

Methodological Monism in Economics

Tamás Dusek

Abstract: The aim of the paper is to give an outline of the relation between general epistemology and the epistemology of economics. The epistemology of economics can be treated starting from the 'general epistemology of science' and from the subject of the investigation, namely the problems of economics itself. Starting from the general or subject-independent epistemology one can make an attempt to adapt to economics various methodological approaches which were practically created to take only the subject of physics or mathematics into consideration. The characteristic feature of this mentality is often methodological monism, a doctrine which implicitly or explicitly states the unity of epistemology in all disciplines. In methodological writings of economics, beside the supporters of some general epistemological viewpoints, there are serious critics of them on behalf of methodologists who start their researches based on economics.

Methodological pluralism does not reject the importation of methodological ideas from other branches of knowledge in an aprioristic way. However, the uncritical adoption of the methodology of physical sciences or 'general' methodology leads to the realm of inadequacy and dogmatism. According to methodological pluralism, every research has to choose its methods and methodology conforming to the nature of its own problems.

The theoretical consequences of methodological monism are not always obvious. Inappropriate methodology can lead to inappropriate theories and inappropriate practical decisions. The negative consequences of formalism will be illustrated by some spatial economic issues in the field of money and price theory, such as the empirical empty doctrine of purchasing power parity and the theory of optimal currency areas. Since neoclassical mainstream is monist, therefore the critique of monism is at the same time the critique of the method of neoclassical mainstream.

Keywords: methodology of economics, methodological monism, methodological pluralism

Introduction

The aim of this paper is to stress the simple but often overlooked postulate that epistemological and methodological problems cannot be treated without referring to the substantive issues of the branch of science concerned. This view renders unjustified the collective treatment of epistemological problems of all of the sciences – a common practice amongst 'general' epistemologists and also from their uncritical followers in various disciplines. This collectivising approach is frequently connected with methodological monism, which is often a tacit methodological viewpoint. According to methodological monism, there is a unified scientific method; only its fields of application are different. The monist view itself has many different and mutually incompatible variations. However, the typical advocate of methodological monism regards one particular methodology established in mathematized physics as the paragon of every empirical discipline, and therefore for economics also. The inverse of this view is virtually nonexistent, for example, nobody would posit that the methodology of linguistics, biology, economics or human geography provides a paragon for every other discipline. The monists mainly use attributes such as: rigour, analytical elegance, development, exactness and scientific as synonyms for mathematized expression.

Methodological writings in economics exhibit both the supporters of a general epistemological viewpoint, and robust critiques which originate in economics. As Mises, one of the strongest supporters of the methodological independence of economics, writes: "general epistemology can be studied only by those who are perfectly familiar with all branches of human knowledge. The special epistemological problems of the different fields of knowledge are accessible only those who have a perfect acquaintance with the respective field. There would not be any need to mention this point if it were not for the shocking ignorance of everything concerning the sciences of human action that characterizes the writings of almost all contemporary philosophers" (Mises "Ultimate" VII).

Methodological pluralism has two intimately connected meanings. Firstly, it means that as any other discipline, economics also has its own subject-dependent methodology; secondly, the sub-disciplines of economics have their own methodology and the same subject can be approached with the help of many convenient methodologies. Methodological pluralism does not reject in an aprioristic way the importation of methodological thoughts from other sources of knowledge. It only requires the reconcilability of the method and the matter of

study. The choice between monism and pluralism should not be based on logics or on an arbitrary decision but on an analysis and examination of economics. This paper will argue against monism by presenting several monist misconceptions, whilst at the same time favouring pluralism.

The second part of paper examines the relation between general epistemology of science and the epistemology of economics. The bulk of the paper is the third part which discusses important and mostly interconnected monist misconceptions. The fourth part touches upon the institutional side of the questions. The fifth part presents two examples of unhelpful theoretical and practical consequences of methodological monism. In this short survey it is impossible to dwell long on the enormous literature of this subject matter.

The relation between general epistemology of science and the epistemology of economics

The epistemological works of science can be divided according to their intended domain of validity. This creates two large groups. Works within the first group deal with the whole or an unspecified field of science, and the second group with a well-defined field of science. In works of the first group, sometimes a methodology-oriented definition of science is given. These definitions simply restrict the possible research area of scientific investigations according to method. The epistemology of each discipline can be treated by starting either from the 'general epistemology of science' or from the subject of the investigation, in the case of economics from the problems of economics itself. Starting from the general or subject-independent epistemology, one can make an attempt to adapt to economics various methodological approaches that were principally created to take only the subject of physics or mathematics into consideration. After this approach, which can be referred to as 'methodological monism', the various epistemological questions, such as the problem of the demarcation of science from non-science or unscience, the problem of induction and causality, can be investigated in an unified way for the whole of science.

This view is based on a tacit assumption that a formal discipline exists, whose subject is the general epistemology of science. It is not to be questioned that the timeless, eternal and subject-independent questions of the rules of thought exists, and in this sense a formal discipline exists which examines these questions;

namely the field of logic. However, epistemology examines not formal and subject-independent questions but rather questions which are connected to the factual events of empirical disciplines. When we examine the influential methodologists of science of the twentieth century, Popper, Kuhn, Lakatos, Feyerabend, Quine and others, we find them buttressing their views mostly from the field of natural sciences. In Popper ("Logic"), examples are solely from physics except for a short reference to biology in connection with universal and singular propositions. However, this comment from Popper on the notion of mammal could be used for illustrating the difference between physical and biological problems, since the study of mammals of other hypothetical planets is not a relevant problem for biology. In Kuhn ("Structure"), there are only three short references to the non-natural sciences and short passages in the thirteenth chapter. Kuhn practically asserts social sciences have no paradigm at all.[1] In Lakatos's and Feyerabend's works many astronomical references can be found (one popular example is the discovery of Uranus) but for instance there are no references to the fields of linguistics, economics, biology, ecology, psychology, sociology, geology or geography.

It is a different matter to ask whether their conclusions can ever be applied to physics or not. However, it appears that these works, which are often treated by uncritical adherents as holding general validity and a prescription in connection with the epistemology of science, are only relevant in the natural sciences. In the best case the misuse of Popper's, Kuhn's and Lakatos's thoughts led to incorrect innovation in terminology, the abuse of such words as corroboration, revolution, paradigm, hard core, research programmes and so on. These words were either used in the original sense and thereby incorrectly, or in a modified meaning. In the worst scenario these monist views generated "an artificially restricted study stifled by the unheeding blinkers of an epistemological concept" (Graves 90). This unfortunate development of affairs can be attributed not to Popper and Kuhn because their aim was to deal only with the natural sciences.[2]

This confusion could be resolved by the recognition that the epistemology of science is neither formal nor empirical (real, factual) but a 'method science', which lays inbetween formal and empirical sciences. This means that epistemological statements and prescriptions are not independent from the empirical sphere in which they were created. The separation of the methodology from the field of research and from the aim of the study leads to various misconceptions which create the basis for failures in theory building and policy

recommendation. These misconceptions, which will be presented in the next section, have an attribute 'monist', because each one stems from methodological monism.

Some general monist misconceptions

It is a hard task to trace the heritage of the following monist misconceptions.[3] However, their presence is so pervasive and widespread that the lack of an exact list of supporters is not such a serious omission. The sources of misconceptions, of course, can be found in the many different approaches often in critical opposition to each other. It is not possible to examine thoroughly the following problems and to give a detailed description of why they are misconceptions. More detailed explanations can be found in the works cited; here the key issue is the variety of misconceptions and their contact to methodological monism.

Monist misconceptions I: Falsifiability and testability of theories

Popperians assert that in the empirical sciences the scientific status of a statement must be falsifiable. A 'statement (a theory, a conjecture) has the status of belonging to the empirical sciences if and only if it is falsifiable' (Popper "Realism" XIX.). This view has its rational core because there are

- tautological statements which state nothing that is new about empirical reality,
- mystical and supernatural statements which cannot be examined in an objective way,
- subjective judgements of values which cannot be examined through an objective interpersonal standard.

However, the treatment of falsifiability, as a general demarcation criterion for science and non-science is clearly erroneous for the following reasons.[4] Firstly, there are obviously false assumptions in economic model building which can be used, despite their evident falsity, of conceptual grasp of some aspect of economics. For example, in the basic model of Lösch's spatial economy, there are many unreal assumptions relating to space (absolute homogeneity), but with these assumptions some aspect of the spatial organization of economy can also be well illustrated. Secondly, and this is a more important logical objection, in the field of human action there are propositions which are very elementary facts of general

experience, evidently true for everybody and at the same time non-tautological. An example is the idea that free exchange leads to mutual benefit (because in the lack of mutual expected benefit, free exchange wouldn't be realized), which is an assumption that is at the same time empirical and non-falsifiable (in the sense as the gravitation hypothesis would have been falsifiable), because its denial would lead to insoluble contradictions in deductive reasoning and it is incompatible with our fundamental knowledge concerning human action. These statements can be treated as laws of thought or laws of reality (Rothbard "Defense"). However, the important thing is that such types of elementary statements are "not conceivably falsifiable, and yet empirically meaningful and true" (Rothbard "Defense" 318).

Monist misconceptions 2: Econometrics as a tool for testing theories

It is often asserted that economics is at a disadvantage compared to the natural sciences since in economics controlled experiments cannot be performed. According to econometrics, economic theories can be tested and refined with the help of sophisticated statistical techniques. The supporters of this view maintain that "econometrics shares its logical foundations with psychometrics and biometrics and, for that matter, with meteorology and even experimental physics" (Marschak 294).

The fundamental problem of econometrics is the probabilistic approach to every type of economic data. The mathematical theory of probability deals with long sequences of random events repeated very often and under a set of same conditions. The events of macroeconomics have unique characteristics; they are not homogeneous members of an identifiable class with known parameters in the distribution of values. They are uncertain, but not random, in the sense of probability theory, that is, they do not have numerical probability. Macroeconomic indices are aggregated (through time, space, individuals, quality and behaviour), weighted and, contrary to physics, biometrics and psychometrics, not results of designed experiments.[5] Macroeconomic indices are not one actualisation of a repeatable 'random sample' derived from a larger population but a part of economic history, and they relate to unrepeatable organized complexity.

The descriptive part of an econometric analysis can contribute to the grasp of concrete ex post relationships between economic indicators, but the manipulation with probability distributions and significance tests is an unjustifiable part of the results. Treatment of macroeconomic indices as a sample is a convention only, ungrounded by any theoretical basis.[6]

In economics, mental experiments are really counterparts of controlled experiments of physics. "Since the relevant variables of the social world cannot actually be held constant, the economist holds them constant in his imagination. Using the tool of verbal logic, he mentally investigates the causal inference of one variable on another" (Rothbard "Praxeology" 318).

Monist misconceptions 3: The misleading views about the role of assumptions

As Friedman writes in his famous essay, "to be important, therefore, a hypothesis must be descriptively false in its assumptions; it takes account of, and accounts for, none of the many other attendant circumstances, since its very success shows them to be irrelevant for the phenomena to be explained" (Friedman 15). In spite of the fact that Friedman's statements were criticized exhaustively from many sides, building theories on unreal assumptions is an everyday practice in theoretical economics. As Musgrave in his seminal paper demonstrated, "both Friedman's and the subsequent discussion are marred by unclarity about the status of 'assumptions' in economic theories (and in physical theories, for that matter)" (Musgrave 378). Musgrave isolates three types of assumption, the first being 'negligibility' assumptions. "Suppose a scientist is investigating some phenomenon and has the hypothesis that some factor F which might be expected to affect that phenomenon actually has no effect upon it, or at least no detectable effect" (Musgrave 378). And one example from Musgrave: "Now suppose an economist 'assumes that there is no government', meaning thereby to assert that the existence of the government has negligible effects on the phenomena he is investigating. It would be plain silly to object that this assumption is 'unreal' because there is, in fact, a government" (Musgrave 379). The second type of assumption is the domain assumption, which posits that the theory can be expected to depict reality accurately as long as certain conditions exist. The third type of assumption is what Musgrave termed as 'heuristic assumption'. In this case, in the first stage the scientist takes "no account of factor F, or 'assumes' that it is negligible; in the second stage he takes account of it and says what difference it makes to his results" (Musgrave 383).

It is important to stress that there is a fourth type of assumption, which Musgrave does not mention explicitly, namely assumptions which are in accordance with reality and could be named 'reality assumptions'. For example the existence of transport costs is an empirical fact, which we can use in explanation without

restricting the domain of our models. Thus reality assumptions could also be treated as a subgroup of negligibility assumptions. Theories built on reality assumptions can be rejected in two ways. First, one can assert that the assumption is not in accordance with reality. Second, flaws can be revealed in the chain of deductive reasoning. Abstract reasoning can also be based on real, but not precise assumptions, not only on unreal ones.[7]

There is a fundamental difference first of all between negligibility and reality assumptions on the one hand and domain assumptions on the other. The absence of the clear distinction between these two types of assumptions leads to two interconnected failures during model building. Firstly, the theoretical part of mainstream economics in constructing mathematical models often uses obviously unreal domain assumptions and then treats those models as a valid explanation of reality, indeed using them in the debates of economic policy. Secondly, the empirical part of the mainstream tries to verify or falsify the mathematical models provided by theoretical economists with the help of statistical data. This practice leads to various mistakes. Two examples of this type of invalid theories and testing are presented in the fifth section.

Monist misconceptions 4: Axiomatisation with false axioms

According to Debreu, “an axiomatised theory has a mathematical form that is completely separated from its economic content” (Debreu 1265). Why is it that such an axiomatised theory can be regarded as a part of empirical science? It is no doubt an interesting question. It is true, that it is not a part of the theory, whether or not an axiomatic system says something, albeit in an idealized nature, about the real world, or not. However, in building an axiomatised mathematical theory, for its empirical status and empirical applicability, it is necessary to give an operational method that permits us to examine the statements of the theory by means of observation. Axiomatised theory without an operational method which enables us to make a correspondence between theory and empirics, is not part of empirical science.

It is worthy to compare Debreu's axiomatisation and Mises's apriorism. Debreu's axiomatisation is grounded not on empirically-grounded axioms but on false empirical or unempirical statements. Mises also used the terms 'axiom' and 'apriorism' in his deductive method. His methodology was misinterpreted many

times and criticized vehemently; for example, Blaug writes that Mises's "writings on the foundations of economic science are so cranky and idiosyncratic that we can only wonder that they have been seriously by anyone" (Blaug "Methodology" 93). However, Mises's apriorism means that his system is independent of any particular, concrete time or place. Mises's axiomatisation is founded not on arbitrarily chosen but self-evident, apodictically true empirical axioms: "The a priori knowledge of praxeology is entirely different – categorically different – from the a priori knowledge of mathematics or, more precisely, from mathematical a priori knowledge as interpreted by logical positivism. The starting point of all praxeological thinking is not arbitrarily chosen axioms, but a self-evident proposition, fully, clearly and necessarily present in every human mind" (Mises "Ultimate" 4). It can be added that Mises's terminology may have been unfortunate and misleading for a superficial interpretator, because Misesian statements are a priori to the theory but a posteriori to the elementary general human experiences about the world. It is a secondary question if the action axiom and the subsidiary axioms are the law of thought or the law of reality. The main thing is that in the Misesian system the term axiom has its original ancient Greek meaning, namely axioms are self-evident truths.

It is strange, in the light of the content of the Misesian system, how widely some methodologists misinterpret it. One might be correct to get the impression that Blaug's criticism is valid not to Mises, but to Debreu. Blaug discusses correctly the nineteenth-century English predecessors of Misesian method (Blaug "Methodology" 55-90). He quotes Cairnes: "The economist starts with a knowledge of ultimate causes. He is already at the outset of his enterprise, in the position which the physicist only obtain after ages of laborious research" (Blaug cites Cairnes, Blaug "Methodology" 78). Blaug criticizes these and similar statements from the Popperian viewpoint (which is inadequate here): "The question of whether there is any way of showing a theory to be false is never even contemplated" (Blaug 81) [81].

Euclid's axioms of geometry and Mises's action axiom show that axioms need not be false or in conflict with elementary experiences. The problem of axiomatisation of monism is not the axiomatisation itself but the using empirically meaningless or false axioms, which is an unthinkable way of theory building in an empirical science like physics.

Monist misconceptions 5: The false dichotomy between mathematical and literary economics

It has been argued many times by respected economists that the attempt to mathematise economics is healthy, because it demands a prior clarification of concepts and propositions about economic phenomena. "It is sometimes forgotten that arguments against the most general types of mathematics are just arguments against science in general" (Tinbergen 368). The alternative way for economics is the verbal one which suffers from ambiguity.[9]

There are many problems and doubts with both sides of this dualism of mathematical and literary economics. The capacity of normal human language is belittled and at the same time the primitive mathematical language is highly overvalued. Every natural human language is able to describe everything in the world, only the efficiency of description may be questioned. Every mathematical symbol has its equivalent in natural languages, but the opposite of this statement is not true, not every expression of natural languages has its equivalent mathematical one. For empirical economical statuses of theories, the symbols of mathematical expressions need to be defined in natural languages (in Hungarian, in English etc.) therefore the precision of mathematical expression is the same as the verbal one.

The mathematician Karl Menger presented many examples which showed that mathematical presentation in economics is not more precise than use of natural language. For clarity, it is worthwhile quoting Menger's paper at length:

"AUSTRIAN FORMULATION. For each good, the utility of a larger quantity is greater (or at any rate not less) than a smaller quantity, whereas the marginal utility of the larger quantity is less (or at any rate no greater) than that of the smaller.

MATHEMATICAL FORMULATION. If q denotes the quantity of a good, and u its utility, then

$$u=f(q), \quad du/dq=f'(q)>0, \quad \text{and} \quad d^2u/dq^2=f''(q)<0.$$

To this day, some mathematical economists believe that these formulae express more than the simple words of the Austrians and, furthermore, that they describe the situation more precisely. But neither of these claims seems to be justified.

Far from saying more, those formula actually say less than the Austrian formulation since they express the same assertion under an additional, if tacit, hypothesis, viz. the assumption that the function connecting utility with quantity admits a second derivative and its graph, therefore, has a curvature at each of its points – an additional hypothesis that clearly is not anchored in economical facts. The Austrian formulation of decreasing marginal utility is more general since it is valid even if there are places where the function does not admit a second derivative and its graph has no curvature, whereas at such places the mathematical formulation fails to assert anything. (...)

Many mathematical economists since Cournot have used tacit assumptions in the theories of return, supply, demand, and so on, by assuming continuity and differentiability of functions as though these properties were matters of course, whereas they are nothing but prerequisites for application of classical analysis and not based on facts. This point deserves being stressed since mathematical economists consider it as one of the advantages of their method that it brings tacit assumptions of verbal formulations to the surface. The Principle of marginal Utility is a case – and as we shall see, not the only one – illustrating the opposite situation” (Menger 40-41).

This is a broad survey. Also, it is difficult to show via examples, the widely-held belief that mathematical formulations bring tacit assumptions of verbal formulation to the surface. Indeed, mathematical formulation can suppress the fact that mathematical symbols often refer to ambiguous, unclear, vague and unmeasurable economic and social phenomena. Therefore mathematical expression is able to provide only the illusion of exactness of economic concepts. Mathematical expression hides much rather the tacit assumptions than the verbal expression. The alleged tacit assumptions can be discovered through thought, not through mathematics. It is groundless to oppose the clarity of mathematical expression to the vague verbal one. The right way is to draw a parallel between the mathematical and a sensible, intelligent verbal expression.

Mathematics can be used successfully in natural sciences. However, this fact does not legitimate its uncritical use in economics. Disregarding the fundamental differences of the subject matter of physics and economics, in physics not only the theory of mechanics, optics, vibrating strings and electrical attraction can be added but there also exist tools for measuring variables used in the mathematical formulation of theories. In economics a theory of value, capital or business cycles can be presented in mathematical form but no instrument exists for an accurate

and unambiguous measuring of the variables used in those theories (McCloskey "Trouble" 87-89).

Monist misconceptions 6: The role and types of prediction

"I suggest that the most innocuous epistemological requirement on *any* science is that its theories can be improved in predictive precision" (Rosenberg XIV; emphasis added). This popular general epistemological viewpoint, which remains often categorical and unspecified, is constantly under criticism by countless practitioners of various disciplines. This postulate does not permit scientific status for example for linguistics, geography, economics, a large part of biology, part of quantum physics and astronomy.

Predictive success has at least two meanings in the epistemology of natural sciences: 1) predicting empirical facts in quantitative terms; and (2) predicting new theoretical statements for explaining empirical anomalies which cannot be explained by current theories. Neither of these types of prediction has a reason for existence in economics, although they also have a distant analogy in economics. In economics, the trend of some economic indicators can be predicted more or less. However, the prediction, despite its quantitative form, cannot be treated as a precise and exact numerical result in a classical physical sense, but as an indicator of direction and magnitude of the examined process. To take an example, it can be predicted that the increase of money supply leads to the increase of price level in the unspecified future, but it is impossible to predict both the timing of the process in exact numerical terms and the exact effect of the increasing money supply to the structure of the price system. As Popper writes, "long-term prophecies can be derived from scientific conditional predictions only if they apply to systems which can be described as well-isolated, stationary and recurrent. These systems are very rare in nature; and modern society is surely not one of them" (Popper "Conjectures" 339). As regards the data which seems paradoxical in the light of theory, it compels us to rethink the theory and all circumstances concerning the data and theory. Predictions in economics have a fundamentally different epistemological character than in physics.[10]

Monist misconceptions 7: Teleological explanation is unscientific

The abolition of teleological explanation from natural sciences after the Middle Ages was an inevitable and advanced step for the exile of the anthropomorphic

elements from inhuman phenomena. The planets, stones and atoms have no aims or goals; animal behaviour is not conducted consciously. For example, it is a pointless question 'For what purpose are planetary trajectories elliptical?' However, the elimination of teleology from human sciences is an unjustified monist view. This claim can be observed explicitly among the adherents of behaviorism. This school maintains that the behaviour of living organisms and thus human behaviour also can sufficiently be explained only by observing empirical events. The problem of this opinion lies not in the emphasis on observable empirical events but its exclusiveness. However, implicitly all formal mathematical treatment of human action transforms men into robots.

People have goals, purposes and preferences, they choose among various courses of action, they learn and change their views. The abandonment of teleology would mean the abandonment of very real human concepts, like learning and choosing. Our knowledge about society and economics would be significantly poorer, if the purposefulness behind the human action was excluded. Examining purposefulness is interesting at both a micro- and macro- or institutional level. What is the purpose of the existence of the various social institutions, markets, exchange, money, private ownership, credit and so forth? – these are intelligent research questions which deserve investigations, together with the traditional (monist) causal-analytical research. In the field of human sciences introspection, conscious self-observations can also contribute to scientific explanation. There is little justification for the monist imposition of one standard for causal existence as occurs in economics.

Monist misconceptions 8: To refute a theory it is necessary to propose a superior alternative

According to a methodological stereotype to refute a theory it is necessary to present a better one. This claim also stems from natural sciences. As Kuhn writes, "once it has achieved the status of paradigm, a scientific theory is declared invalid only if an alternate candidate is available to take its place" (Kuhn 77). "To reject one paradigm without simultaneously substituting another is to reject science itself" (Kuhn 79). In the field of physics this claim might be legitimate. In economics and other sciences it is part of a defensive tactic by the supporters of criticized theories which are in a dominant theoretical position. The defense of theories by mainstream economists is often combined with an a priori disregard of competing theories, because they are not expressed in mathematical form.

In multi-paradigmatic sciences, as economics, pure criticism has a very important task, namely throwing light on the epistemological, methodological, logical and empirical weakness of competing theories (or 'paradigms') and the inadequate applications of some methods. It is known that in the field of economics there are many competing theories in each subdiscipline of economics. The criticism without explicit positive alternative also has its justification. Each critique strengthens the competing theories in an automatic way, without permanent mentioning of the advantages of one of the competing theories. Each theory can contribute to our understanding of economic phenomena in one way or another even in refutation.

Institutional aspects of monist misconceptions and the critique of critics of pluralism

As has been demonstrated in section 3, the monist misconceptions presented there are not based on a firm logical or empirical ground. After all, each misconception stems from false parallels between economics and natural sciences. Further, though, the misconceptions are legitimated through institutional elements and are strengthened by the power of inertia. Teaching in most universities suppresses systematically students' criticism of monist authority. When someone has acquired and become accustomed to monist misconceptions, s/he does not abandon them easily. Moreover, the chances of publications and obtaining citations are larger, academic career possibilities are easier in the wake of monism for those who follow the accepted path. Econometrics, mathematical economics, and unreal formalism all have strong positions thanks to leading academic journals, associations, research foundations, conferences, government bureaucracy and universities in post-graduate and doctoral programs. It is supported by philosophers and sometimes also by natural scientists who propagate the idea of the unity of science without grasping the specific problems of various disciplines. However, monism is not the only existing viewpoint, the discussed misconceptions have a share in heavy critics and they have sound alternatives.

Every type of pluralism has a priori advantages to monism, that is, a sound attitude to open ended intellectual quest and the diversity of research interest rather than an artificial restriction of research through method. "Since economics as practiced in the English-speaking world is strongly oriented toward mathematical models, any economic argument that has not been expressed in that

form tends to remain invisible" (Krugman "Rethinking" 3). "The fact that formalists have claimed the term 'economic theory' for their approach alone, and that the rest of us have let them get away with it, is a disgrace" (Chick 1868). If formalists would stop insisting the unjustifiable belief that they were the representatives of the only true economics, the contrast would be decreased between non-formalists and formalists.

It must be admitted that pluralism is open to some justified critique. Pluralism is in many respects more heterogeneous than monism, therefore it is not difficult to find works which have suffered from the weaknesses in argument, logical inconsistency and vague writing. However, monist critics attacking alternative views rely mostly on the misconceptions set out above. Most of all they rely on the fifth misconception: the false dichotomy between mathematical and literary economics. Additional arguments frequently rest on simply psychological, political and institutional elements. For instance, one favourite counter-argument to the critics of mathematical and statistical treatment of some issues is that the critics are not well trained in mathematics and statistics. It is also common practice to point at institutional academic competitions and at the incompetence of 'outsiders'. To mention only one typical example, according to Krugman, who is labelled on the back cover of his own book as 'one of the world's most thoughtful and innovative economists', 'many of those who reject the idea of economic models are ill-informed or even (perhaps unconsciously) intellectually dishonest' (Krugman "Development" 79). Krugman understands 'economic models' to mean only those models which are expressed in algebraic form and are based on various unreal assumptions. As Krugman states in the following: "The problem is that there is no alternative to models" (Krugman "Development" 79). "In fact, we are all builders and purveyors of unrealistic simplifications" (Krugman "Development" 80). As Krugman repeats many times, verbalism is archaistic, murky, boring, unscientific. Krugman's only argument is his a priori belief in the absolute and only truth of his methodology, which is based on misunderstandings and half-truths. He also leaves the many critics of his method unanswered. He admitted in an interview (with Fujita) that one element of criticism of his 'spatial economy' was generated by his "insufficient attention of previously published works" (Fujita-Krugman 149). Fujita's response to this assertion was: "In my opinion, such an apparent rejection by some traditional geographers arose not simply from an insufficient review of previous literature. Rather, it was based on emotional grounds" (Fujita-Krugman 150). This typical reaction shows the lack of critical rationalist attitude, that is, openness to criticism, propagated by Popper.

Practical consequences of monism

Monist misconceptions produce a strong effect on the choice of research topics and research methods. In general, only theories expressed in mathematical forms count to the economics in the eye of the neoclassical formalism and only statistically measurable variables are considered important for econometrics. The first, seventh and eighth misconceptions (testability, teleological explanation and the claiming of a superior alternative to refutation) play an important role in the ideological reinforcement of mainstream theories, which would be otherwise indefensible. Other misconceptions also have an ideological part, but they have a direct effect on theory building as well. The second, third, fourth and fifth misconceptions have the strongest impact on the everyday practice of economics.

To examine this effect and illustrate the practical impact of monist misconceptions, we will analyse two popular theories, both of which are used as argument in international monetary policies. Both are dealt with at greater length elsewhere.^[11] First is Purchasing Power Parity theory (PPP). The second is the theory of optimal currency areas (OCA). The two chosen theories have a common characteristic, that is, they are based on an insufficient treatment of space.

PPP theory has been viewed as a theory of exchange rate determination. The modern form of the theory is generally attributable to Cassel who formulated the approach after the abandoning of gold standard during the World War I. (Cassel) The absolute version of PPP states that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the two countries. The relative version of PPP predicts that the rate of change in the nominal exchange rate is equal to the differential of price level changes. This theory can be read in every elementary textbook of international economics, supplemented by the mathematical form of the theory (which, being redundant, is not presented here). Commonly the price level is the effect and the exchange rate is the result, but seldom is assumed reversely the connection between the two phenomena.

The central problem of the theory is that it is based on unreal domain assumptions therefore it is easy to refute the theory only by examining its assumptions. After the tacit assumption of theory, the national economies are spaceless, dimensionless points. Inside the countries the price level (in absolute form of theory) or its change (in relative form) is constant everywhere. In reality the countries have spatial extension and the price level varied at different points

within the countries and its temporal change is also different. In short, the theory would be valid only in a world where every commodity and service would be perfectly transferable without costs. As regards to general price level, it is only an abstraction. In fact only the individual prices exist, and one sort of general price level is extracted from the individual prices by the help of weighting, sampling and other auxiliary assumptions. The domain assumptions sometimes are transformed into heuristic assumptions, explaining the empirical invalidity of the theory.

Purchasing power parity doctrine is examined by sophisticated statistical and econometric techniques. The time series of aggregated price levels and the nominal exchange rates are treated as a random sample. Most papers of this type deal with the technical properties of the slightly different data sets. To take some examples (at random): "Two potential problems arise when working with nominal exchange rates and ratios of price levels. First, unit roots are possibly present in the logarithms of nominal exchange rates and price level ratios. If unit roots are present, then standard asymptotic theory for least squares estimators is invalid (...). A second potential problem is that nominal exchange rates are often characterized by more frequent outliers than would be expected if data are normally distributed." (Crowner et al. 786) "We present two asymptotically equivalent procedures for detecting a unit root in spot exchange rate and price level data: (1) the Augmented Dickey-Fuller (ADF) test, and (2) the Phillips and Perron Z_t statistic. Both procedures allow for fitted drift in the time series model." (Corbae–Ouliaris 509) "In such a situation, it is essential to devise tests with increased power. This is achieved by extending the Dickey and Fuller tests to a system of univariate autoregression, estimated jointly by Generalized Least Squares (GLS)." (Abuaf–Jorion 160) The emphasis is on technical questions and not the empirical and theoretical ones.

This 'testing' of purchasing power parity theory is very popular in mainstream journals. These examinations suffer a lack of support from the theory of statistics and probability, as demonstrated above in discussing the second monist misconception about the role of econometrics. Apart from the fact that the time series are not random samples, there is also an extra epistemological problem in this type of testing: the theory is based on unreal assumptions, which restrict the validity of the theory to a dimensionless imaginary world in which the transactions of goods are costless. In contrast to the theory, data employed in testing it originates from the real world, where the countries have extensions and

the transport has cost. This situation makes the 'testing' worse and more unreasonable than one proving Pythagoras' theorem by measuring real triangles. The latter would also be unjustified, but in this case measurements can be made and the assumptions on which the theorem based can be treated as intuitively true, because the connection between imaginary and real points, lines and circles can be created without a problem. In the case of PPP doctrine this is different: it is based on a false treatment of space and an unjustified aggregate view with immeasurable variables.[12] This procedure is at the same time positivist (the test is grounded on observation statements) and strongly anti-positivist (the theory is grounded on unreal, unempirical assumptions).

There is an entirely different application of calculation of PPP. It is considered as an economic indicator and as a help in making intercountry comparisons of economic activities. This is harmless and contributes interesting information to economic history. This application does not have connection with monism, it provides only the empirical data for 'testing' the theory. In reality, this testing is only a complicated description of the difference between the actual exchange rates and PPP exchange rates. In PPP theory the following misconceptions are concerned: falsifiability and testability of theories, econometrics as a tool for testing theories, the role of assumptions and false dichotomy between mathematical and literary economics.

Turning now to the theory of optimal currency areas, this theory suffers from the same deficiency as PPP theory: a false treatment of space, unreal assumptions, econometric 'testing' and a focus on the connection between aggregated indicators without sound attention to original components. On top of this, OCA postulates the simple adjustment of monetary policy and the ability of exchange rate adjustment to subdue country-specific shocks.[13] The discussion about the theory after Mundell's article (Mundell) deals with fundamental issues as well, but concentrates on technical questions: testing the correlations over time between economic activity (such as real GDP, unemployment rate, industrial production and so forth) of various countries, measuring the openness of countries and so on (Frankel–Rose). The following conceptual shortcomings are more important. Labour and capital are not homogenous and labour is not mobile through space and through different branches of industry. Mundell's definition of region mixes the functional (factor mobility) and homogenous (uniform) elements (Mundell). The interregional flows belong to functional elements. However, functional (nodal) regions, in the case of economics, do not have firm borders – the space

divided to functional regions are continuous and they consist of overlapping regions. The OCA does not mention the effect of spatial aggregation, mostly called the modifiable areal unit problem. This problem consists of two related but distinctive components: the scale effect and the zoning effect. The scale effect is the variation in results, that may be obtained, when the same areal data are combined into sets of increasingly larger areal units of analysis. With larger areal units the homogeneity of spatial units is decreasing therefore they are seemingly lesser suitable for a common currency, at least according the OCA. The zoning effect is any variation in the results, due to alternative units of analysis, where the number of units is constant.

The OCA theory is an example first of all for the third misconception, namely the role of assumptions, because the OCA theory itself is expressed in a more literary way than the common neoclassical models, like the theory of competition or consumer behaviour. It is important to stress that only one misconception is able to invalidate a theory or an approach. Further problems are not discussed here as the above should be sufficient to serve as a clear illustration of the point.

Conclusions

The methodology of economics is an interesting area of study not merely for its own sake, but for the importance of sound practice of economic theory building and to serve sound policy prescriptions. Monist misconceptions about the nature of economic science lead to inadequate theories which have had a negative influence on the development of economic theory. The misconceptions can induce the reduction of obtained knowledge in economics and the rebirth of old and refuted mistakes in a new form. It is easy to find theories, in which incompatible methodological prescriptions get haphazardly muddled and despite their inconsequence they are still being used to support political decisions. There are many theories which are 'elegant', 'rigorous' and 'great' but they have absolutely nothing to do with reality. While this type of reasoning in economics remains in a dominant position, a substantial part of the resources of research has to be used up to refute them.

Notes

- [1] "It remains an open question what parts of social science have yet acquired such paradigms at all" (Kuhn 15).
- [2] Popper's later works are engaged in biology, history and social sciences; space limitations make it impossible to discuss them here. About the misuse of Kuhn's concept in economics see Baumberger, Blaug "Kuhn", Coats, Loasby; in geography see Graves, Mair; Johnston, Pohl; in pedagogy and behavioral sciences see the brilliant work of Scharnberg.
- [3] A thoroughly examination of the general monist claims can be found in Hayek's excellent Classics, 'The counter-revolution of science' with some historical background.
- [4] Not only in the field of economics. About falsificationism in economics see Hausman 'Falsificationism', Hausman 'Appraisal'.
- [5] See Morgenstern. "In general, economic statistics are merely by products or results of business and government activities and have to be taken as these determine" (Morgenstern 14).
- [6] See various works of McCloskey and Ziliak on econometrics and statistical significance: McCloskey "Rhetoric", McCloskey–Ziliak, Ziliak–McCloskey.
- [7] See Long. "Friedman's mistake lies in taking a theory that incorporates ancestry, eye colour, and so on to be the 'logical extreme' of realism. But realism does not demand that all these extraneous traits be specified; it merely demands that their *non-existence* not be specified either. Those who criticise neoclassical models for their lack of realism are not seeking a precise abstraction that *more closely* approximates reality; rather, they are seeking an abstraction that is not precise at all" (Long 9).
- [8] Further questions on axiomatism see Backhouse, Chick, Dow, Kumaraswamy, Weintraub.
- [9] As Kumaraswamy comments on Debreu's claim to mathematical formalism: "however, we are not told whether the rigour sought by other schools of mathematics might not be based on alternative concepts of 'correct reasoning'. Are we being told that, say Wicksell or Simon, reasoned incorrectly and obtained false

results simply because they were not followers of Hilbert or Bourbaki?" (Kumaraswamy 253).

[10] See Lawson and Mises 'Human' in general; see Streissler about econometric forecasting.

[11] First of all in my book (Dusek), I have dealt in several chapters with spatial problems concerning theory building in economics.

[12] Mises had presented the sources of the mistakes of purchasing power parity theory as early as 1912 in his fundamental but to the mainstream virtually unknown book about the theory of money (Mises „Theory” 95-102, 195-203, 215-223). The theory was criticised by Ohlin also without any effect on mainstream theory (Ohlin). Similar counter-arguments can be found in Jetzer.

[13] See Block, Mongelli.

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Tamás Dusek is assistant professor at Széchenyi István University, Győr, Hungary (dusekt@sze.hu)

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