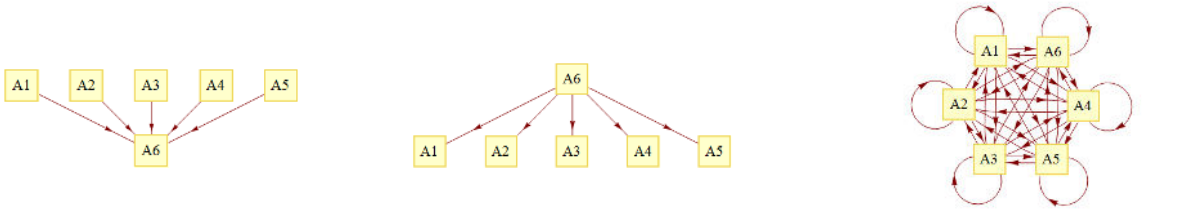


Fig. 1: Basic cases for activity dependence ("0" indicating that the row element is not (or only marginally) influencing the corresponding column element; "1" indicating a strong influence): dominant dependence (left), dominant independence (middle) and complete interdependence (right).

Complexity theory assumes that beyond these basic cases there are structures of interdependencies between activities which are crucial for the survival of the system as a whole. A prominent example of such a structure is "near decomposability" (Simon 1977; 1996, 193, pp 197, pp 207; 2002). According to this view complex systems survive by building clusters of internal activities which are significantly linked more intensely than the clusters themselves. Hence, these clusters are rather robust against changes in the other clusters coupled to them. If the coupling of the clusters is circular in some way, a system as a whole can be separated from its environment (cf. fig. 2).

Against this backdrop science in general (and economics as a special case as well) can be understood as a social subsystem being differentiated against other subsystems *firstly* by a special orientation schema specific for that subsystem ("Leitdifferenz") and *secondly* within that subsystem by a net of dense relations related to this orientation schema (contrary to the loose relations to the orientation schemata of other subsystems) (cf. Luhmann 2003). Hence, apart from the "functional differentiation" of science as a whole there is an operational differentiation within science (in terms of different disciplines, administrative roles etc.). In that view scientists generate insightful knowledge being eager that this

knowledge is perceived, modified and distributed by other scientists.[1] In that sense science is indeed about communication generating further communication. Hence, a self-referential process of opening up possibilities to connect for other researchers is at the heart of modern science. This is realized by research collaborations, conferences, journal contributions and books as well as by institutional forms of scientific communication and – not the least – the allocation of money. Linked to this process of generating, modifying and diffusing knowledge is a process of acquiring scientific reputation at the level of the scientists.[2] These observations imply that the main drivers for the processes in science are originated in the science itself: neither being dominated by interests outside the science nor dominating other fields of social activities is the main feature of modern science.[3]

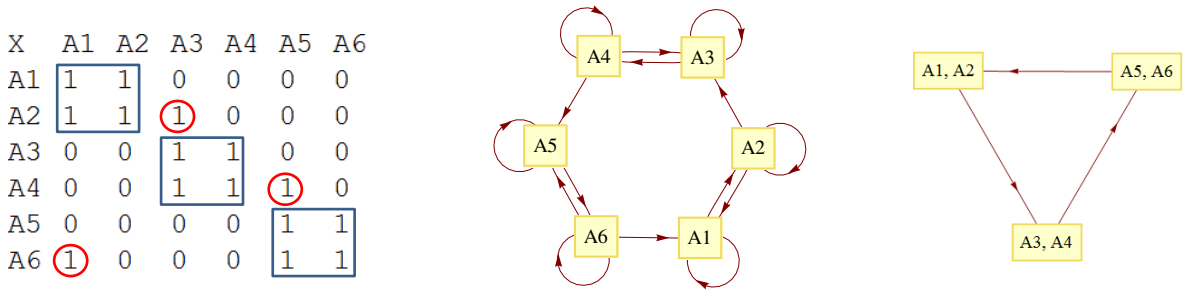


Fig. 2: Near-decomposability and modularization in a circular system: activity dependence in binary terms with modules in blue and interfaces in red (left), system graph of all elements (middle) and of simplified modules (right).

Even though the structure of near-decomposable sub-systems is already an institutionalized form of reducing uncertainty the latter remains a feature within every science. Hence, if one suggested option for new knowledge becomes accepted by a larger group of scientists this reduces the remaining uncertainty because possibilities to connect to this option are becoming calculable. Taking into account the recursive nature of scientific operations this is then tantamount to a "lock in" of these knowledge options in that the probability that scientists pick it up is the higher the more it is already accepted. Whereas the creation of such a path might be accidental (or pushed from outside the science at stake) the consolidation of such a path is endogenously produced by feedbacks or "amplifiers": the efforts to get scientific perception are economized due to economies of scale and scope, to network externalities; furthermore the amount of scientific perception and reputation itself are expanded, and the switching costs to other knowledge options are increased (path dependency in science; cf. Peacock 2009). This first order path dependence of singular research trajectories (related to a specific research topic, belief, methods etc.) can be condensed to a second order path dependence if these singular research trajectories are bundled up by assigning a common denominator

[1] Insightful knowledge is meant here as a specific type of knowledge beyond 'tacitness' on the on hand and purely instrumental orientation on the other hand.

[2] This does not exclude that a scientist gets reputation from outside the science.

[3] Which does of course not exclude, that these influences are observable in specific historical contexts.

to them. This is tantamount to a generation of "paradigms" or "research programme" in modern science.[4] If such a paradigm is becoming dominant against competing paradigms science is in a stage of monism (cf. Dusek 2008 for the epistemological dimension).

Such a modern type of self-referential science is not 'coming out of the blue'. Rather it is an arduous result of a conflict-laden historical process. At least three essential elements being a prerequisite of modern science are worth mentioned here: *firstly*, a constitutional guarantee for the freedom of scientific research *secondly*, an autonomy of science institutions (in administrative as well as fiscal terms) as regards the state authorities and *thirdly*, the (more or less) unconditional financial alimentation of science institutions and activities by the state.[5] Based on these achievements a scholarship which was predetermined by religious and/or political tasks – even if there had been different degrees of personal independence and integrity – has been substituted by profession only dedicated to generate and diffuse insightful knowledge (cf. Schülein/Reitze 2012, 107f).

Conceptualizing science in this way as a "functionally differentiated sub-system" (Luhmann 2003; 1992, pp 271) does not mean that science is operating in an autarchic manner. One the one hand it needs elements it cannot produce itself. Apart from material inputs like paper, computer and electricity it needs a human input in terms of educated individuals. Additionally, it needs something it can observe and reflect about (and this has to be accepted by other scientists).[6] Nevertheless, the way this observation and reflexion takes place is to a large degree determined from inside science. On the other hand the subsystem of science is loosely coupled to the rest of society in that the products of science are used in other subsystems and scientific research is inspired by the other subsystems. Hence science is prone to being influenced by these subsystems (as well as influencing them).[7] Rather than being a heuristic device for strictly

[4] There are similarities and differences between the drivers for creating as well as consolidating path dependence and paradigm in science on one side and economy on the other side (cf. Dosi 1988, Kuhn 1970, Peacock 2009).

[5] This is at least true for basic scientific research due to a lack of private interest to engage therein.

[6] This is also true for the special group of epistemologists: they need scientists which are not themselves epistemologists.

[7] „Die Finanzierung des Systems mag von außen gelenkt, die Meinungsfreiheit mag politisch reglementiert, die Operationen des Systems können effektiv eingeschränkt oder im Grenzfalle ganz unterbunden werden. Die mitwirkenden Personen mögen eigene Interessen einbringen, zum Beispiel Interesse an Karriere oder an Reputation. Die Organisationen mögen die verfügbare Zeit von Forschung auf Lehre verschieben oder umgekehrt. Die »öffentliche Meinung« und, in ihrem Hintergrund, die Massenmedien mögen bestimmte Themen favorisieren und anderen die öffentliche Resonanz entziehen. Das alles mag für den Erfolg der Wissenschaft (wie immer gemessen) wichtig sein, ändert aber nichts daran, daß die Wissenschaft, wenn sie als System operiert, autonom operiert; denn nirgendwo sonst kann mit der für Wissenschaft spezifischen Sicherheit ausgemacht werden, was wahr und was unwahr ist. Andere Funktionssysteme greifen in die Wissenschaft zwar ein, wenn sie in Erfüllung ihrer eigenen Funktionen operieren und ihren eigenen Codes folgen. Aber sie können, jedenfalls unter den Bedingungen der modernen Gesellschaft, nicht selbst festlegen, was wahr und was unwahr ist (es sei denn mit einer Usurpation dieser Terminologie für eigene Zwecke und mit dem wahrscheinlichen Resultat eigener Blamage). Jede außerwissenschaftliche Festlegung dessen, was nicht wahr oder nicht unwahr sein dürfe, macht sich, heute jedenfalls, lächerlich; und extern motivierte Wissenschaftskritik muß sich folglich als »Ethik« ausweisen. Man kann nicht herbeireden, daß Sonnenenergie in wirtschaftlich ausreichendem Umfange in Strom verwandelt werden kann, daß Aids nur bestimmte Gruppen betreffen könne, daß die Änderung der genetischen Strukturen des Menschen unmöglich sei oder daß der Mensch im Prozeß der Schöpfung der Welt und nicht á la Darwin entstanden sei - wie immer

demarcating isolated subsystem the idea of "near-decomposability" offers the perspective of autonomous but co-evolving subsystems, i.e. sub-systems that have their own strong internal dynamics but being nevertheless influenced by other sub-systems.

This way to view science as part of a modern society being composed (at least to a large part) of self-organized subsystems is in a way a departure of the usual explanations of what science is and how it evolves. In this respect three approaches can be distinguished: the epistemological approach, the sociology of science approach and the social system approach.

According to the *epistemological approach* the scientific observer and the observed reality can be separated and scientific evolution is tantamount to the approximation of both. Criteria according to which this approximation should be judged are suggested; in that sense this is a normative approach to scientific progress. Logical positivism (Mill 1872/2006) as a first variant of this approach is strictly focussed on empirical observability and suggests methods for transforming observed circumstances into scientific explanations.[8] According to the critical rationalism (Popper 1989) such a procedure cannot be successful in terms of verification because the explanans is already laden with pre-empirical beliefs or theory content. Hence, scientific progress cannot be defined positively but only negatively: explanations are valid as long as there is no counter proof for what is suggested by the explanation.[9]

The obvious explanatory gaps of the epistemological approach as regards the observable dynamics in modern science are the background for the *sociology of science approach*. Although scientific observer and the observed reality are still considered as separate entities in this approach, scientific evolution is not considered as an increasing progress in terms of insights and knowledge but rather as a discontinuous (non-linear) process. This is due to the social organization of science which is taken into account as an element of the explanans for what is going on in science. Hence, there is a switch from a normative to a descriptive perspective on science. The most prominent variant of this approach is originated from Kuhn (1970). Kuhn observes that knowledge in modern science is organized in form of "paradigms" meant as a bundle of problems as well as concepts and methods for dealing with these problems.[10] These paradigms are the outcome of scientific competition between different attempts to relate problems, concepts and methods making one of them dominant.[11] This dominance holds until an

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man solche Ansichten für wünschenswert halten mag. Man kann Finanzströme in diese oder andere Richtungen lenken; aber wenn die Wissenschaft nicht co-operiert, ist auf diese Weise nichts auszurichten; und wenn ihr nicht-selbst-gewählte Forschungsprogramme zugemutet werden, ist die Wahrscheinlichkeit um so größer, daß sie bei autonomem Operieren, also: beim Operieren als Wissenschaft, zu dem Ergebnis kommt, daß bestimmte Ansichten unwahr sind." (Luhmann 1992, pp 293)

[8] One example for such a method is deductive-nomological explanation suggested by Hempel/Oppenheim in which the explanans consists of antecedent conditions and laws from which the explanandum should be derived.

[9] Cf. the further development of critical rationalism by Popper himself (cf. Schülein/Reitze 2012, 160f).

[10] Path-dependency is not discussed in Kuhn (1970).

[11] Kuhn does not explain how these paradigms come about. Path-dependence, especially second order path dependence as suggested above, is an explanatory option offered by modern complexity theory.

increasing number of contradicting “anomalies” are observed and a new paradigm is established by a conflict laden process. This suggested procedural dichotomy between routine (reign of paradigm) and revolution (switch of paradigms) has been differentiated by Lakatos (1978). In his view a paradigm is not a monolithic whole but composed of a “hard core” of basic assumptions as well as beliefs and a “protective belt”: “These research programmes are characterized by a ‘hard core’ of what the scientist in the research programme regard as irrefutable axioms, surrounded by a ‘protective belt’ of auxiliary hypotheses in which the scientific work of testing and refuting is carried out. The ‘hard core’ contains a ‘positive heuristic’ which is a set of suggestions or guideposts as to the directions in which work in the protective belt should proceed. A research programme may be ‘progressive’, that is, the work in the protective belt leads to the explanation of a wider set of phenomena or to increasing empirical corroboration; or it may be ‘degenerative’, that is the research programme can only be kept alive if its practitioners have to resort to ever restrictive assumptions to sustain it and where it is no longer capable of generating new empirical corroboration.”(Mair/Miller 1991, 7)

Enhancement of perspective and generalization of what is observed in the sociology of science approach defines the social *system approach*. In this approach scientific observer and the observed reality are no more strictly separated entities, but strongly depend on each other in that the observed reality is itself considered as a social construction (in terms of observation and communication) the genesis of which can be observed by science (in terms of second and even higher order observations[12]). Scientific activities as well as their results are explained by their broader social embeddedness or to say it the other way round: the rules of science are to a large part determined by the rules governing the society at large. Hence, the evolution of science is not only non-linear but also a succession of progress and retrogression (e.g. in forgetting insights) is possible. In such a framework a combination of descriptive (what is going on?) and normative (what is an outside observer expecting?) points of view is possible. A crude variant of this approach has been put forward by Marx and was later specified by Marxists (e.g. Bernal (1939), Hessen and Grossmann as documented in Freudenthal/McLaughlin (2009)) and proponents of the ‘Frankfurt School’ (e.g. Horkheimer 1933; 1937). According to this variant science in capitalism is characterized by being subsumed under economic interests determining the direction as well as the speed of scientific research. Especially in the social sciences this implies a more or less conscious orientation of research(er) towards the requirements of these interests. Social science is then dichotomized in simply legitimizing of what appears to the observer on the one hand and in demystifying theses appearances and clarifying the hidden causes on the other hand.[13]

[12] Beyond second order observations are observations of scientific observations in theories of science.

[13] According to Marx enlightening economics is bound to revolutionary interests outside science: he sees Smith and Ricardo backed by a “revolutionary bourgeoisie” (MEGA II/3.2, 617) and himself backed by the working class: “Die eigentümliche historische Entwicklung der deutschen Gesellschaft schloß hier also jede originelle Fortbildung der „bürgerlichen" Ökonomie aus, aber nicht deren - Kritik. Soweit solche Kritik überhaupt eine Klasse vertritt, kann sie nur die Klasse vertreten, deren geschichtlicher Beruf die Umwälzung der kapitalistischen Produktionsweise und die schließliche Abschaffung der Klassen ist - das Proletariat.“ (MEGA II/6, 703) Against this backdrop his analysis of

Considering science as an operationally closed and functionally differentiated subsystem is radically different from these approaches – although it is a specification of the social system approach by means of complexity theory and by integrating insights of the sociology of science in terms of paradigms and research programmes. It turns aside from these usual ideas about science and its development: because the reality of science is assumed to be scientific communication, because there is no dichotomy between scientific observer and observed reality and an attempted approximation between both. In that sense science is not about truth; rather it is about appropriateness for the scientific community.

2.2 Modern economics

2.2.1 Development of economics after the 2nd world war

Economics as a social science has specificities which are not observable in natural sciences. A consensus about acceptable knowledge is more difficult to achieve because the possibilities for exact observation and experimenting are more limited and hence the spectre for 'creative construction' of insights is not that limited. In that sense economics can be regarded as a 'moral science': „I … want to emphasise strongly the point about economics being a moral science. I mentioned before that it deals with introspection and with values. I might have added that it deals with motives, expectations, psychological uncertainties. One has to be constantly on guard against treating the material as constant and homogeneous. It is as though the fall of the apple to the ground depends on the apple's motives, on whether it is worth falling, and whether the apple wanted to fall, and on mistaken calculations on the part of the apple as to how far it was from the centre of the earth."(Keynes 1938/1973, 300)[14]

Attempts have been made to understand the recent development in economics by using the aforementioned approaches to the evolution of science (with the exception of the social system approach): logical positivism, critical rationalism und the sociology of science (cf. Hands 2001). But it turns out, that the traditional explanations for science development are only of limited explanatory value when applied to social sciences in general and to economics particularly. Especially the epistemological approach is applicable for social sciences (such as economics) only in a limited way. „Returning to the idea that economists are unable to rule out various assumptions that may lead to similar conclusions, the issue for us is how to choose between two (or more) theories, *none* of whose premises can be verified exactly as either holding or not, and none of which can easily be disentangled via either observed data or giant natural experiments." (Athreya 2013, 16) Rather, the constructions used for getting insights in economics should be judged on a plausibility basis (e.g. by avoiding contradictions to the knowledge communicated in other sciences) without sharp discrimination criteria applicable. Hence, in economics a type of „organized storytelling……to persuade others" (ibid. 2013, pp

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the "decay of the Ricardo-school" (MEGA II/3.4, pp 1260) might be read exemplarily as a switch from enlightening type to legitimatizing type of research in economics.

[14] Keynes borrowed the apple metaphor from Montague (1893, 367). Here all sciences which are not related to physical observations are classified as "moral". (I thank Ingo Barens for this hint)

13) is going on. This constructive story telling can be linked to the limits for directly observing the causal elements, especially if they are inner states of individuals.

Nevertheless, economics is obviously a specialized modern science: it is separated from other social sciences (operational specialization), not dominated by outside interests nor is it dominating other social sub-systems.[15] The nature of scientific communication is mostly self-referential.[16] Accordingly, a multitude of singular path creations and consolidations (combining topics, methods and beliefs) could be observed in recent times (e.g. theory of production, market form theory, growth theory). Additionally, a second order path creation and consolidation has taken place after the 2nd world war[17] thereby synthesizing several hitherto separated singular paths to a paradigm especially by elaborating a unified and consistent formal treatment for the state spaces of households and firms as well as for the way they operate in these state spaces and the information requirements involved. Correspondingly, the properties of an overall equilibrium for these entities have been specified in terms of existence, uniqueness and stability (cf. Hicks (1939/1962), Samuelson (1947), Koopmans (1957), Arrow/Hahn (1971); for an overview cf. Weintraub 1993, pp 59; Ingrao/Israel 1990, pp 217).[18]

This was accompanied by strengthening the autonomy of economics in separating the economic knowledge from the social neighbour disciplines. Whereas before the 2nd world war it was not unusual to link knowledge from psychology, sociology and political science to the economic knowledge proper (as can be easily verified by taking into account the classical economist, the early neoclassicals as well as the different schools in pre-war economics), after the war this was substituted by an attempt to figure out a "pure economics". References to psychological knowledge were obliterated in the construction of the homo oeconomicus, references to sociology were obliterated by the devise of methodological individualism[19] and

[15] The thesis in the text runs counter hypotheses about the economy becoming a hegemonic subsystem subsuming science as well as counter hypotheses about science itself subsuming other subsystems.

[16] "Most mainstream macroeconomic theoretical innovations since the 1970s (the New Classical rational expectations revolution associated with such names as Robert E. Lucas Jr., Edward Prescott, Thomas Sargent, Robert Barro etc, and the New Keynesian theorizing of Michael Woodford and many others) have turned out to be self-referential, inward-looking distractions at best. Research tended to be motivated by the internal logic, intellectual sunk capital and aesthetic puzzles of established research programmes rather than by a powerful desire to understand how the economy works - let alone how the economy works during times of stress and financial instability. So the economics profession was caught unprepared when the crisis struck."(Buiter 2009, 2)

[17] Creating and stabilizing this meta-path, was heavily influenced by the activity of institutions like Cowles Commission (according to which "science is measurement"), Econometric Society on the one hand and externally created reputation-hotspots in the selection of Nobel prize winners in economics on the other hand. This kind of institutional influence on establishing a dominant conceptual path in economics has to be separated from institutional influence directed to create a "neoliberal" policy orientation e.g. by the Mont Pelérin Society. It has been shown, that the conceptual background for this policy framing is rather ambiguous (cf. Mirowski 2013, pp 50).

[18] This was intended also as a way to overcome the separation between microeconomics and microeconomics the main source of which was the work of Keynes. In that sense the "neoclassical synthesis" as well as the dynamic stochastic equilibrium models are two stages of getting rid of the 'aberration' resulting from Keynes' contributions and of re-establishing the general equilibrium frame work as a backbone of all economics.

[19] The idea of explaining social phenomena by starting with the individual originates in the early work of Schumpeter. According to him this methodological device allows to get rid of all sociological inferences and to constitute a closed "pure economics". "Nicht darauf kommt es uns an, wie sich die Dinge wirklich verhalten, sondern wie wir sie schematisieren oder stylisieren müssen,

references to political science obliterated by elaborating welfare theory (and later on public choice). According to the concept sketched above this is another step in operational differentiation within the social sciences.

The final component of post-war economics was a switch to a performance driven science. The basic idea behind this switch is the mapping of scientific quality into quantity by figuring out frequency measures on different levels. This mapping is used as an allocation device for resources as well as reputation in the realm of science. That means, the more knowledge options are accepted and diffused the more these options will be rewarded. This can be read as an explicit acknowledgement of the self-referential nature of scientific communication. Conversely, this nature is further strengthened by these procedures.

To summarize, synthesizing different paths to a consistent paradigm, strengthening the autonomy of this paradigm and finally the frequency dependence of resource allocation generate a strong 2nd order path creation and stabilization in economics after the war.[20]

Such a diagnosis of strong paradigm domination in post-war economics is in sharp contrast to the smooth diffusion models of competing paradigms suggested recently by several authors. According to Colander et al. (2004, pp 458) the economic profession itself should be considered as a complex system in which a tension between a conservative core and a critical "edge of profession" interact: "The very concept of an edge of the profession is designed to suggest a profession in which there are multiple views held within the profession, and goes against the standard classifications of economics. Those standard classifications convey a sense of the profession as a single set of ideas. In our view, that is wrong; it is much more useful to characterize the economics profession as a diverse evolving set of ideas, loosely held together by its modelling approach to economic problems." (ibid, pp 486). Astonishingly, the authors do not explain what the complexity feature of the specialized science of economics really is and how order (out of "multiple views") is generated within such a system. – Another concept about the way economics evolved is presented by Davis (2006). He suggests a vintage model consisting of different layers (L_i) representing the different discourses. In the course of time new layers come up (often by importing ideas of other sciences) devaluating the existing layers.

Both suggestions strictly contradict the conceptualization of science development as an uneven process being shaped by self-generated and reinforced commitments to overcome uncertainty as suggested by the social system approach sketched above as well as by the sociology of science approach of Kuhn and Lakatos. According to the latter views only incremental addenda at the belt of the paradigm will be accepted by the majority of the scientific community (onion model). In Fig. 3

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um unsere Zwecke möglichst zu fördern, das heißt also, welche Auffassung die vom Standpunkte der Resultate der reinen Ökonomie praktischste sei…..Wir wollen gewisse wirtschaftliche Vorgänge beschreiben und auch das nur innerhalb ganz enger Grenzen. Die tieferen Gründe derselben mögen interessant sein, aber sie berühren unsere Resultate nicht. Sie gehören zu dem Gebiete der Soziologie…." (Schumpeter 1908/1970, 93f) Later on this methodological device was coined by Schumpeter coined as "methodological individualism" and distinguished from "political individualism" and "sociological individualism" (cf. Schumpeter 1965, 1083f; Hodgson 2013, 32f).

[20] Dobusch/Kapeller (2009, 877ff) show that network effects, economies of scale and scope as well as sunk costs and the mainstream bias in performance-dependent resource allocation play an important role in generating this quasi-monistic structure in post-war economics.

the difference between the 'optimistic' layer model und the 'pessimistic' onion model is illustrated.

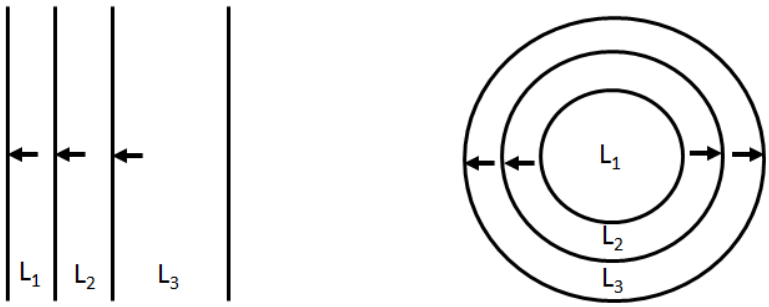


Fig. 3: Layer model (left) and onion model (right) of scientific evolution.

2.2.2 Orthodox mainstream – a straw man?

A lot of authors (Colander 2000; Colander et al. 2004; Davis 2006; Vromen 2007; Hodgson 2013, 8) pretend that a part of the recent post-war development in economics has been a new kind of pluralism. According to this diagnosis concepts originating from outside economics have been imported and assimilated by the latter and thereby generated new fields of economic research eroding the borders of mainstream economics. Hence, the old-fashioned mainstream is assumed not to exist anymore.[21]

The following new concepts and the corresponding research are mentioned in this context:[22]

[21] The arguments for backing this assessment are quite different. Colander (2000, 135f) mentions intertemporal allocation, renunciation of utilitarism as well as marginalism and bounded rationality as enhancements of old neoclassical orthodoxy but does not deny that its kernel in terms of individualism, maximization and equilibrating still maintains. Colander et al. (2004, 486ff) go a step further in pretending that this core will be eroding in the course of time due to the critical impetus coming from the "edge of profession" which as a whole is seen as a complex system. This theoretical vision boils down the practical hope of the authors that enlightened members of the core mercifully accept ideas articulated at the edge. Vromen (2007, 68f) has argued that in economic research specifying rationality by goal maximization has recently been substituted by assuming "formal consistency requirements" (ibid.); according to him equilibrium is no longer conceptualized as an optimal state but rather as a "consistency of mutual expectations" (ibid.) and finally that the selfishness of the individual is not a necessary postulate anymore. Vromen is of the opinion, "….that current economic research at the frontiers of the discipline can no longer be characterized in the standard terms of self-interested and fully informed (perfectly) rational individual behaviour and aggregate (comparative) static equilibrium analysis."(ibid., 69) From this alleged relaxation of the traditional core axioms of neoclassical economics Vromen draws the conclusion, "…that the boundary lines between orthodox and heterodox economics have increasingly become blurred."(ibid., 71). Davis (2006) is not showing but simply assuming that in economics there is a turn away from "neoclassical dominance" but neither the latter nor the turn away is specified. Instead he presents a concept of scientific development for legitimizing his assumption (cf. the discussion of the layer model above).

[22] Cf. Colander et al. (2004, 496), Davis (2006, pp 1); Vromen (2007). "This plurality of theories is also evident in their content, and the changing nature and scope of evidence, reflecting an increasing

- In the realm of microeconomics property right and transaction cost economics hinting to the role of institutions and information asymmetries, game theory as a concept taking systematically into account the activities of others as a determining factor for own pay off, behavioral as well as experimental economics with its orientation towards observations (instead towards axioms) and by hinting to the violation many rationality standards – at least in the lab;
- In the realm of macroeconomics the taking into account of multiple equilibria, complexity economics using formalisms for analysing non-linear system with emergent properties, and finally evolutionary economics focussing not only the biological foundation of behaviour but also the dynamics of populations composed of heterogeneous elements.

This is a rather disparate assembly of recently upcoming strands in economics which needs further qualification as regards the plurality-hypothesis mentioned above. *Firstly*, complexity economics as well as evolutionary economics are up to now heterodox side streams. This can be derived not only from their basic conceptual ideas explicitly based on criticizing the postwar-paradigm in economics mentioned above.[23] Furthermore this side stream nature is obvious if one looks at quotation frequencies in economic journals as well as books. *Secondly*, the remaining concepts and research fields can be each divided into one part the focus of which is to harmonize the enhancement and complication at stake with the paradigmatic state of the art in post-war economics and another part in which perspectives beyond this realm are at the centre of research (cf. Dobusch/Kapeller 2009, 870, 892). This last part is not yet fully discussed as regards its implications for a non-mainstream economics.

The background for these relaxations of the 'old-fashioned' specification of neoclassical economics seems to be a particular field of research which has been hyped recently: experimental game theory and behavioural economics (cf. Vromen 2007, 70f; Arnsperger/Varoufakis 2006, 9f, 11f). If this is the case, the question arises whether the conceptual and methodological enhancements arrived at in this specific field of research can be considered as pars pro toto for economics as a whole. At least the experimental underpinning of theory building confines this kind of research to areas in the economy which are accessible for experiments and excludes those, which are not.[24] Hence it can hardly be classified as being

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understanding of plurality in the subject matter. Thus, by considering the possibility of different information sets among different categories of economic actor, rational expectations theory generated multiple equilibria. This outcome jeopardised the clear implications which had earlier been drawn from the strong rational expectations hypothesis. Similarly, behavioural economics took on board different attitudes to risk in order to explain more complex behaviour in financial markets, and new types of evidence were gathered on the basis of experiments, and happiness studies have gathered new evidence based on surveys (....). Game theory took on the implications of interaction between different interest groups, and so on. Increasing analysis of heterogeneous agents reflects a movement away from the idea of the representative agent in an effort to capture more effectively a complex reality (see for example Kirman). Thaler predicts a continuation of this trend. Nevertheless the resulting complexity of the disciplinary landscape can be seen as being unified by the shared purpose of a general systematisation of agents' rational behaviour under certainty and uncertainty conditions, including interactive behaviour (.....)." (Dow 2008, 77).

[23] This assessment does not contradict the fact that former adherents of „The Economy as an Evolving Complex System" return to the realm of neoclassical economics (cf. Blume/Durlauf 2006, 2). Human beings and their thinking are no exception from evolving complexity including retrogression.

[24] The realm of this research is even more constrained if it is taken into account that there is a common sense between experimental economists about the necessary design for experiments (e.g.

representative for the whole discipline. Apart from that, the knowledge gained in the field of behavioural and experimental economics has not yet successfully passed the test of being canonically consistent. Whereas the 'old-fashioned' constructs of neoclassical economics (selfish perfectly informed individual, maximization of goals under well specified constraints and Pareto-equilibrium) are complementary to each other and by this constitute(d) a paradigmatic whole, this is no more the case if the suggested relaxation of these constructs is assumed. How behaviourally enriched individuals interact in the market and what kind of outcome they are able to generate is by no means answered through this research.[25] The more the scientific mapping of individuals diverge from homo oeconomicus the more ad hoc assumptions are necessary to ensure mutual compatibility of individual decisions and – even more ambitious – any kind of equilibrium.[26] These ad hoc assumptions are not required if methodological individualism and methodological instrumentalism are supposed as axioms. Hence, even for this specific part of economics it is not shown that the modifications of the standard definition of neoclassical economics can be synthesized into a consistent concept being a challenge for the mainstream. In picking up the notions suggested for the development of modern science above it can be asked whether the new singular paths of economic discourse are still compatible with the second order path dependence and the corresponding paradigm emerging in economics after the 2nd world war or not. Hence, behavioural/experimental economics is ambiguous as regards its implications for modern mainstream economics. One part is focussed on divergences from the rationality standards determined by the expected utility concept in terms of "anomalies". Here the main focus is on the robustness of these effects and, in case of robustness, on how to mitigate them in such a way that the mentioned rationality standards can be re-established.[27] The other part is based on the assumption that these violations not only persist but furthermore are often 'ecologically' rational in that they are adequate for much decision situations ("fast and frugal heuristics"). This can be considered as a starting point for figuring out a behaviorally informed concept of economic agent.[28] The same can be observed in the other fields of modern economic discourse mentioned above: Most part in transaction cost economics is devoted to the task of enhancing incentive structures and efficiency criteria in such a way that the usual rationality and equilibrium assumptions still apply. Most part in game theory is focussed on the modification of the equilibrium concept (especially by including Nash equilibrium) and on figuring out the conditions achieving it in different game situations. Hereby Pareto efficiency still remains the reference idea.[29]

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excluding intransparent situations and deception, including monetary reward etc. (cf. Camerer 2011).

[25] According to the experimental orientation mostly interaction in small groups by applying stylized settings is investigated. But even in this stylized interaction environment an equilibrium outcome – even one with multiple equilibria – is not guaranteed (cf. Fehr example).

[26] Assuming the new relaxed axioms suggested by Arnsperger/Varoufakis (2006) it can be asked furthermore if methodological individualism is itself prone to ambiguity if social attitudes (like reciprocity, altruism etc.) as well as a dependence of present individual action on past social outcome is assumed (cf. ibid., 10). Contrary to the traditional neoclassical concept then an unexplained social disposition of the individual as a precondition for his way to act is hypothesized.

[27] Cf. Sunstein (2014), Mirowski (2013, pp 256), Berg/Gigerenzer (2010).

[28] Cf. Gigerenzer (2011), Beckenbach (2015).

[29] According to the ambiguous nature of these discourses mentioned above there are also components in transaction cost economics (e.g. by introducing asset specificity and the

Taking the above mentioned ambiguity of the new discourses in economics into account it seems plausible to diagnose a shift to a modified axiomatic structure of neoclassical economics still allowing to draw borderlines between neoclassical and non-neoclassical economics: "Once upon a time, it could be argued that neoclassical economics is typified by a familiar melange of theoretical practices: positing an equilibrium in the labour market, the habitual recourse to Say's Law, the assumption that the interest rate will adjust automatically so as to equalise investment and savings, the depiction of capitalist growth à la Robert Solow and company, the imposition of Cobb-Douglas or CES production and utility functions etc. Nowadays, any attempt to define neoclassicism by reference to these practices is music to the neoclassical ear: For there is an endless list of mainstream models which distance themselves from some, if not all, of the above. One of two conclusions appear in front of us: Either the mainstream has moved on from neoclassicism (as neoclassical economists claim) or the definition of neoclassicism needs to be re-thought and abstracted from a list of neoclassical practices like the one above. We choose the latter."(Arnsperger/Varoufakis 2006, 7) According to these authors the axiomatic hard core of modern neoclassic economics consists of three components:

- Methodological individualism, i.e. "…..the idea that socio-economic explanation must be sought at the level of the individual agent."(ibid., 8)
- Methodological instrumentalism, according to which "….all behaviour is preference-driven or, more precisely, it is to be understood as a means for maximising preference-satisfaction. "(ibid., 8) and
- Axiomatic imposition of equilibrium which is tantamount to a theoretical three-step move: "First, one discovers an equilibrium. Second, one assumes (axiomatically) that agents (or their behaviour) will find themselves at that equilibrium. Lastly, one demonstrates that, once at that equilibrium, any small perturbations are incapable of creating centrifugal forces able to dislodge self-interested behaviour from the discovered equilibrium."(ibid., 11)

Moreover, an important part of the hard core remained untouched by this new research. These parts are not discussed neither by the adherents of the 'new pluralism' nor by Arnsperger/Varoufakis. Such parts are the basic worldview behind most components of modern economics, a sample of characteristic methods as well as the opinion leading institutions (vergl. Dobusch/Kapeller 2012, 1038). Additionally the basic tenets (or axioms) have to be accomplished. Hence, the complete structure of the mainstream (or modern neoclassical economics) can be summarized as follows:

- The basic world view is focussed on notion of scarcity as the distinctive foundation of economics. Scarcity as an individual relation between limited means and unlimited ends does not only exclude situations with satiation but is furthermore mediated by social processes (e.g. market operations and technology configurations) and therefore cannot explain anything in itself. Finally such an approach to economics is eo ipso ignorant against the different historical forms in which scarcity manifests itself and is dealt with.[30] This is

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fundamental transformation) and game theory (e.g. by including bounded rational players) which are indeed critical against the mainstream.

[30] Scarcity as the main focus of economics has been put forward by Robbins (1935, pp 15). This has been an early signpost for the research in favour of a paradigmatic pure science of economics (ibid., pp 64, pp 70) which took place later on and which eliminated the "…statesmanlike vagueness in the

tantamount to explain and legitimize the specificities of modern (capitalist) market economies by referring to circumstances which are much more general in terms of historical validity. Hence, the level of generality in the explanans and the explanandum systematically diverge or to say it in other words: there is a wrong identification of necessary and sufficient condition in scientific explanation.[31] The specific social conditions which have to be dealt with here remain hidden behind the suggestive use of more general and universal considerations. Hence, there is a basic ignorance against "social forms" (Marx) or historic specificities in the economy (cf. Hodgson 2001) in this ideology of scarcity (Söderbaum 1994).

- There are multiple – partly relaxed – tenets (axioms) (TN) the endorsing of which are still typical for a large part of modern economics. They can be grouped as follows: [32]

  – Action theoretic tenets are (TN_1) a given stylized state space[33] in which agents can operate and (TN_2) an ability of the agents to attain all information relevant for their action;

  – Action is modelled as decision; the corresponding decision theoretic tenets are the (TN_3) the idea that any decision is structured by preferences, i.e. a subjective ordering of available decision alternatives, (TN_4) a separation of this ordering from constraints, (TN_5) a clear distinction between cause and effect (unidirectional two level explanation) and – by taking into account the action theoretic tenets – (TN_6) a maximization rule as regards the decision alternatives;

  – Interaction is modelled by starting from the individual, i.e. by pursuing (TN_7) the methodological individualism;[34]

  – (TN_8) The outcome of interaction is assumed as to be in equilibrium or the focus is on conditions making such an equilibrium possible.[35]

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description of the postulates…" (Koopmans 1957, 136) inherent in Robbins' suggestions. Some aspects of this conformity between Robbins' early definition of economics and its axiomatization of later on are analysed by Backhouse/Medema (2009).

[31] The most prominent example in this respect is the explanation of prices in general by referring to the notion of scarcity. In almost every textbook on microeconomics you can find a type of reasoning starting from the phrase "If there is no scarcity, there are no prices" and deriving from that the conclusion "Prices have to be and can be explained by scarcity". Even if scarcity (in which form ever) should be a necessary condition for prices coming into existence, the former is by no means a sufficient condition for explaining the latter.

[32] The literature is only mentioning parts of these tenets: e.g. Hodgson (2013, pp7) discusses TN_3, TN_4, TN_7 and TN_8. Arnsperger/Varoufakis refer to TN_3, TN_6, TN_7 and TN_8.

[33] 'Stylized' is meant here not in the sense that inessential features can be neglected in a scientific abstraction but rather as a requirement of formal/mathematical manipulation. Most prominent example is the convexity assumption.

[34] If methodological individualism is proposed in strict terms by taking the individual and only the individual as explanans and interaction as well as all sorts of economic structures as explanandum this methodological device can only be maintained by smuggling in unexplained elements (cf. Hodgson 2013, pp 31).

[35] The relaxed way to use the equilibrium concept can be illustrated by referring to Blanchard (2008, 27): „A macroeconomic article today often follows strict, haiku-like, rules: It starts from a general equilibrium structure, in which individuals maximize the expected present value of utility, firms maximize their value, and markets clear. Then, it introduces a twist, be it an imperfection or the

- Corresponding to such a sort of analysis there is a sample of methods which are typical for the mainstream: generally a preference for calculus and especially maximization methods as well as methods of game theory[36] and finally econometric methods for the data fitting.

- Finally organizational features have to be mentioned as a component of mainstream economics: accepted academic practices as well as established institutions are of essential importance here.

Hence, contrary to the hypothesis of a new pluralism it seems more appropriate to characterize the current situation as an ongoing dominance of a modern neoclassical mainstream. Its core has been partly modified and partly it is accomplished by side-streams mainly engaged in integrating new subject matters. In that sense the onion model of scientific development is more adequate than the layer model mentioned above (cf. section 2.2.1). Or to put it terms of Lakatos' research programmes: the research in experimental as well as behavioural economics can be qualified at the most as driving the neoclassical research programme towards becoming "degenerative" in that it includes a threat for some traditional core axioms because neither their generality nor their compatibility can be guaranteed anymore.[37] Whether this threat can be fend off remains to be seen in the future.[38]

2.3 Need and varieties for pluralism

2.3.1 Need for pluralism

Usually the need for pluralism is derived from normative considerations in that the adherents postulate it without qualifications as a basic requirement of scientific research.[39] From an analytical point of view this is not convincing if this postulate is unconditional because pluralism (of what kind ever) is not a prerequisite for the

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closing of a particular set of markets, and works out the general equilibrium implications. It then performs a numerical simulation, based on calibration, showing that the model performs well. It ends with a welfare assessment." Quiggin (2010, 105) relates this practice to the procedures of 'normal science': "The requirement to stay within a step or two of the standard general equilibrium solution yielded obvious benefits of tractability. Since the properties of general equilibrium solutions have been analysed in detail for decades 'modelling general equilibrium with a twist' is a problem of exactly the right degree of difficulty for academic economists. The problem is hard enough that solving it requires, and exhibits, the skills valued by the profession, but not so hard as to be unsoluble, or soluble only by abandoning the frame work of individual maximization."

[36] Some authors additionally refer to mathematical formalism per se as an essential mainstream feature (cf. Lawson 2015; Dow 2008). In this general form this argument cannot be substantiated: there are also heterodox concepts using mathematical formalisms (e.g. evolutionary economics complexity economics and – to a part – postkeynesian economics). Rather, it is a special type of mathematical formalization (calculus and optimization algorithms) and a specific way to attribute semantic contents to formalisms which is typical for modern mainstream (cf. Dow 2008, pp 80).

[37] This corresponds to Dow's distinction between „official discourse" and „unofficial discourse" (Dow 2008, 79).

[38] Two options for such a defence can be derived from the literature: (i)constructing protective belt mechanisms for re-establishing the traditional axioms (e.g. giving homo oeconomicus a new chance by way of 'nudging') and (ii)relaxing and generalizing the axioms in such a way that they are still compatible with each other and remain valid for the whole realm of economics.

[39] Mostly these postulates are specified in terms of epistemological, ontological and methodological requirements (cf. Dow 2008, Dobusch/Kapeller 2012, pp 1041).

working of a modern science sketched in section 2.1. Hence, the question is, whether there are analytical arguments in favour of pluralism taking into account the observable social practices in modern sciences.

Considering research, the development of economics especially after the 2nd world war has manifested that a normal science can get stuck into one paradigm or narrowly defined research programme. Reduction of uncertainty and transparent opportunities for building up reputation make these fixations popular for the scientists. But at least in three respects the role of modern science can be threatened by such a development. *Firstly*, according to the Leitdifferenz which is the backbone for the modern autonomy of science, the main task of scientific activities is to generate and diffuse new insightful knowledge. This task can be fulfilled only in a limited way if scientists are orientated to an established ensemble of knowledge. At least radically new knowledge is then impossible. *Secondly*, science in general and especially economics is evolutionary in nature: new and unexpected possibilities of scientific observation as well as unforeseen explanation requirements make a given and accepted knowledge stock vulnerable to change (cf. Veblen 1898; Georgescu-Roegen 1966, pp 3, pp 92; Dow 2008, pp 83). Focussing and preserving such knowledge runs the risk of blocking this evolutionary nature. *Thirdly*, if establishing a paradigm/research programme is coupled with a higher degree of autonomy in that the science at stake gets (more) independent of neighbour sciences such a (more or less) complete decomposability is in contradiction to the near-decomposable nature of the real world. Ignoring the isomorphism with the real subject-matter is not a problem in itself, as long as it is accepted in the science. But for logical reasons it generates problems of internal inconsistency and – at least in the long run – of legitimacy of that science.[40] *Fourthly*, in a "moral science" (in the sense of Keynes quoted above) scientists have to care for self-reflectivity: the focus they choose as well as the generalizations they pretend in their theories have to be questioned every time because there is simply no objective knowledge in a social science like economics. Economic knowledge is a construction the main and first purpose of which is to enable scientific communication; therefore the appropriateness of these constructions for getting insights need ongoing reflections (cf. Dow 2008, 81f). A dominating paradigm (monism) is tantamount to abolish such a self-reflection.

Related to scientific research is the instruction/education as a part of science. Here not only the education of scientists themselves is at stake. Rather, in modern societies with large fields for applied sciences, science has to deliver knowledge and methods for instrumental qualifications. Against this backdrop instruction and education as a part of the institutions of science (especially universities) have some specificities from which requirements for this part can be derived. Its main focus is not on specialized (rather quick devaluated) knowledge but on self-reflectivity, meta-qualifications and general problem solving abilities (cf. Weehuizen 2007, pp 155; Garrett et al. 2010, pp 219). Hence, there is a necessity not only to offer a consistent educational perspective in methodological terms but also for presenting different concepts to structure and handle knowledge. This is an implication of delivering meta-qualifications and of the varieties of problems which have to be solved later on the job. Hence, multiple perspectives are a generic feature of scientific instruction and education. Here pluralism is not only necessary as

[40] A straightforward example is economic policy: if it is conceptualized in the closed frame work of (welfare) economics no convincing recommendations for solving real world problems can be given.

safeguarding against missing the task of science as in the case of monism but rather an indispensable permanent feature.[41]

2.3.2 Complementary vs. competitive pluralism

Considering the current state of economics in research as well as instruction/education there seem to be good reasons for establishing pluralism without referring to the normative constructions of the epistemology of science. A straightforward way to implement that pluralism would be to complement monistic mainstream economics by revitalizing the components it has skipped when becoming dominant (complementary pluralism).[42] First of all that would imply to (re-)consider the contributions of psychology, sociology and political science could offer for solving problems in economics or at least to correspondingly broaden the perspective of economic analysis. Additionally, institutionalizing self-reflection in economics in terms of giving the history of economic thought, epistemology and ethical considerations in economics a greater importance would be a part of such a complementary pluralism. Finally, broadening the spectre of subject-matters of economics by focussing important but neglected topics (like justice, gender, environmental degradation) is an essential element of this kind of pluralism.

Even though such an enhancement would create an environment for relativizing mainstream economics the latter remain untouched in its essential elements. Therefore, there is a need for competitive pluralism. The focus of this kind of pluralism is to figure out concepts and theories having the same subject matter as mainstream economics but that do not share any (or most) of the tenets of the latter. This does not exclude that similar methods are used if they are promising in terms of new insights.[43] Accordingly, such a competitive pluralism should demonstrate the possibility of enhancing the knowledge base of mainstream economics e.g. by showing a higher level of generality, and/or more plausibility and/or higher empirical evidence.[44] The main goal of such a competitive pluralism is to erode the current mainstream in economics. Whether this may lead to a new mainstream in the future remains an open question.[45]

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[41] This is in sharp contrast to the narrow mindedness of mainstream education and hints to its disorienting role as regards instruction and education (cf Vromen 2007, pp 74; Hodgson 2013, 5 for an overview).

[42] Most suggestions under the headline 'pluralism' can be assigned to what is called here complementary pluralism.

[43] Hence, appropriate mathematics has its place in such an endeavour (contrary to what Lawson 2015 is proposing).

[44] This is not a plea for heterodox monism in that the superiority of a concept/theory cannot be stated objectively (cf. Dow 2008, pp85). Rather, it is a plea for competing constructions of economic knowledge.

[45] In that sense this kind of pluralism is fundamentally different from the idea of "interested pluralism" favoured by Dobusch/Kapeller (2012, pp1043): it is not assumed that a dominant paradigm situation can be transformed (by the goodwill of the players in science) into an overarching "ideal speech situation" à la Habermas. Rather pluralism is a contest which has to be organized by dissenters alone on the level of arguments, methods and practices. What happens if this contest situation is neglected can be studied by considering e.g. the fate of the journal "ecological economics" which starts as a dissenting journal (in a sense assuming an "ideal speech situation") and which is dominated now by the neoclassical mainstream.

3. A stepwise exit from orthodox mainstream: the case of microeconomics

3.1 Heterodox side-stream – a chimera?

Although the features of mainstream economics may be a starting point for explaining the heterodox alternative the latter is not conceptualized as a simple anti-thesis to the neoclassical mainstream (whatever may its status quo). According to the specificity of knowledge and insights in science in general and particularly to the post-war situation in economics (cf. section 2.1 and 2.2 above) there is a need for a competing paradigm the components of which are consistent with each other. As guidelines for figuring out such a paradigm are suggested: availability of concepts, primary focus on plausibility and empirical support instead on generality, precision and elegance (cf. Vromen 2007, 87) and finally conceptual openness towards the neighbour sciences. In such a context the modern neoclassical concept turns out to be a special case with limited explanatory power. Contrary to what Vromen presumes this is not an all-aspect-all-theories-approach (ibid. 2007, 72ff) but focusses on the main topics of microeconomics and macroeconomics.

Going beyond the homo oeconomicus construct as well as methodological individualism is an implication of taking bounded rationality seriously. No simple (static) aggregation of autonomous entities is possible if technological as well as behavioral interdependencies are acknowledged as a normal state of the art. Rather, the (past) results of interaction are a determining factor for (actual) individual decision: there is a recursive aggregation including an explanation of the individual by the economic interaction outcome. This is of special importance if the interaction outcome cannot be deduced from individual properties (emergent phenomena). In such a perspective institutions as frozen and sanctioned interaction outcomes are an essential part of economic analysis. Hence the catch word here is at least recursive methodological individualism or even a combination of methodological individualism and methodological holism.

Heterodox approaches leave maximizing behaviour and methodological instrumentalism behind. In this respect the neoclassical vision is composed of two assumptions: a stylized (smooth) state space (e.g. convexity, continuity) and consistency requirements as regards the decisions in this state space. Besides didactical reasons there is no need to transfer these assumptions into the realm of a heterodox approach which is oriented towards a “plausible” mapping of observable state spaces as well as decision procedures. Hence, the main topic of the heterodox approach is to relate different state spaces with the selection of appropriate decision procedures. Neither ‘difficult’ (large, complex or even uncertain) state spaces nor sub-conscious ways of deciding and acting (e.g. routines) are excluded. In such a context two features come up which are alien to the modern neoclassical approach: *firstly*, the criterion for rationality of actions is no longer the same for all individuals but rather determined on the individual level by way of selecting an action mode or by pursuing an experience-dependent aspiration level; *secondly*, constraints and choices are no longer independent from each other because preferences may be influenced by those constraints or changing the constraints may guide the way to act (e.g. in the case of innovation).

Even though stylizing the state space of agents is indispensable for any modelling attempt, in a heterodox approach this state space configuration is not determined by a mathematical formalism which is chosen a priori (i.e. without considering the problem at stake). Additionally, it is not necessary to include state space properties in the agent's knowledge in their possibilities to act. Exploration and exploitation as procedures for creating a state space and making use of it are essential features of a heterodox approach. Two elements are becoming important then for discriminating between different options to act: *firstly*, observing, gathering, assessing and retrieving information about the own activities and *secondly* the influence of observable activities of others. The way, this discrimination between different options takes place, largely depend on the specific economic context (e.g. it is different in households and firms) but in any case it is not appropriate to consider deliberate (preference driven) decision as the only way to tackle this discrimination requirement: "fast and frugal heuristics" (Gigerenzer 2011) are also an essential element here.

Even if the Pareto-optimum as the 'old' device for equilibruium construction has been relaxed to mere compatibility requirements (as in the case of Nash equilibrium) or simply to market clearing processes it is still an essential feature of the modern neoclassical research programme to postulate and mainly investigate some sorts of equilibrating procedures. Contrary to that, the charm of the heterodox approach is the absence of any such kind of a priori postulates. According to the heterodox perspectives sketched so far, a true bottom up explanation of the economic outcome is intended. That means, "plausible" agents as well as "plausible" interaction modes determine the order of economic activities as a whole without superimposing restrictions guaranteeing a desired structure of this outcome. Hence, it is not per se excluded that economic activities generate equilibrium but this is a special case in the spectre of possible types of order (including cycles with single or multiple periodicities, chaos, statistical power law etc.). To sum up individual discrimination, social discrimination and how both are mediated by prices as well as institutions is another essential part of a heterodox approach.

Contrary to the general features of the neoclassical research programme mentioned above the heterodox programme is sensitive for the historical specificity of the modern market economy. Considering the economic practices as 'social forms', a scientific endeavour which migrated to economic sociology in recent times, should be re-introduced in economic analysis itself. The self-referential and self-propagating nature of these social forms not only puts further limits to a simple means-ends approach in economics but is also critical to the popular view that the wellbeing of the consumer is the ultimate goal of economic activity in our times. In such a context money plays an essential role and has to be one of the core subjects of heterodox concepts. It is not simply a veil on mutual preference articulation but an essential mechanism for making them comparable. Accordingly to explain the supply and demand for money (in its different forms) endogenously should have a prominent part in heterodox analysis (on the micro as well as the macro level).

Finally, to concede the embeddedness of the economy and accordingly to focus interdisciplinary concepts is an important feature of the heterodox approach. The multi-mode approach to economic decisions necessitates collaboration with psychology; the role of norms, institutions as well as the emergence of social action

necessitates collaboration with sociology; deciphering uncertainty and instability and the corresponding adaptation requirements induced by a vulnerable ecological environment necessitates collaboration with ecology etc..

3.2 The case of microeconomics

Microeconomics is a limited field of research and teaching being a result of a dubious division of activities in economics. It has been marked as a special area of scientific activities in economics by being separated from macroeconomics (cf. Varian 1987; Machlup 1960). This separation still holds although there is an ongoing debate about synthesizing these different realms of economics either by generalizing the (market) activities of agents or by giving macroeconomics a sound microfoundation (cf. King 2012).

Whereas the modern research in microeconomics has been assessed above as being ambiguous in terms of pluralism (cf. section 2.2.2) in microeconomic instruction and teaching a crude monism still dominates. Starting from the latter *firstly* a suggestion is made how the requirement of pluralism can be realized on an introductory level by picking up the tensions in the protective belt in the modern neoclassical research programme. *Secondly*, a heterodox microeconomic competing alternative on the advanced level is sketched thereby radicalizing the difference to conventional neoclassical axioms.

3.2.1 A pluralist introductory course in microeconomics[46]

Learning and applying conceptual consistency are essential features of scientific education. This necessitates a selection of theories/concepts as well as a selective focus on the subject matter under investigation. But there is no need to consider only one concept – quite the contrary: what methodological consistency (instead of blind faith) is can best be internalized by comparing (at least two) different approaches. Especially on an introductory level establishing such a comparison and thereby training self-reflectivity is an essential feature regarding the goals of scientific education.[47] Hence, in this case the desiderata of 'competitive pluralism' sketched in section 2.3.2 are realized in one course.

According to its role in the economic education as a whole, the starting point in this course is a condensed but consistent presentation of the subject matter, assumptions and methods of modern neoclassical microeconomics. For the sake of neat comparability in the corresponding heterodox part of this course, the assumptions and methods of the neoclassical fundamentals are changed only in a parsimonious but never the less far reaching way: (i) there is no complete

[46] Identifying pluralism with considering all given concepts/theories as well as all aspects of a topic under consideration („excessive pluralism"; Vromen 2007, 72f) is a strawman. Nevertheless, Vromen uses this strawman for legitimizing a monistic education in economics: "I believe that it is better that students get a solid training in a particular school, tradition, and approach than that they only touch upon, in a rather facile way, various schools and approaches. And it seems obvious to me that this particular school, tradition and approach should be the one that is dominating the discipline."(ibid., 73) What follows in this contribution is meant as a practical criticism of these allegations.

[47] Of course there is a trade-off between guaranteeing self-reflectivity and completeness but – given the time-constraints – a reasonable compromise seems possible.

information about the agent's possibilities to act (¬ TN_2) anymore and therefore no maximization (¬ TN_6); instead, (ii) there is a kind of adaptation in that agents explore the state space (which is in a first step still the stylized neoclassical one[48]) and process the information about their experience in a simple learning process. As a consequence a new level of explanation is introduced (¬ TN_5) and the equilibrium postulation becomes arbitrary (¬ TN_8). Hence, essential features of the mainstream concept (like the separation of constraints and goal-related sorting of alternatives (TN_4) or the isomorphic treatment of households and firms remained untouched by this modification. Whereas the results are not that distinctive as in the neoclassical counterpart this modification is never the less more "plausible" and includes the neoclassical results as a special case. Hence, the trade-off between elegance and plausibility can be illustrated by such a procedure.

How consistency and comparability are linked can be deduced from the syllabus (cf. fig. 4): not only the orthodox and heterodox view can each be composed in a systematic manner (taking the blue coloured vs. the red coloured headlines respectively) but also the comparison between the approaches is enacted in each chapter. Furthermore the methodological isomorphism between the way households and firms are dealt with (as well as its limits) becomes transparent.

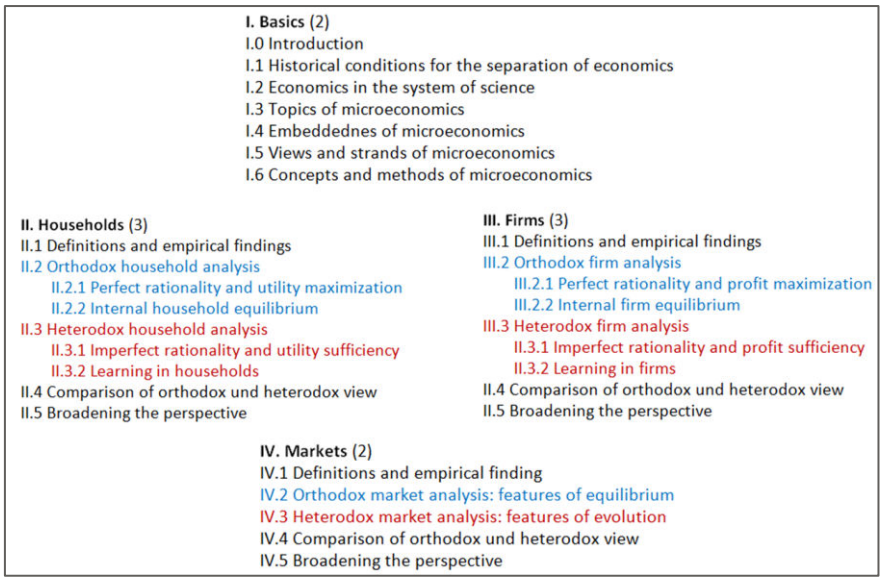


Fig. 4: Syllabus of introductory course

The modelling architecture of the heterodox part has some features which should be emphasized here: *Firstly*, in mainstream microeconomics the agent's architecture consists only of one layer (relation between cause and effect in the form of 'dominant dependence'; cf. fig. 1)[49] and has the same basic structure for households and firms (cf. fig. 5). Contrary to that there is a two-layer structure in the architecture of agents supposed in the heterodox part of the introductory course with the aspiration level as the intermediary variable for adaption (whereas

[48] This is done only for didactical reasons. Neither nice functions nor functions at all are required for the working of the heterodox modification.
[49] Cf. Georgescu-Roegen (1966, pp 103) for an early criticism of this view.

the similarities for households and firms are still given). Hence, the attribute of hierarchy is introduced in an elementary fashion (cf. fig. 6)



Fig. 5: Basic architecture of microeconomic agents in mainstream (left: household with CA_i for the possible consumption activities; right: firms with PA_i and OA_i for the possible production and organization activities respectively)

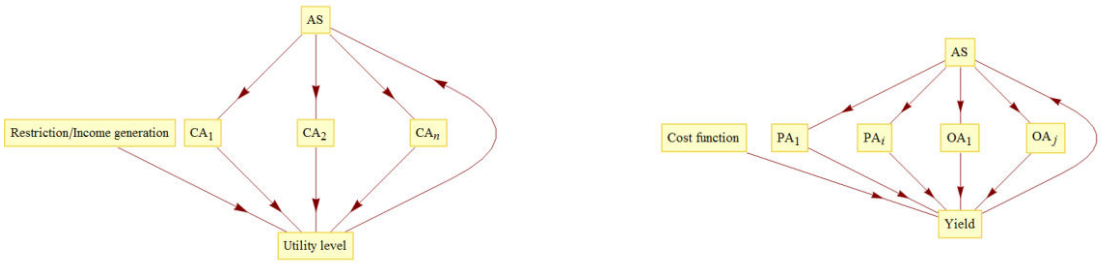


Fig. 6: Basic architecture of microeconomic agents in elementary heterodox microeconomics (left: household with CA_i for the possible consumption activities and AS for the aspiration level; right: firms with PA_i and OA_i for the possible production and organization activities respectively and AS for the aspiration level)

Secondly, an essential feature of the heterodox part is the adaptation algorithm ascribed to the agents for exploring and exploiting the state space. To illustrate the way this algorithm works a very simple starting point is chosen: the case of partial factor variation in firms with a traditional Cobb-Douglas-production function. The profit function for the factors a and m and their given respective prices ($p°_a$, $p°_m$) can be noted as (a being the variable factor which is controlled by the firm):

$$G(a) = p° \, a^{0.5} \, (m°)^{0.5} - (a \, p°_a + m° \, p°_m).$$

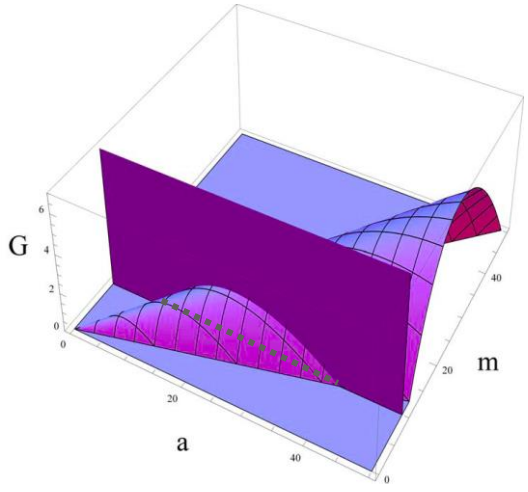


Fig. 7: Profit function for partial factor variation

This is depicted in fig. 7. Assuming that the production function is not known to the firm this boils down to:

$G(a) = p^\circ Q - (a\, p^\circ_a + m^\circ p^\circ_m)$.

Hence, there is a need that the firm explores its technological state space by varying the amount of a. A simple search algorithm for such exploration (and a possible switch to exploitation) can now be figured out by using the information the agent can acquire by his activity in different time steps (t): a(t) as input and G(t) as observable output for different t. Starting from an initial amount of a (a(0)) the agent has the alternative to apply the same a in the next time step, to reduce it, or to increase it. If the last two cases are given it has to be determined to what amount a should be changed. This is captured by the following difference equation (cf. Wall 1993):

$$a(t) = a(t\text{-}1) + \frac{AS(t) - G(t-1)}{\frac{G(t-1) - G(t-2)}{a(t-1) - a(t-2)}}, \text{ where}$$

$$AS(t) = (1\text{-}\varphi)AS(t\text{-}1) + \varphi[(1\text{-}\lambda) \sum_{i=1}^{mem} \frac{G(t-i)}{mem} + \lambda\, G(t\text{-}1)] + \gamma[(1\text{-}\omega) \sum_{i=1}^{mem-1} \frac{G(t-i) - G(t-i-1)}{mem-1} + \omega(G(t\text{-}1) - G(t\text{-}2))].$$

A crucial role in this adaption algorithm plays the aspiration level (AS) synthesizing the past profit experience in terms of averaging the profit and averaging profit differences in proximate time steps determined by the memory capacity (mem) of the agent. According to the insights about the working of the memory the last step has a special weight in both components for processing information about past profit experience. Hence, bounded rationality is depicted in a very simple manner by stipulating limited knowledge, memory constraints and as a measuring rod for the individual performance, the aspiration level. Fig. 8 shows how in this simple case (for a given numerical specification) the exploring agent is even approaching the optimum by using the search algorithm above.[50]

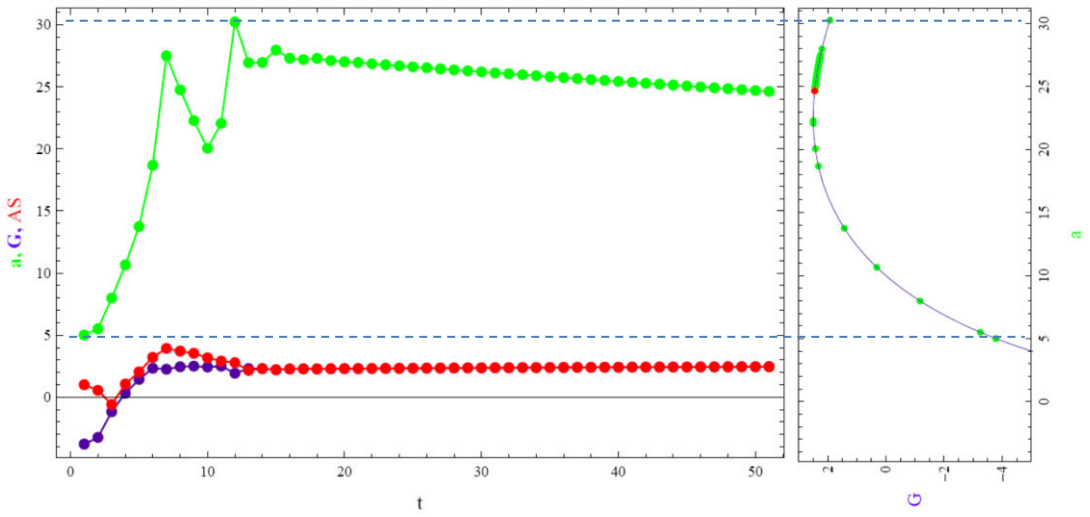


Fig. 8: Simulating exploration/adaptation for partial factor variation of a firm. Time diagram (left) for different variables and corresponding state space diagram (right) with red point in the optimum.

[50] This quasi-optimal result is by no means necessary. It is the more improbable, the more complicated the state space is and/or the less appropriate the calibration of the search algorithm is in terms of γ, λ, ω and φ.

Thirdly, a feedback from the agent's experience to the state space itself can be integrated in such an adaptation frame work: the more the firm is getting experienced in applying the factor a, the more the production function can change in that the productivity of a is increasing[51]. Hence, the corresponding learning effect is not simply given but generated by the exploration of the state space. To depict that the background production function (unknown to the agent) is defined as:

$G(a) = p^\circ a^{\beta} (m^\circ)^{(1-\beta)} - (a\, p^\circ_a + m^\circ\, p^\circ_m)$, where

$\beta = f(t, a)$, $\Delta\beta > 0$ if $\Delta a > 0$.

This is a simple way to integrate the idea of path dependency (in terms of production or organization) in this frame work. The changing state space as well as the exploration trajectory (which is scanning only a small part of this state space) are depicted (again with a given numerical specification) in fig. 9.

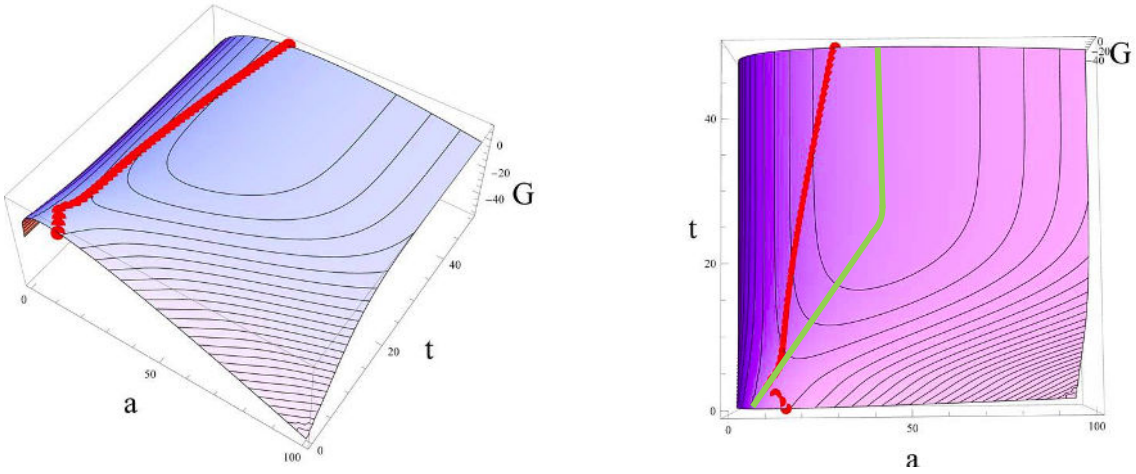


Fig. 9: Exploration path (red) optimal path (green) and dynamic state space for partial factor variation of a firm.

The advantage of such a heterodox complement to the standard approach in microeconomics is obvious: a direct explanatory competition between both views is possible without requiring much research for figuring out the heterodox element. But there still remains an antithetic fixation on the neoclassical starting point. Furthermore, the potential of heterodox ideas (cf. section 3.1) as regards the core of microeconomics is not fully exploited.

3.3.2 A heterodox advanced course in microeconomics

In this course an attempt is made to synthesize various heterodox ideas to a template for modelling the agents typically considered in microeconomics. As a background it is assumed that the modern economy can be conceptualized as an operationally closed subsystem in the society as a whole. In the same way as the

[51] Hence, TN_1 is at least modified in that the state space is not given but has to be explored; nevertheless it remains stylized in the sense mentioned in section 2.2.2.

subsystem of science (cf. section 2.2) it is oriented toward a central "Leitdifferenz". In the case of the economy the basic operations are payments which create new payments (cf. Luhmann 1988). Hence, the main feature of the economy is to organize comparability of heterogeneous activities and products by mapping them into payment aspirations und to proceed this comparability in terms of market operations.[52] The operations required in such a context are pursued by agents. Focussing on the way the agents are conditioning this context as well as on the way this context is recursively conditioning the agents is tantamount to an agent-based foundation of economic operations.[53] The idea of "near decomposability" (cf. section 2.1) is not only the backbone for differentiating operationally closed subsystems as a means for complexity reduction in the society as a whole, but is also a useful heuristic for analysing what is going on within these subsystems in terms of agent's activities. Hence, also in the case of the economy, complexity reduction on the agent level can be captured by activity clusters being loosely linked to each other but consisting of strongly related elements inside. This distinction is not only useful if the coupling between agents shall be distinguished from what is going on within agents (or agencies); it is also a useful heuristic for characterizing their internal architecture of (cf. below).[54] This multi-level architecture is a feature of maintaining the ability to act in a complex state space and runs strictly counter the two level architecture of the mainstream concept for agents ($\neg$ TN_5).

As already mentioned, such a heterodox approach dispenses with all essential features of mainstream economics (cf. section 2.2.2). As can be deduced from the previous paragraph it is not "scarcity" by which economic operations are founded, but rather comparability. Contrary to the usual ideological supra-historic background a modern capitalist and market dominated economy is assumed to be at stake. Hence, households and firms are considered as "social forms" (Marx) being shaped by money and commodity relations as well as unequal abilities in their way to act. All agents are subject to a precarious process of acceptance and integration in economic terms (for which the above mentioned comparability is an essential precondition). The activities of the microeconomic agents have macroeconomic preconditions (e.g. division of labour and industries, organisation of money and credit) as well as macroeconomic outcomes (e.g. patterns of overall activities in the course of time like the economic cycle) which cannot be deduced by considering the agents alone.[55] Hence, there are substantial limits to methodological individualism in the heterodox view of microeconomic affairs ($\neg$ TN_7).[56] As common features for the heterodox portray of microeconomic agents it can be emphasized: (i) the hierarchical clustering of activities within agents ($\neg$ TN_5), (ii) a recursive control and adaptation ($\neg$ TN_2), (ii) multiple modes of action (like deliberate decision, routines, search in an unknown state space) as well as (iii) a 'multiple self'-

[52] In such a perspective it is clear that institutions enabling this comparability like money and its organization play a central role for constituting the modern economy.

[53] This is an essential difference to Luhmann's approach who wants to get rid of actor concepts by separating communication processes from its social environment.

[54] In very broad terms there is a self-similarity on the different levels of analysis.

[55] This does not exclude that an overall approach is possible in which a large part of the macroeconomic prerequisites as well as outcomes can be explained by referring to agents and their interaction in different sectors. But this is beyond the usual limits of microeconomics.

[56] Correspondingly, methodological holism in macroeconomics has substantial limits in that meaningful microeconomic requirements – beyond the usual ad hoc constructions under the headline of "microfoundation" – have to be postulated in a heterodox macroeconomics.

nature (like having contradicting goals or following different operational procedures) of these agents (¬ TN_6).

Rarely attempts are made to figure out households, firms and their market operations from a heterodox point of view (cf. Lavoie 2014, Hill/Myatt 2010, Goodwin et al. 2005, Himmelweit et al. 2001 for exceptions). The suggestions offered in this contribution are a specification of ideas from complexity economics and evolutionary economics as regards the requirements of competitive pluralism (cf. section 2.3.2). Households in a capitalist economy can be ascribed the basic property to combine biological reproduction with figuring out a social role on a low level of internal differentiation. The background for both clusters of activity is the assumption of a hierarchy of needs (cf. Lavoie 2014, Georgescu-Roegen (1966, pp 193), Maslow 1954). This concept is specified for the given context by synthesizing the classical distinction between necessary und luxury consumption (cf. Schefold (1986, pp 206), Smith (1784/1979, pp 869)) and Veblen's elaboration of the social role of consumption (Ramstad 1994, Veblen 1949). Hence the hierarchically ordered levels of households are: essential reproduction, variable reproduction (including 'defensive consumption'), and social role consumption (including 'keeping up consumption', 'positional consumption').[57] The corresponding activities are shaped by the precarious process of acceptance and integration in terms of market participation. This is implemented by a feedback between social role consumption and the corresponding aspiration level. In case of a persistent divergence from this aspiration level the efforts to gain income are varied (cf. fig. 10 (left)).

Contrary to that it is assumed that firms have the essential property to maintain/increase capital by realizing a surplus on the market. The internal structure of their activities is based on a high level of internal differentiation. This structure is shaped by market conditions (buying and selling) and by internal power relations. To capture these features, a synthesis of Marx' ideas and the modelling attempts of Nelson/Winter (1982) is proposed. Again, there is a hierarchy of activity levels: the management defining market/firm strategy as well as aspiration levels, the strategic operational level (r&d leading eventually to innovation options, finance, investment) and the tactical operational level (procurement, organization/production, turnover). The dynamics is constituted by a recursive binding of operational activities to management decisions (cf. fig 10 (right)).

[57] The distinction between these levels is an analytical device to classify empirically observable household behavior.

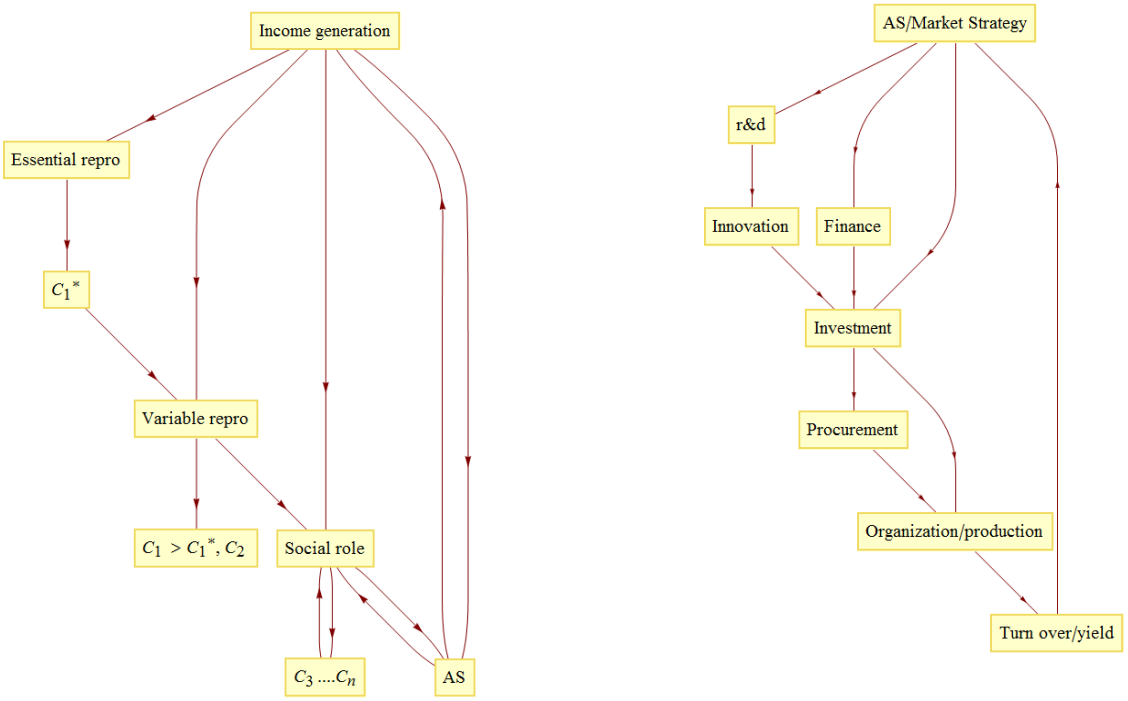


Fig. 10: Basic architecture of microeconomic agents in advanced heterodox microeconomics (left: household with C_i consumption activities on different levels; right: firms)

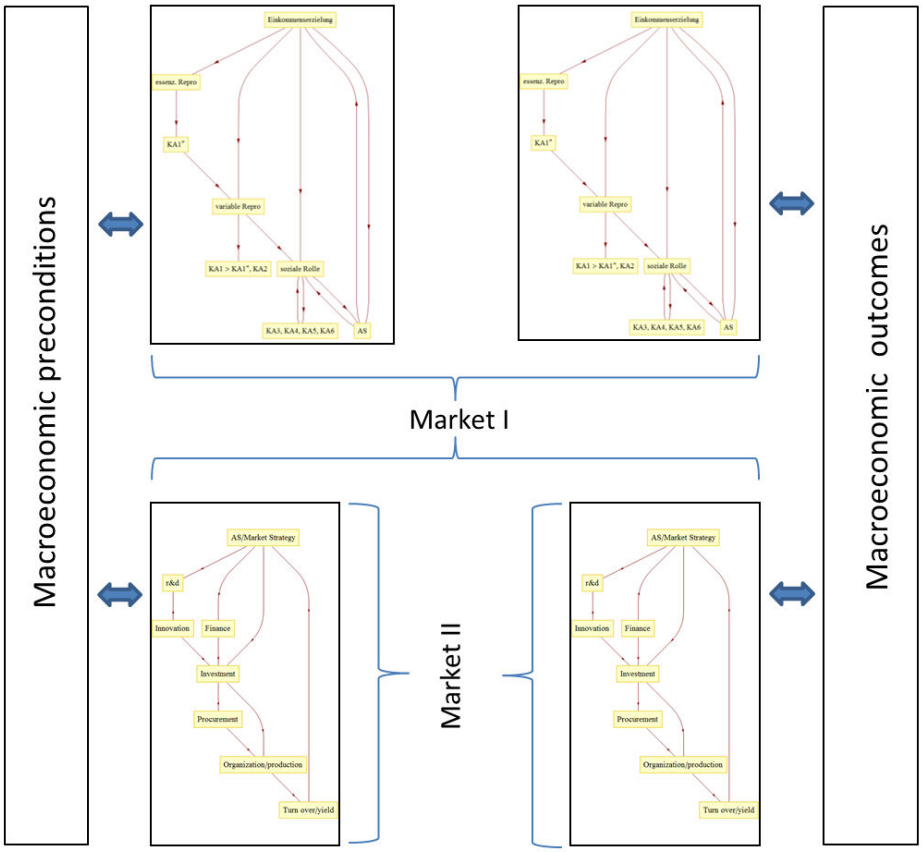


Fig. 11: Market interaction between firms and households and complementarity to macroeconomics.

Based on these conceptualizations of agents a heterodox market process can be figured out. At the core of such a market process is endogenously generated supply for commodities and labour power each in terms of posted prices in different sectors on the one side and the sectoral differentiated demand for commodities and labour power at the other side. Because there is no hidden construction guaranteeing the accordance between these two market sides, not only money plays an essential role but furthermore adaption in terms of prices as well as quantities is required (including heterogeneity of prices, inventories and varying capacity utilization). This is intertwined with a market- and power-induced exploration of the technology state space (cf. fig. 11).[58] Based on given macroeconomic prerequisites prices, quantities, (un-)employment emerge – possibly even in a cyclical manner (cf. fig. 12 and 13).

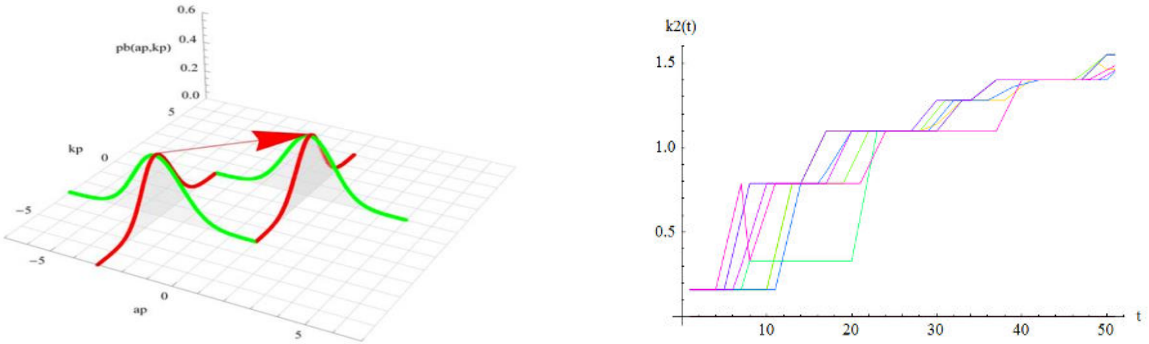


Fig. 12: Stochastic exploration of technology state space: dynamic local distribution of productivity options (left) and exploration paths for different firms (right).

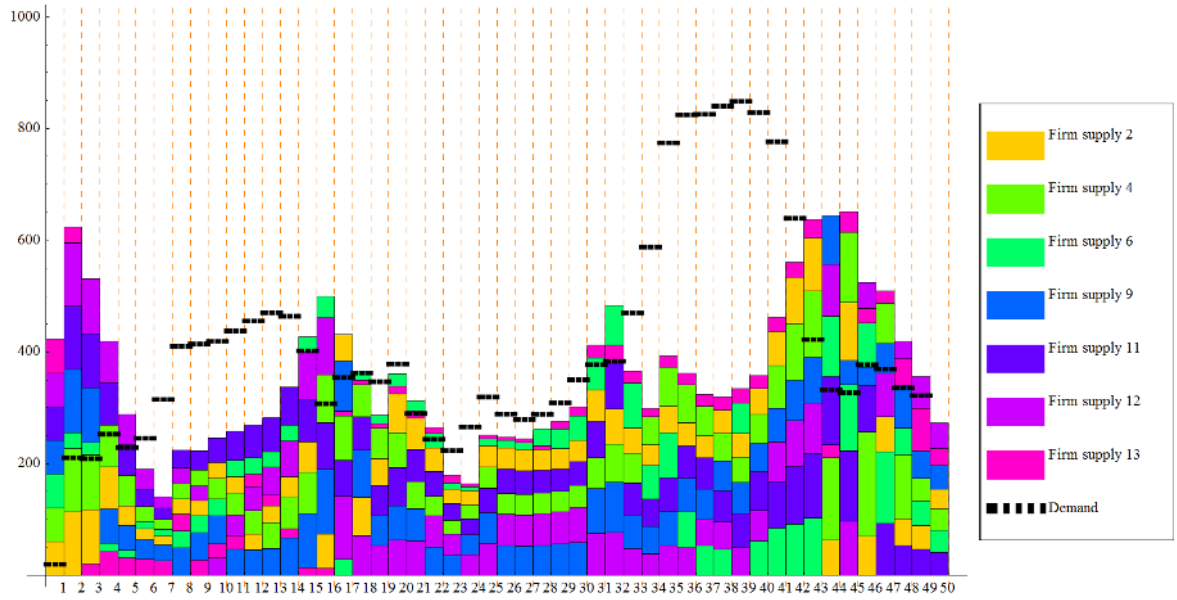


Fig. 13: Cyclical development of supply (composed of firms with different productivities; coloured bar charts) and of demand (dotted black line).

[58] This is tantamount to an agent-based explanation of technical change and transcends the usual aggregative post-keynesian approach (cf. e.g. Lavoie 2014 pp….).

In such a concept the antithetic binding to the mainstream approach is abandoned and the full range of heterodox ideas can be scanned for their appropriateness. Especially as regards the selection of conceptual ideas and as regards their capability of being consistently integrated a lot of research has to be done in the future. Furthermore, it has to be investigated in what sense (i.e. according to which criteria) comparability with advanced mainstream economics can be established and operationalized. In what sense is such an approach "more plausible"? In what sense can there be a better explaining of "stylized facts"? Can it be demonstrated in such a heterodox frame work that mainstream microeconomics is dealing with "special cases"?

4. Conclusions and perspectives

The persistent narrowness in the scope of orthodox mainstream economics is not accidental. It seems to be a necessary result of the general reproduction dynamics of the modern science of economics and a consolidation of a particular path backed by this reproduction dynamics.[59] If such a particular path is dominating in that the drivers for closing and sealing off this path are stronger than the drivers for eroding and decomposing it, economics is running the risk of monism. In that case the task proper of science to generate and disperse new insights and knowledge is threatened and pluralism becomes an obligatory medicine. Whether the self-reflectivity of economics (the blocking of which is often an element of path domination) is sufficiently sensible for this threat or if interventions from other social subsystems (like politics) are required as an element of therapy cannot be anticipated here.

Whereas in research at least competitive pluralism is a requirement only in a specific situation (monism) in education pluralism in both its competitive as well its complementary form is indispensable. Variety of perspectives, of concepts, and methods is a necessary element of preparing the students for the real world complexities of economic life. That this not necessarily ends up in an omnium-gatherum of educational elements should have been demonstrated by the suggestions above. Absence of such a broad approach simply generates an education failure.

[59] Hence, it seems naïve to connect this narrowness with specialization per se as Quiggin (2010, 128f) assumes in the case of macroeconomics: "The prospects for a macroeconomic analysis based on alternatives to expected utility theory are so promising, why has so little work been done along these lines? In part, perhaps, this simply reflects the effects of specialization. Decision theorists focus on individual choices, and when they seek economic applications, this leads them naturally (sic – FB) to look at microeconomic problems."

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