

# Economics as an Empirical Science

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## Abstract

*The author seeks an answer to a complex question whether and on what conditions economy may be considered an empirical science. In the first part, basic epistemological and methodological issues along with the problems of rhetorical nature encountered by economists are discussed. In the next part peculiarities of economics are explored, in particular limited possibility of experimenting, uncertainty and generality of forecasts, how research and publication of results influence an object of research and the linkages between economics and human interests. Finally the future directions for economic research are debated, especially, the possible potential of experimental economics and observation, as well as whether and to what extent results of a research can be predicted*

## I. What is Economics?

Strange though it may seem it is not easy to say ‘What is economics?’ There are many definitions (for example by Adam Smith, Alfred Marshall, Lionel Robbins).

### 1. Economics – the Science of Economic Management

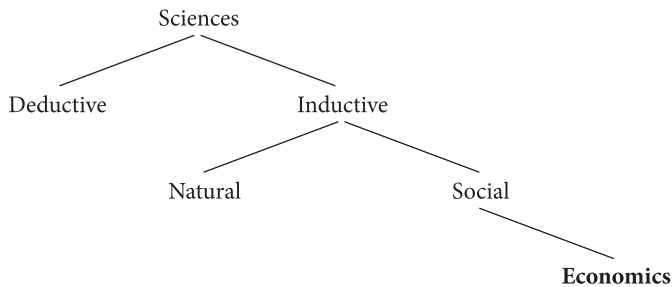
In this paper I will stick to the following definition of economics: economics is a science that collects and classifies the general knowledge of economic management (production

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and distribution of goods). Please notice that this definition excludes ‘technological knowledge’ (such as for example the knowledge of methods of metal working by spin forming) outside the scope of economics, which I consider, is of advantage.

The management, for its part, comprises the production of goods and their distribution among different people. A good is anything that meets the needs: a thing (e.g. a table, a 2 zloty coin), a service (e.g. haircut, or the performance of Górecki’s Symphony of Sorrowful Songs), and legal rights (such as copyrights or Coca-Cola trademark).



**Picture 1. Place of economics among other sciences**

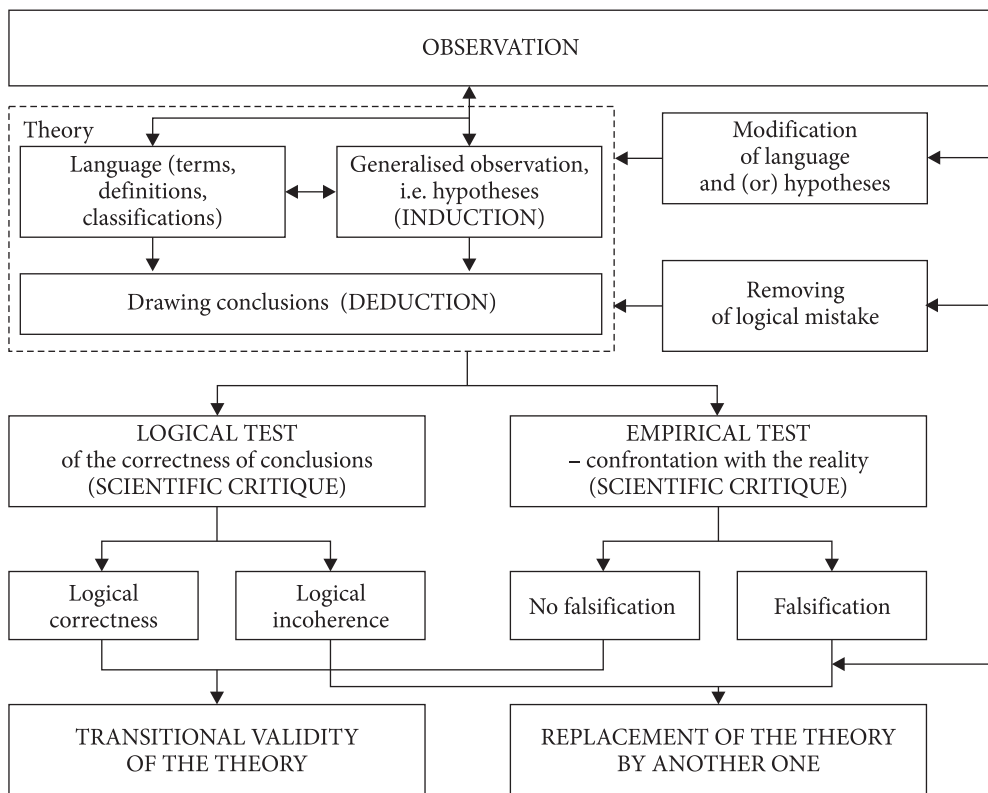
I would like to add that economics by this definition is an empirical science (see picture 1). What it means is, its theorems should be true, they should describe the real process of management, and not be true in the logical sense only.

The empirical character of economics is well summarised by the classical formulation made by Milton Friedman 50 years ago. Friedman says: ‘... theory is to be judged by its predictive power for the class of phenomena which it is intended to ‘explain’. Only factual evidence can show whether it is ‘right’ or ‘wrong’ or, better, tentatively ‘accepted’ as valid or ‘rejected’ (Friedman 1953). Therefore, the truthfulness of an economist’s statement is decided by the observation of economic phenomena and the effectiveness of actions based on this observation.

## 2. The Method of Economics

In studying the process of producing and distribution of goods, economists, like other scientists, use the method that provides a tool of verification of the obtained results. Picture 2 shows the operation of this specific ‘knowledge production machine’, which economics is (see Woll: 16).

The method is what sets apart the work of economists from the work of artists and priests, who also claim they know the truth. Reasonable people can argue whether they like paintings by Paul Klee and never reach an agreement. The existence of elves is likewise an object of indeterminate debate. However, the figures concerning the excess in state expenditure over the revenues during a budget year can be more or less defined objectively, which means the truthfulness of economists' knowledge is verifiable by anyone who is properly prepared to do it.



**Picture 2. How the economic knowledge is made**

The economists' method involves several subsequent actions. They are:

- 1) observation of economic process,
- 2) generalisation (induction),
- 3) drawing conclusions (deduction),
- 4) scientific critique.

**Observation** is a deliberate act of noting and recording something. An economist observing the economy does not have to deal with facts alone. Firstly, observation is a deliberate act; so in selecting the object of observation, economists refer themselves to their knowledge. Secondly, by interpreting the results of observation, economists refer themselves to their knowledge.

For instance, in 2004, some people only noticed Poland had an extremely high unemployment rate (at the end of the year the official rate of unemployment was nearly twice as big as in other European states). According to other observers, however, the situation was less dramatic than it seemed, because outside the statistics bloomed illegal, unofficial economy, and thousands of officially unemployed Poles found employment there. Briefly, observation does not only consist in a passive recording of the facts.

Terms, definitions and classifications are formed as a result of observation and preliminary interpretation of the facts. Terms (names) mark phenomena and enable people to transmit information. Definitions are precise characterisations or explanations of the used terms. Their precision is necessary for example because it enables unambiguous statements. Classifications categorize objects encompassed by the definition. The objects are grouped so that the objects of one group be more similar to each other from the point of view of our interest, than objects taken from different groups.

**Generalisation (induction).** Based on the results of observations we can make generalisations. Induction is the generalisation of the results of observation in order to name the permanent regularities of economic actions of management. Generalisation is followed by hypothesis. Unfortunately, generalisation does not usually produce solid knowledge. For example, when the fact is that in all analysed countries the augmentation of state expenditure beyond the level of state revenues caused the rise in prices, one cannot draw a firm conclusion that budget deficit causes inflation, because it could be different in another country. Let us not forget, however, that the bigger the number of the countries in the study, the more probable the hypothesis gets.

**Drawing conclusions (deduction).** The next stage of creation of an economic theorem is deduction. Deduction consists in drawing logical conclusions, thanks to which we have assumptions to consider certain judgements (conclusions) true. Deduction is drawing logical conclusions. Therefore, if deduction is based on true assumptions it produces true knowledge in a logical sense.

The function of assumptions, from which conclusions can be drawn, may be played by generalisations. Hypotheses about regularities that characterise the process of economic management result from the conclusions and generalisations as well.

Hypotheses can become economic laws, meaning theorems deemed true, which describe recurring relations between economic actions. Everything depends on the degree of their confirmation in confrontation with the reality.

Observations of the economic processes, generalisations and conclusions result in the establishment of economic theorems, which are systematised, logically connected sets of laws, hypotheses, definitions and classifications formulated in a language. The value of theorems is in explaining causes of phenomena and sometimes making possible their forecast. The ability to formulate theories is a proof of the science's maturity.

**Scientific critique.** If the freedom of science is guaranteed, economic theories are constantly subject to scientific critique. The critique consists in confronting economic theory with the reality and subjecting it to logical analysis.

The critique leads to: confirmation of the theory, amendment or rejections. The concord of the result of observations with the existent knowledge does not authorise scientists to consider this knowledge true once and for all. In the future facts may occur that will contradict the existing convictions. A persistent discord between the data resulting from observations and the existing conclusions has radical effects. It usually leads to the amendment of a fragment of the existing theory or substituting it with another, challenging theory. It is for this reason that many scientists encourage looking for facts that would not so much confirm an economic theory as challenge it. Submitting hypotheses to the most challenging tests speeds up acquisition of solid knowledge.

Of course, the work of economists also requires intuition, imagination and faith. They come handy when we select the object of research, formulate theses, plan tests and choose the manner of presenting what we have to say. This makes scientific work art-like.

### 3. The Language of Economic Theory

Let us have a look at those characteristics of economists' statements that hold back the accumulation of solid knowledge about economy. The statements are ambiguous, deviated, unclear and incontrovertible (see: Nowak 1985: 100). They impede observational verification of the reliability of the expressed opinions.

Ambiguity means that different definitions of the same term are used at the same time. It results from the existence of different definitions of the used name. For example the statement: 'Growth is a condition of wealth' may be true or false,

depending on the definition of the term ‘growth’. If ‘growth’ means ‘the process of growing of a man’, the statement is false. On the other hand, if ‘growth’ means ‘economic growth’, the statement is true because indeed, the wealth of a society depends on the rate of production growth.

Another problem is deviation of the statements. Deviation means that an important part of the statement was omitted, which makes it unverifiable. The error of deviation is committed when a statement is incomplete, which makes it unverifiable. For example the author of the statement: ‘A company maximalises profits’ did not specify which company they meant. In effect the statement may be true or false, depending on which firm is observed.

It happens sometimes that economists make unclear statements too. The lack of clarity means the meaning of the term is not precisely defined. The lack of clarity occurs when definitions of terms imprecisely attribute objects to names. For example, Polish economists have not reached an agreement whether the term ‘galloping inflation’ means a rise in prices whose rate exceeds 30%, 40%, or 50% year-on-year. As a result, the dispute whether ‘Poland had galloping inflation in 1992’ is impossible to determine. (In 1992 the annual inflation rate was 43%).

Finally, a vice in economists’ statements can be their incontrovertibility. Incontrovertibility means that a statement is impossible to dispute because of the language in which it was pronounced. Incontrovertibility (impossibility to falsify) can be an effect of tautology of the statement or the use of names that do not have any equivalent in objects. Tautology results from the definition of the used terms. For example, observation constantly confirms the thesis that ‘the consumer pursues happiness’. However, any act or behaviour, including suicide, can be considered ‘a pursuit of happiness’. On the other hand, the statement: ‘the productiveness of labour of a male elf is approximately 34.6% higher than that of a female elf’ cannot be proven false based on any observation, because we are not able to measure labour productiveness of elves.

Ambiguity, deviation, lack of clarity and incontrovertibility impede observational verification of the truthfulness of statements. As a result we get irrelevant disputes, acceptance of false opinions and illusory explanations.

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Of course, many details of the picture of economics painted above raise doubts and have been disputed for many years. Here are a few examples:

1. For centuries economists have been arguing about the meaning of the so-called Hume's Guillotine and the role of the 'prescriptive statements' in economics<sup>1</sup>. The object of discussion in particular is the possibility of making value-free 'positive economics' usually opposed to normative economics that contains only prescriptive judgements. The debates about this matter have been going on and on at least since the mid-19<sup>th</sup> century, and the problem itself hasn't been determined once and for all yet<sup>2</sup>.
2. For many years economists have also argued whether the assumptions of economics should be 'realistic'. The question of discussion in particular has been whether the assumptions used in deduction by authors of economic theorems ought to or not ought to be a realistic reflection of reality. There are at least three challenging positions on this matter. First, I mean the opinion, often attributed to Milton Friedman that reality of assumptions, on which an economic theorem is based, is of no importance. What is important, however, is that the conclusions drawn from the theorem should be compatible with the reality (instrumentalism). Secondly, there is the opposite position, which requires that the assumptions faithfully describe the reality (realism). Thirdly, there is a middle position, according to which the assumptions of economic theorem are idealised (simplified) theories about economic processes. The most famous example of such assumption is a statement that all actions of men are motivated solely materially, in other words a man is an economic creature (in Latin: homo oeconomicus).
3. Yet another object of economists' debate is the role of methodological individualism in economics. According to the point of view of 'methodological individualists' social phenomena should be explained in reference to the viewpoints and decisions of individuals (see: Nowak 1985: 102; Nagel 1970: 458–469). For instance, in the second half of 20<sup>th</sup> century this opinion took the form of the quest for the so-called microfoundations of macroeconomics. The objective of these efforts has been to explain all macroeconomic features of economy by

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<sup>1</sup> Hume's Guillotine (Hume's law) and Hume's dictum is a recommendation of precise distinction and restrictive division of facts and values. On the one hand, we have empirically verifiable or logical descriptive statements, which say what 'is', what 'was' and what 'will be', and on the other hand impossible to evaluate as true or false – prescriptive statements (about what ought to be) 'what's good, and what's bad'.

<sup>2</sup> See, on this matter, for example (Czarny 2004).

referring to the rational behaviours of economic actors that have the character assumed by microeconomy<sup>3</sup>.

My belief is the abovementioned controversies do not invalidate the image of the science of economics presented on picture 2. I think all these ambiguities can easily become and they indeed do so, an object of detailed research conducted as part of economics in this sense. Speaking more directly, despite all reservations (suggestively expressed for example by the advocates of the rhetorical approach to economics, including Deirdre McCloskey), I do not know a picture of economics which would be more 'thorough' in the descriptive sense<sup>4</sup>. What's more, I do not believe that some other vision of economics could make it a more effective instrument of accumulating solid knowledge of economic management.

#### 4. Why is it so Bad, when it's so Well?

The comments expressed so far may suggest that economics is a science very similar to other empirical sciences, including natural sciences, such as physics, chemistry or biology. But in reality, the methodological situation of social sciences, including economics, is quite peculiar in comparison to natural sciences, which has been emphasised by many authors since the times of Adam Smith.

Economics may be set apart from sociology and political science because it manages somehow to provide rigorous, deductive theories of human action that are almost wholly lacking in these other behavioural sciences (see: Blaug 1995: 14). But on the other hand, economics has not so far managed to establish such a number of useful theorems that would allow it to compete with natural sciences in the ability to explain and predict phenomena. Neither can economists boast of such spectacular

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<sup>3</sup> In this context it is worth to make a notice of the establishment at the end of 20<sup>th</sup> century of a group of macroeconomic models which were part of the neoclassical economics, and in case of which microeconomic methods of mathematical optimisation were applied in reference to singular representative economic actor, whose actions next explained the operation of economy as a whole.

<sup>4</sup> In the opinion of Deirdre McCloskey, the image of economics presented on picture 2 is not realistic. The prevalence of a specific viewpoint in the course of an economists' discussion does not depend on the procedures presented on picture 2, but the persuasion applied by participants of the debate. In arguing their points economists apply reasoning through analogy, metaphors, they refer to authority, introspection, symmetry, etc. The objective of all these efforts is to persuade the listeners to accept the speaker's argumentation and reject someone else's. Briefly, in McCloskey's opinion the reasons of accepting of economic theories have nothing to do with methodological rules referring to the positivist ideas (McCloskey 1985: XVII–XVIII; 42; and all of chapter 4) [in Polish see also: (Czarny 2007)].



achievements as landing on the Moon, splitting the atom or heart transplant. In addition, they often argue in public about the matters that seem elementary. And they commit spectacular errors in their explaining and forecasting the course of economic phenomena, which makes many observers doubt the scientific character of economic occupation.

For instance, in the 12 edition of a famous textbook *Economics*, in 1985 Paul A. Samuelson (with William D. Nordhaus) stated that since 1928 the Soviet Union had been developing faster than the United States, Germany and Japan. Even a year before the Berlin Wall came down they wrote: 'the Soviet economy is proof that, contrary to what many sceptics had earlier believed, a socialist command economy can function and even thrive' (Samuelson, Nordhaus 1989: 837). The word 'thrive' had not disappeared from the textbook until the 14 edition. Meanwhile, what had been noticed for example by Roberts, is that already in 1988, thanks to perestroika and glasnost, it was evident that Soviet economy had been stagnant for decades (see: Roberts 2002; compare with: Skousen 1997).

In effect, when it comes to GDP forecasting, Blaug formulates the following opinion: 'We cannot accurately predict the growth of GNP in an economy more than a year ahead and we cannot even predict the growth of NNP in individual sectors of economy during the next two, three years' (Blaug 1995: 355–356). Briefly, the economists' ability to forecast economic phenomena is negligible and it is not even clear that it surpasses the abilities of an intelligent layperson. Polish examples that confirm this diagnosis can be found for instance in critical evaluations of the accuracy of macroeconomic forecasts made in Poland published regularly by Borowski; (see for instance: Borowski 2007).

I presume the cause of this state of the affairs are the peculiar properties of the very object of economists' research. In the next chapter I will have a closer look at the most important of these properties in order to see to what extent the peculiarities of economics as a science impede the application of the rules of contemporary methodology of empirical sciences in this area.

## II. Peculiarities of Economics

The science of economics is essentially different from the most important natural sciences in many aspects.

### 1. Limited Possibility of Experimenting

The properties of the object of interest of economists are the reason why experiment plays a mediocre role in economy, while being a basic instrument of work of a scientist who explores nature.

An experiment consists in deliberate changing of the selected properties of a phenomenon in order to determine the relations between them and other properties of the same phenomenon. An experimenter makes sure to eliminate all secondary influence that could interfere with the relations described. Running an experiment demands such things as: 1) a clear distinction and definition of the analysed features of the phenomenon, meaning the potential causes and effects; 2) repeatability of effects, meaning the events caused by the change of causes; 3) possibility of directing the change of causes; see: (Nagel 1970: 387–394). In case of economics these preconditions are especially difficult to fulfil. Economic process is a complex and undividable entity and one cannot usually isolate and arbitrarily change only some of its fragments.

For instance, let us imagine that economists want to run an experiment that would explore the impact of changes in the investment expenditure on the growth rate of the gross domestic product. This type of research would meet many obstacles.

First of all, how would you define ‘investment expenditure’? Do they refer to a definite year? If so, which one? What should be the time interval between the years when the gross domestic product increased and the period when the investment expenditure changed? After all, the economic growth rate in a given year depends not only on the machines acquired a year before but also those that had been in use for more than a decade. Furthermore, the relation between investments and production is very hard to isolate from the impact of other factors. The increase of production, apart from investments, depends on the predominant form of corporate ownership in an economy, competences of politicians responsible for economy, changes of prices on foreign markets and natural disasters, which makes the matters ultimately complicated.

Secondly, the decision which part of the gross domestic product will be spent on investments has a great impact on the life of the society. The bigger the investments, the less can be spent on current needs. Therefore, political and economic power is necessary to authorise the changes of investments, which is the necessary condition of experimenting. Briefly speaking, it is hard to imagine that anyone could interfere with the daily life of millions of citizens just so as economists could satisfy their curiosity.

Thirdly, in economics (and social sciences in general) it is often hard to notice the repeatability of the results of a potential experiment<sup>5</sup>. Reactions to the changes in the amount of investments can be varied, depending for instance on the changes of social awareness, which, for its part, impedes precise identification of the relation between the amount of investments and the growth rate of the gross domestic product. At the same time, in natural sciences the repeatability of the results of an experiment enables intense scientific critique and is decisive when it comes to endorsement of the theories.

In addition, we should notice that experiments are not applicable at all in the research of many social phenomena, because the very nature of these phenomena is singular. The emergence of a market economy with predominant private ownership is an example. It is a process that had been completed centuries ago in Western Europe and the same combination of political, cultural, demographic, technological and other circumstances that initiated it cannot be recreated in any place in the world today. Therefore, no experiment can be conducted in order to find out which of these circumstances were most decisive.

## 2. Uncertainty and Generality of Forecasts

Theories formulated by economists usually refer to specifically defined situations. Their occurrence requires that specific conditions must be fulfilled. As a result, the conclusions drawn from these theories bear rather great uncertainty. Moreover, the conclusions are usually very general, which diminishes their practical utility (for instance the utility of economic forecasts.)

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<sup>5</sup> Repeatability means the result of a specific study reappears when the study is repeated by another person.

## The Effect of Changeability of Circumstances of Economic Management

Economic theories do not usually refer to all economies and societies. The relations described by those theories occur only in strictly defined circumstances. The circumstances are not only complex but changeable as well. They are influenced by such things as the entire area of culture, political system, and technology. Such changeability of the terms of economic management calls for precise demarcation of the scope of applicability of specific laws of economy, in order to avoid any deviation. The demarcation is done by naming the preconditions of regularities. But since the preconditions are very numerous, making of the list is very hard.

The changeability of the situations that economists have to deal with often makes them refer to the *ceteris paribus* clause (Latin: 'all other things being equal'). However, the *ceteris paribus* assumption interferes with the verification of reliability of a theory, thus weakening the effectiveness of the scientific critique. It can be applied in order to protect the theory against challenging testimony of observational data. After all, one can always say that that an observational anomaly which challenges a theory was caused by the changes in the terms of economic management, which, the authors of the theory assumed, had been constant.

Indeed, the *ceteris paribus* assumption restrains the theories of natural sciences as much as in social sciences, nevertheless the conclusions of natural science theories seem more reliable than in social sciences. They differ often sufficiently to base all manner of practical decisions on them, like constructing aircraft and bridges. In general an economic (and social science) theory probably has to rest on more *ceteris paribus* assumptions and auxiliary hypotheses than natural science theory because social phenomena are subject to more potentially disturbing influences than natural phenomena. Furthermore, the nature of those disturbing influences makes them more changeable (see: Beed and Beed 2000: 423–424). For this reason, economists do not have their 'Planck constant' or 'gravitational constant'<sup>6</sup>.

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<sup>6</sup> According to the Duhem–Quine thesis no theory can be exploded by a one-off experiment. Falsification is attempted on entire sets of logically connected hypotheses. For example, in economics the verification of the stable money demand hypothesis requires the acceptance of auxiliary hypotheses about the factors influencing variables which define the money demand (for example the method of measuring the quantity of money, or the manner of creating money supply, etc.) In case of a specific test, the main hypothesis cannot be separated from auxiliary hypotheses, so that when there is a significant difference between the real and the expected quantity of money, the negative result of the test is not 'concentrated'. It can be caused by a fault in the stability hypothesis, as well as one or more of the auxiliary hypotheses. It may seem reasonable then to change particular parts of the theory, but the rules are unclear, which may cause constant disputes.

To sum up: the changeability of circumstances of economic management resulting in the limitation of the scope of almost all 'laws of economics' makes regularities uncertain and of little practical use. What's more, the scientific critique of economic theories is difficult, because the facts that contradict them can always be justified by some faults in one of the unprecise preconditions of the theories. Needless to say, this situation complicates the accumulation of solid economic knowledge.

## Generality of Forecasts

It is the changeability of the circumstances of economic management that causes economic theories and forecasts to be rather non-specific. Worse more, their specification is usually impossible, as the circumstances of economic management, including people's reactions to economic stimulants are not constant (recurrent), but variable. As a consequence, one cannot say for example how much exactly the price and sales figures of a product will rise after the consumers' income will have increased, or how many months exactly it will take for the growth of money supply to cause a noticeable escalation of the average price level in an economy. In other words, theories that find solid empirical confirmation do not happen often in economics. One of the exceptions is the Baumol-Tobin square root rule that explains the transaction demand for money. The square root formula implies that income elasticity of money demand can be derived as being equal to  $+1/2$ , while the elasticity of demand on percent equals  $-(1/2)$  (Baumol 1952; Tobin 1956).

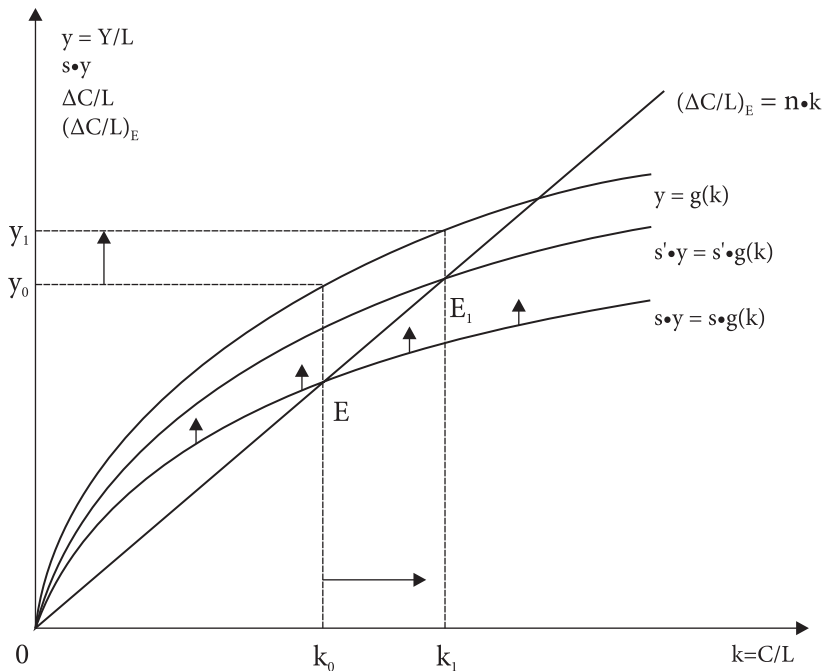
The verification of theories is difficult in economics due to the common use of the method of comparative statics for instance. The standard application of this method allows only to define the direction of changes of the analysed variable (but not the magnitude). Since having the correct sign (plus or minus) is much easier than having both the correct sign and magnitude, an emphasis on such qualitative prediction generates theories, which are low in empirical content, have few potential falsifiers, and are difficult if not impossible to test severely. The result is often economic theories

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It is usually an especially important problem in economics because of the complexity of situations described by economists. The complexity compels numerous simplifying assumptions (for instance differentiability of the production function, perfect information, lack of externalities, and so on). As a result, empirical falsification of a hypothesis based on all these assumptions cannot be considered as conclusive, because one cannot determine whether it was not caused by a fault in one of those assumptions. In other words, 'the Duhem-Quine thesis complicates all scientific testing, including economics, but its additive effect in social science may be more undermining of temporally stable results than in natural science' (Beed, Beed 2000: 423-424).

which are confirmed by the evidence but provide very little information (see: Hands 1992: 24).

Similar problems are connected with the distinction of short term and long term, when their actual length is not defined (this distinction based on different criteria can be found for instance in calculating price range of demand and supply elasticity, in the AD/AS model, as well as in the neoclassical growth theory). As a result, the testing of specific theories is complicated.



Y – total output  
 L – labour force  
 s – “old” saving rate  
 s’ – “new” saving rate  
 n – population growth rate  
 k=C/L – capital per worker  
 (ΔC/L) – real investment per worker  
 (ΔC/L)E – required investment per worker  
 g(k) – macroeconomic growth function

**Picture 3. Solow’s model of economic growth**

For instance, a conclusion of the neoclassical model of growth is the thesis of the equality of rates of economic growth in steady states with different saving rates. Picture 3 presents Solow’s two-sector model of economy with two steady states, where

the real investment per capita is equal to the required investment per capita (points E and E1). In points E and E1 the rate of economic growth is equal (under the assumed conditions in the steady state the economic growth rate is by definition equal to the population growth rate,  $n$ ). At the same time points E and E1 are matched with different saving rates ( $s$  and  $s'$  respectively). As a consequence, in this economy there is no positive relation between saving rate and economic growth rate (which strangely enough is confirmed empirically).

The attempts at testing the thesis of the non-existent relation between saving rate and growth rate are difficult because of the lack of information about the length of 'long-term' in this type of the neoclassical model of growth. The contradiction of this thesis by reference to the challenging facts is not enough, because it may be possible that the period, from which the data on saving rates and growth rates were taken, was too short and the thesis of no-relation between the two in points E and E1 refers to a longer period. For example, as Mankiw says: 'The inability of saving to affect steady-state growth might appear inconsistent with the strong correlation between growth and saving across countries. But this correlation could reflect the transitional dynamics that arise as economies approach their steady states' (Mankiw 1995: 278).

### 3. The Impact of Research and Publication of Results on the Object of Research

As you know, in case of economics the research procedure itself may change the behaviour of individuals and groups in an economy. The publication of results of a research can have a similar impact on the properties of an object under study. Because of that finding the truth about economy is even more problematic. Since the act of research modifies the features of the researched object, the economic knowledge acquired through research does not describe the normal behaviour of people in an economy, but their behaviour changed by the applied research methods. Similarly, since getting acquainted with the results of a research changes the behaviour of the researched, the conclusions of economists do not describe the real behaviour of people in an economy, but their past behaviour, from the period before the publication of the research results. Meanwhile, the purpose of research is to describe behaviours undeformed by external factors.

The method of questionnaire surveys is a classic example of this type of complications. The questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents about the

behaviour of subjects in an economy by interviewing all of them according to the same scheme. Even if the pollster has got the right qualifications and does not deform the data, there is no certainty that the gathered information will reflect the real views of respondents. There are many reasons why.

First of all, a respondent may believe that his/her answer will have impact on the matters of importance to him/her, which may prompt them to give a different answer than they would normally do. For instance, a worker who is not convinced about the grounds justifying a strike may still support it, thinking a strike could bring about a raise of wages.

Second of all, during research a respondent may reckon that he/she is expected to have an opinion on certain matters, the importance of which he/she did not realise before. This may cause them to answer with conviction questions they never thought about before, and for instance express opinions in a discussion about the proper amount of budget deficit.

Thirdly, a respondent may keep to him/herself the truth about their opinions and behaviours, because they may be afraid an information like that could be used against them. For instance, the unemployed will not willingly admit they undertake illegal work.

The verisimilitude of economic forecasts may also raise doubts because the publication of forecasts can sometimes change people's behaviour. For instance, as a result we get 'self-defeating prognosis'. Nagel quotes a story about economists in the post war United States who on the basis of an apparently adequate analysis of the state of the American economy predicted an economic recession and growth of unemployment rate for 1947. And because of this warning businessmen lowered the prices of a number of products. The effective demand for these products increased, which in turn revived the market. And in the end the predicted recession never came into effect (Nagel 1970: 402).

## 4. Economics and Human Interests

In the course of economic management the interests of groups and individuals, including material interests, are accomplished to various extents. For instance, as a result of income division some people obtain bigger or smaller part of the income produced by the entire society. Apart from that, people in an economy also have ideal interests. They want to have a say in politics and economy and want the management of economy to be done in accordance with their views.



The knowledge provided by economics has a strong impact on people's potential to achieve various goals. Sometimes it leads to intentional or unintentional deformation of this knowledge in order to create the conditions that would enable some people to gain material benefits and other. Heilbroner goes as far as saying that in case of social matters research, an emotional involvement of the scientist is unavoidable. The nature of this involvement is different than in a scientist who investigates nature. In case of the natural sciences a discovery of an unexplained anomaly can threaten the intellectual 'safety' of the explorer of nature, and maybe even his mental 'integrity'. However, this discovery cannot compel a negative moral evaluation of the scientist himself as an element of the existing social order. But as far as social sciences go, the emergence of unexpected results of a research almost always weakens or strengthens the legitimacy of the system, of which a social scientist is always a part. (see: Heilbroner 1973: 139). Heilbroner further writes: 'I will even risk an opinion that every scientist dealing with social matters in his work, approaches his task with an (intentional or unintentional) desire to prove efficiency or inefficiency of the social order he investigates' (Heilbroner 1973: 141). As a consequence, the image of economy created by an economist can be deformed. In extreme cases the deformation consists, for instance, in presenting false descriptions and theories as scientific knowledge.

The deformation can be done in at least two ways. Firstly, the interested party can create the deformed knowledge themselves, like Joseph Stalin did for example when he 'observed' the so-called basic economic law of socialism which said that in socialist countries all enterprises have the sole objective of 'securing of the maximum satisfaction of the constantly rising material and cultural requirements of the whole of society through the continuous expansion and perfection of socialist production on the basis of higher techniques'<sup>7</sup>. Of course, the existence of such regularity was contradicted by the actually observed actions of enterprises in socialist countries.

Secondly, the interested parties can interfere with scientific critique and in this way influence the results of economic theories selection. This can be done for example by falsifying research results, subjectively dividing funds for scientific development, deforming teaching curricula, enabling the publication of research results only to a chosen few, blocking the chance of professional promotion of the critiques. The intensity of this type of actions can vary. One of the most drastic examples in Poland is the fate of the so-called Kalecki's school in Poland (see: Osiatyński 1984: 253–302). In different

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<sup>7</sup> See: (Stalin 1952: 22); compare: (Stalin 1949: 144). In Poland the critique of the opinion about the existence of the basic economic law of socialism did not let this idea to die out until the end of 1970s. See for example (Minc 1980: 114). I described this problem in more detail in: (Czarny 1989, chapters 3 and 4).

historical circumstances the applied measures are usually more subtle [see for instance, relatively recent Polish debate on rationality principle in economics; (Czarny 1989)].

Such practices driven by material and ideal interests of people may complicate and impede the cognition of economic laws. For example in Poland during many decades after WW2 up until the end of 1980s only few handbooks of economics of the world standard were published. The content of publications that were commonly used as handbooks for students of economics was usually outdated, incomplete or deformed by propaganda. This obviously decreased the level of economics teaching in Poland and hampered the development of economic sciences.

### **III. On the Potential for Progress in Economics**

I don't believe that the presented above peculiarities of economics as an empirical science could put a stop to its progress. Here is why.

#### **1. Experimental Economics and Observation**

It is true that the potential for experiment is very limited in economics. But let us not forget that some of the natural sciences had not used experimental methods for many years either (for example astronomy and embryology). And it did not prevent scientists from establishing scientific truths in these fields.

Furthermore, the abovementioned economists' trouble with experimenting does not totally exclude the possibility of referring to experiment as a source of knowledge. Sometimes, against the odds, it is possible. For instance, certain tax improvements can be introduced for selected enterprises, and research can be done to measure their impact on the magnitude of the output. Similarly, market simulations can be done by arranging situations, in which groups of people investigated by the experimenter, act the same as people who maximise utility and (or) profits on the real market.

#### **Experimental Economics Development**

The increasing role of experiment as a source of knowledge for economic scientists has been confirmed by the fast development of experimental economics in the second half of the 20<sup>th</sup> century. Some of the most fundamental assumptions of economic theory

were put to test (like for instance the consumer rationality assumption proclaimed by the advocates of the revealed preferences concept). The subjects of those experiments can also be animals (e.g. pigeons, rats). But even in those cases when an experiment is possible (which are more likely with microeconomic, not macroeconomic, problems) it is not as easy as in natural sciences.

Of course, the enthusiasts of experimental economics give emphasis to its successes. In their opinion, experimental economics has been one of the great success stories of the last 20 years. We now have rigorous ways to test models of human behaviour in the laboratory. Some standard models, such as supply and demand, have turned out to be much more robust than we would have thought 20 years ago. Other models, such as expected utility, have turned out to be less robust. The growth of experimental economics has led many theorists to construct theories that are simple, concrete and testable, rather than theories that are complex, abstract, and general. Laboratory observations have also been instrumental in alerting us to theoretical dead ends, such as some of the more convoluted refinements of game-theoretic equilibrium concepts (see: Varian 1992: 118–119).

However sceptics doubt the reality of the perspective of creating a basis for economic observations in this way: it seems unlikely for many reasons. For example, the data from questionnaires collected in various situations suggest people have different reactions in an artificial situation than when they face real and important changes in their material welfare. Besides, economists are too often compelled to substitute important empirical data with experimental ones ( O'Brien 1992: 103).

In general: '... the status of experimental findings in economics remains controversial. Even among experimentalists, there are sharp disagreements about the criteria for judging the validity of experimental designs and for drawing inferences from experiments' (Sugden 2005: 177).

## Observation Instead of Experiment?

An experiment as a source of cognition of economics can sometimes be replaced by comparison of results of observation of various economic phenomena. Admittedly, manipulating the price in a simulated situation, when all other circumstances that influence the demand remain constant, in order to observe the level of demand in relation to different prices, is not very practical, because of the high cost for example. As an alternative, one can, however, refer to the information from the past about the sales figures at different price levels and apply regression analysis.

In the same way, one cannot reconstruct for experimental purposes the social situation that led to the establishment of the capitalist system in Western Europe. It is possible, however, to compare information about it with the history of societies in China and India, where capitalism as a form of production organisation did not exist. In the same context, it might be useful to observe the transformation of economic systems in countries like Russia, Poland and China by the end of the 20<sup>th</sup> century. Such comparative observations can be very enlightening and help identify the key circumstances that led to the establishment of the capitalist form of economic management. A classic example of such analyses is Weber's research on the rationalisation process in Western Europe, as well as China and India; (see for example: Weber 1922: 17–206); compare (Weiss 1975: 47–48; Czarny 1989, chapter 1; Czarny 1990a). As for the transformation in socialist countries, I would recommend comparative analyses of the institutional conditions of transformation 'from plan to market' in Russia, China, and other communist states by Stiglitz et al. (see for example: Hussain, Stern, Stiglitz 2000; Hoff, Stiglitz 2002; Ellerman, Stiglitz 2003). It is obvious, however, that the number of such 'natural experiments' discovered by economic historians and the quantity of provided information is limited.

Milton Friedman wrote it already in mid-20<sup>th</sup> century that 'evidence cast up by experience is abundant and frequently as conclusive as that from contrived experiments; thus the inability to conduct experiments is not a fundamental obstacle to testing hypotheses by the success of their predictions. But such evidence is far more difficult to interpret. It is frequently complex and always indirect and incomplete. Its collection is often arduous, and its interpretation generally requires subtle analysis and involved chains of reasoning, which seldom carry real conviction. The denial to economics of the dramatic and direct evidence of the 'crucial' experiment (in Latin: *experimentum crucis* – B. Cz.) does hinder the adequate testing of hypotheses; but this is much less significant than the difficulty it places in the way of achieving a reasonably prompt and wide consensus on the conclusions justified by the available evidence. It renders the weeding-out of unsuccessful hypotheses slow and difficult. They are seldom downed for good and are always cropping up again.' (Friedman 1953: 10–11).

## 2. Results of Research and Their Publication Can be Predicted

I pointed out in previous chapters that the research procedure can influence the object of economic research, and what's more, the general availability of results of economic analyses may lead to such changes in people's behaviour which render

the research invalid. Of course, this state of the affairs is not helping scientists who investigate economy. But this does not mean that truthful description of an economic process becomes impossible in this situation. The arguments to support such thesis are as follows:

The publication of economic research results does not always lead to a change in people's behaviour. Nurkse's describing of the so-called demonstration effect did not in the least modify consumer attitudes. Consumers continue to copy each other's behaviours and buy everything their neighbours deem desirable.

Furthermore, knowing the regularity of human action, one could predict and take into account the respective change in people's behaviour. This would enable taking into consideration the results of the changes in formulating research results. For example, if the analysis of an economy with AD/AS model and inflation expectations argued Philips' Curve shows that in the near future the inflation rate will equal  $\pi$ , then in the course of research – bearing in mind Lucas Critique – one could assume that the price expectations in that economy equal  $\pi_e = \pi$ . According to the rational expectations theory, if the real unemployment rate,  $u$ , is not equal to the natural unemployment rate,  $u^*$  ( $u \neq u^*$ ), people should adjust their inflation expectations,  $\pi_e$ , to the level of  $\pi$ , defined by the equation of the short-run Phillips curve, plotting inflation expectations:  $[\pi = \pi_e - \alpha(u - u^*)]$ , where:  $\pi$  is the inflation rate,  $\pi_w$  is the rate of growth of money wages,  $\pi_e$  is the expected inflation rate,  $\alpha$  is the degree of wage sensitivity to the unemployment rate,  $u$  is the real unemployment rate, and  $u^*$  is the natural unemployment rate<sup>8</sup>.

However, anticipating the change in people's behaviour caused by the research is not easy and requires arbitrary choices, regarding for instance the scale of this change. Against the forecasts of radical advocates of the rational expectations theory, who assumed – in the spirit of Lucas Critique - that  $\pi = \pi_e$  (see: above), the introduction of the Philips Curve, inflation expectations argued, did not cause its disappearance. Observation still confirms the existence of counter dependency of the inflation rate and unemployment rate (see for instance: Dornbusch, Fischer, Startz 2003: 551). Advocates of the rational expectations theory explain this by unavailability of important information and consequent false assessment of the situation by people who, nevertheless, have rational expectations. In other words,

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<sup>8</sup> However, if  $\pi = \pi_e - \alpha(u - u^*)$ , then  $\pi = \pi_e$  if, and only if,  $u = u^*$ , so in this situation the short-run Phillips curve should not exist. If the real inflation rate is always equal to the expected inflation rate, then then real unemployment rate is always equal to the natural unemployment rate. This means the change of the real unemployment rate is not coupled by the opposite change of the real unemployment rate.

unexpected changes of the growth rate of money supply in an economy are followed by the change of unemployment rate, while the expectable changes don't; see (Lucas 1973). (Another explanation is stickness of nominal wages. Nevertheless, everything points out that predicting human reaction to research is difficult.

### 3. Other Problems

Difficulties connected with other problems that bother economists can be surmounted too, including uncertainty and inaccuracy of forecasts, and the impact of material and ideal interests of economists which deform the verisimilitude of their statements.

#### For Less Uncertainty and More Accuracy of Forecasts

The ambiguity of economic forecasts effectively complicates and sometimes makes completely impossible their verification. However, it can be prevented. First of all, by avoiding unrealistic ('heroic') and unverifiable assumptions, which obviously do not reflect the reality.

Secondly, it is necessary to pursue the creation of theories of empirical character, and give them the most precise form possible, as well as put them to strict tests by confronting them with the reality. What it means is, that in order to succeed economists really need to overcome their common reluctance to evaluate economic theories according to the criterium of originality of their empirical content. The research on scientific papers found in economic publications has for many years show a drastic irrelevance of the published papers to the reality; see: (Blaug 1995: 31; compare Canterberry and Burkhardt 1983; Leontief 1982; Oswald 1991). Leontief had noticed this already in 1971 when he wrote that the measure of professional success in economic milieus was inappropriate. The empirical work, such as gathering adequate data about economy, was unappreciated, while theoretical work, such as creating new mathematized economic theories or econometric techniques, was overrated; see: (Leontief 1971: 3–5; compare: Backhouse 1997: 212.) .

#### The Role of Interests

Both material and ideal interests have indeed great impact on the content of economic theories, which had been confirmed for example by the history of the so-called political

economy of socialism in Poland. It does not have to mean, however, that economic knowledge becomes irrevocably deformed. For example, the Eastern European version of real socialism collapsed, and with it the political economy of socialism.

We should remember that economic knowledge is not the only factor that influences the changes of achieving human goals and objectives. It is similar with natural sciences. It is common knowledge that the views of Copernicus or Darwin were rejected. [Nevertheless, Heilbrunner is right when he says that such problems are more damaging to economics and social sciences than astronomy and biology (they more often concern imperative material interests)].

In my opinion, freedom of science is of crucial importance here. It guarantees competition among scholars, which in turn increases the intensity and effectiveness of scientific critique. In general, I believe, however, that despite all reservations, Joseph Schumpeter was right when he wrote: 'there exists a mechanism that tends to crush out ideologies automatically' (meaning the empirical economics model from picture 2 above – B. Cz.). Of course, 'this may be a time-consuming process that meets with many resistances'. In effect 'we are never safe from current intrusion of new ideologies to take the place of the vanishing older ones' (Schumpeter 1954: 44).

## 4. On the Progress in Economics

I have so far pointed out various problems that economists have to face when they investigate economy. They are usually caused by the properties of the researched object, which impede the verification and critique of economic theories.

Firstly, the use of experiment as a source of information about economics and the generality of economic predictions make the testing of particular statements as well as total theories more difficult than in natural sciences. This weakens the intensity of scientific critique, thus hampering the process of accumulation of solid knowledge of economics.

Secondly, because of things such as the limitation of validity of theories to specific situations, the changeability of economic conditions, the problems with their accurate description, the unrealistic assumptions (e.g. applying *ceteris paribus* or assuming that people are fully aware of the circumstances and results of their actions) the negative result of an observation does not at all imply resignation from the verified theory. A negative test result can be for example explained by a change of circumstances, which had been considered constant, or changed as a result of the research or publication of research results.

Thirdly, the strong dependence of the possibility of realisation of interests (both material and ideal) on the content of economic knowledge is the reason of relatively permanent deformations of the knowledge of economics, it weakens the scientific critique and complicates the accumulation of solid economic knowledge.

Reservations of this kind are being expressed these days by many methodologists of economics. 'The difficulty in economics and the social sciences is ... (1) there is not a substantial body of precise, well-tested and corroborated laws in the fields in which predictions are wanted, ventured or required to support rationally the policies adopted; and (2) the 'independent evidence' in favour of all 'the initial conditions' which are often so much more numerous, complex and difficult to isolate than in the natural world, is often practically impossible to ascertain with sufficient precision and reliability. ... For if predictions useful for practical policies are to be obtained, these initial conditions must themselves be reasonably precise, not too numerous, and themselves predictable. ... In fact, prediction in economics and social sciences has often to be attempted not on 'well-tested and corroborated laws, but on tentative, imprecise generalizations regarding trends and tendencies.' (Hutchison 1964: 94–95). At the end of the 20<sup>th</sup> century this opinion was fully accepted by such scholars as Caldwell (see: Caldwell 1982: 238–42) and Blaug (Blaug 1995: 22).

However, there is much reason in the statement that making science does not only consist in forecasting. One of the biggest achievements of economists is their language. What I mean is the well known set of terms and classifications such as: 'scarcity of goods', 'real value', 'transaction costs', 'market equilibrium', 'alternative cost', 'sunk costs', 'scale advantage', 'external results', 'surplus of consumer and producer', 'information asymmetry', 'merit and demerit goods', 'intermediate and final goods', 'gross domestic product, GDP', 'PPP - purchasing power parity', 'PPP exchange rate', 'short-term and long-term macroeconomic equilibrium', 'multiplier', 'natural rate of unemployment', 'involuntary unemployment', 'inflation tax', 'comparative advantage', etc. The glossary is expanding all the time (for example: 'coopetition').

Thanks to this language economists are able to describe, explain and analyse the world of economics with more precision and clarity. Moreover, the analyses prove to be useful in practice. Such is for instance the case of anti-monopoly policy (e.g.: Will Microsoft be divided at last, or not?) and analysis of costs and advantages (e.g.: It is worth to build a giant airport in this place, or not?).

In other words, the achievements of science, including economics, are not only general scientific laws. As Solow commented: 'There is enough for us to do without pretending to a degree of completeness and precision which we cannot deliver. To my way of thinking, the true functions of analytical economics are best described



informally: to organize our necessarily incomplete perceptions about the economy, to see connections that the untutored eye would miss, to tell plausible – sometimes even convincing – causal stories with the help of a few central principles, and to make rough quantitative judgments about the consequences of economic policy and other exogenous events (Solow 1985: 328–9; quoted after Mayer 1993: 47). Furthermore, the science does neither only, nor mostly, develop by identification of correlations of the long known characteristics of the observed objects. Another thing of great importance is the creation of new notions, or the new ways of describing and classifying of the phenomena, comparing them with other notions and investigating the consequences of their application; (compare: Hausman 1994: 13).

As for the economists' ability to formulate laws of economics, the progress in this area is – most likely – a question of time. Let us remember that natural sciences had been developing for many centuries before they achieved today's level of advancement and today's potential.

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To sum up, I share Blaug's (Blaug 1992) and Backhouse's (Backhouse 1997) opinions that the problems of economists with defining the truth about economic processes result from the accumulation of problems that are familiar to natural sciences as well. On the one hand, Solow is obviously right, when he says the achievements of economics are not limited to some general scientific laws. But if we want to go beyond his minimalist programme, we must reach out to Blaug's instructions. The potential of further development of economics truly depends on how fast we are able to replace the common tendency to create irrelevant models of economic management, unrelated to the reality, with an equally common tendency to create and test theories that refer to the results of empirical research. The system of stimuli the scientists respond to is decisive. They involve the criteria of evaluation of scientific success accepted in economist milieus, the manner of qualification of papers for scientific publications, and the division of funds for economic sciences development.

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