

## ABOUT PERSPECTIVE DIRECTIONS OF ESTABLISHMENT AND FURTHER DEVELOPMENT OF ECONOMIC METROLOGY

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**Abstract.** The characteristic of perspective directions of econometric studies at the present stage is carried out. The following directions like traditional, post-traditional and modern are distinguished. The necessity of establishing an economic metrology as a general theory of economic measurement and a theoretical-methodological basis of econometric science further development is grounded.

**Key words:** econometrics, economic metrology, metrological economy, metrological behaviour, motivational behaviour, value, price.

**Introduction.** The aim of this article is general scientific analysis of the practice of econometric studies at the present stage of economic science development and substantiation of the formation of such a modern direction of economic science development as an economic metrology or a mathematical economy. The author carries out this aim by analyzing both the practice of econometric studies at the present stage of economic science development and the practice of economic measurement. The monitoring of the latter makes the author think that the general theory of economic measurement cannot be formed on the basis of establishment of so-called economic-mathematical models. It must be formed through the monitoring of economic measurement practice. The main idea of this article is to show that basic economic parameters, especially those most fundamental or primary ones like economic value and an economic price are not formed in the market though through its mechanism, but through certain metrological behaviour of business activity entities, which is based on appropriate economic behaviour and so-called motivational behaviour. During the practical implementation of such an aim the author summarizes both his own and world experience of econometric studies in order to define the most fundamental principles of forming economic parameters in the practice of business activities.

**The main results of the study.** They are distinguishing by the author of the article the main directions of econometric studies at the present

stage of economic science development in the context of defining their advantages and disadvantages in order to justify the necessity of establishing a modern or theoretical direction of econometric science development, the result of the implementation of which would be formation of such a modern version of economics and econometric science in particular as an economic metrology.

There are three directions of this kind, let us give them a generalized description in the context of justifying the necessity of establishing such a theoretical-methodological basis of econometrics as an economic metrology.

1. The traditional direction of econometric researches.

The historical development of econometric science (econometrics in its hyper wide sense) can conditionally separate two major historical periods. Firstly, the syncretic period when econometrics developed as part of economic science in general, such as economics, which had other economic sciences, and econometric problems were treated and dealt with in the context of scientific analysis of other economic problems. We do not intend to consider this period of its development in this paper. Secondly, differentiated (separated) period of its historical formation and development, when econometric research has differentiated from other economic sciences and separated its subject as a particular part or aspect of economic science subject in general. We know that organizational and methodological establishing of econometrics as a special economic science took place in the early twentieth century. Major works of Ragnar Frisch and Jan Tinbergen came out into the world. In broad (or hyper-wide) value this research examines the quantitative relationships in the development of the economic structure of society, or even in its broader sense it is a science of principles, techniques, methods of quantitative analysis in economics. This second period of its development is of interest to the author of this work. In modern development

of econometric science we can identify three areas, the practical realization of each of which ultimately contributed to the establishment and further development of the appropriate version, or variant, of econometrics in its broadest sense (fig. 1).

The first is a traditional direction, in which was formed econometrics in its traditional sense, i.e. as the science of study of the empirical relationships between economic parameters

(exactly the same this science was qualified by its founders – Robert J. Frisch and Tinbergen). This version or the option of econometric science can be described as empirical econometrics, as such quantitative analysis of economy which is not seeking to investigate the specificity of metrological behavior of businesses and on this basis to identify the fundamental principles of formation and change of economic parameters.

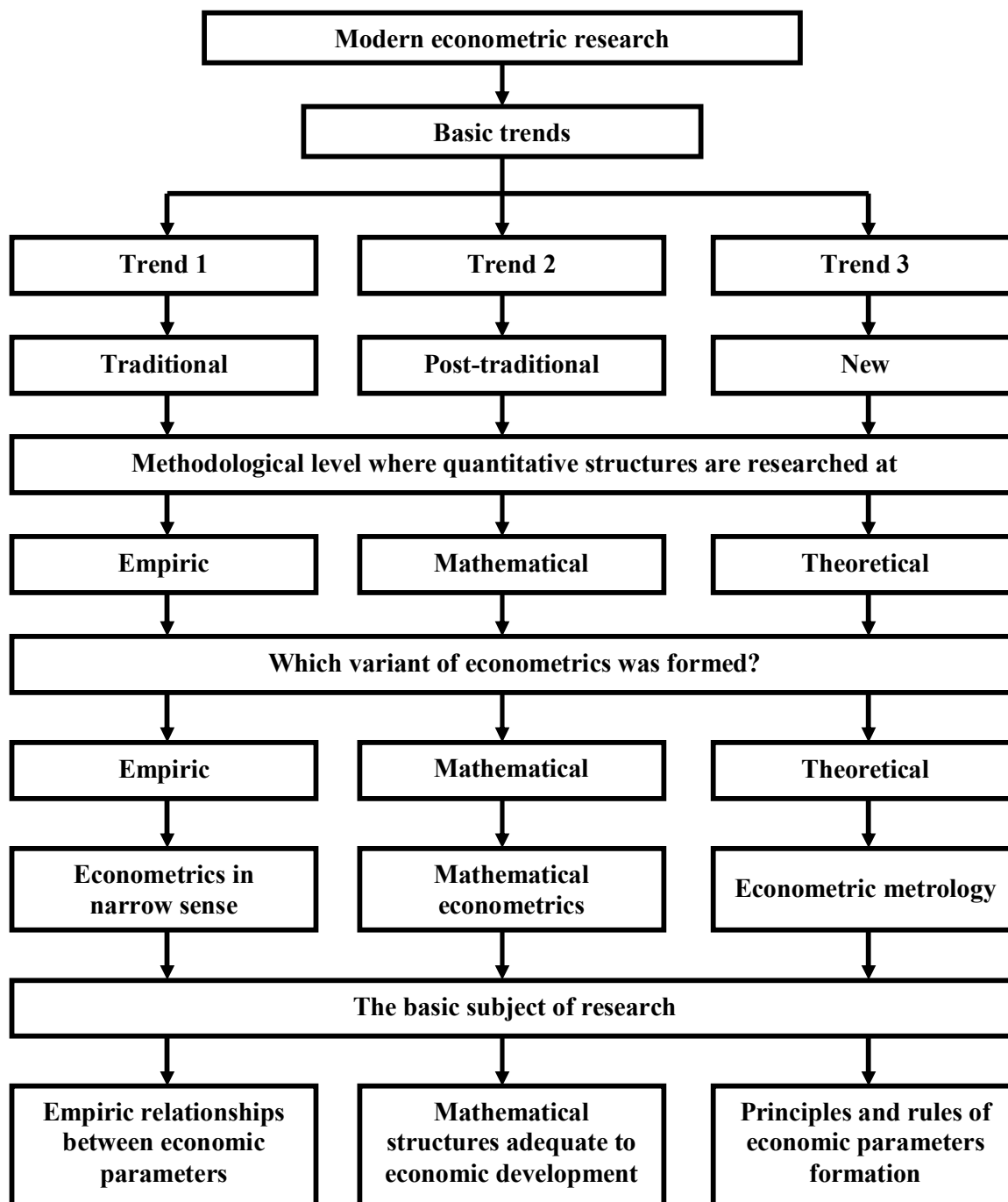


Fig. 1. Basic trends of modern econometric research

Traditional economists, in the early twentieth century, and today, at the beginning of the XXI century, understand econometrics in its narrow sense as a science of the empirical relationships between certain economic parameters. This traditional direction of econometrics has significant practical value and we do not deny its role in the development of econometric science and economic science in general. However, its main drawback is that quantitative analysis of the practices of economic measurement and management practices generally were replaced by the analysis of economic and mathematical models that are not always (and practically – rarely) an adequate reflection of the peculiarities of development and functioning of economic systems. Traditional econometrics (in our interpretation – empirical econometrics) reached a deadlock: today it is actively engaged in finding ways to accurately solve economic and mathematical equations (models), forgetting (most likely deliberately or unconsciously, as evidenced by our analysis of the practice of traditional econometric studies) that this “game of precision”, loses any sense when the model itself is an inaccurate reflection of economic reality. Furthermore, the exact solution (the most accurate possible) of economic-mathematical functions is always accompanied by the formation of metrological costs (the term was first used in the econometric analysis in our previous works). Sometimes these metrological costs may be more than economic benefit we receive at the exact solution of certain economic and mathematical functions. “Academic game” in the accuracy of solving economic and mathematical equations only has a certain meaning to the “point” of metrological balance (the term also belongs to us – G.B.) of the system, to which the economic benefit from the degree of accuracy of economic “solutions” still exceeds metrological reference costs or losses, or more precisely, the “imaginary” reference costs (such as uncollected revenue or product that is formed when some of the economic cost or economic resources are directed for metrological purposes).

**Post-traditional direction of econometric researches.** The second is the post-traditional (in our terminology) direction of econometrics, when

very some mathematical structures are actively developed to provide an adequate reflection of the real practice of management. This trend began to develop actively especially in the second third of the twentieth century, and retains some influence on the development of econometric science today, at the beginning of the XXI century. Alternative econometric investigation was launched by the representatives of mathematical sciences, selecting the real economy, the real practice of management as the object of analysis on one reason or another. During the practical implementation of the second, purely mathematical, econometric direction of science gradually formed such its version, or variant, as mathematical economy. Significant contribution to the development of mathematical economy made famous Soviet scientists – L.V. Kantorovich, V.V. Novozhilov, V.S. Nemchynov and others. If traditional econometrics kept to the economic reality and it formed the basis of certain economic-mathematical equation or function, the representatives of post-traditional (mathematical) direction of econometrics clearly gravitated to the analysis of abstract mathematical structures that allegedly have some relevance to the economy and economic development. Econometrics in the form of mathematical economy diverged more far from their own economy. Economic-mathematical analysis of economic and mathematical models has been completely replaced by mathematical analysis. As a result econometrics gradually began to become part of mathematical science. This only by the initial idea was mathematical economics, and essentially or actually it transformed into economical mathematics as a specific part of mathematical science.

In this form of economic mathematics econometrics of post-traditional trend is growing today. This specific method of mathematics found a good niche for its mathematical research, and gradually in the following research the matter ceased to play a significant role, went to the back, or even was excluded from econometric analysis. Scientific studies of this type is difficult to identify at least as economic or econometric, it performs as purely mathematical, and economics “exists” in the names of sections or paragraphs. In the middle (especially in the second third) of the twentieth century due to excessive mathematization of economic studies,

degeneration of econometric science began, it partly maintained its metrological nature, but has ceased to be economic science. Degeneration of econometrics in a broad sense was particularly noticeable in the second half of the twentieth century. As a result there was a substitution of an object of research – economics was not subjected to quantitative analysis, it began to dominate and completely diverged from the economic matter. Guided by good intentions and trying to improve the accuracy of economic analysis, economists, mathematicians gradually “lost” in their research the economic matter. This approach to econometric research of economists was for a math mostly favorable, as they more or less possessed the techniques of mathematical analysis, but did not understand the economy, the objective economic development. They thought that mathematics in the economy is omnipotent and that it can improve the accuracy of economic research. Thus they, consciously or unconsciously, omitted the obvious truth that the problem of accuracy – is the problem of the historical development of the economy, rather than the intensity of the use of mathematical tools in it. The very objective economic development provides an objective transition from inaccuracies to the exact (or more accurately) economic measurement, so the problem must first address the accuracy of the historical economic material and then use mathematical tools.

Moreover, as we have repeatedly pointed, the fact that most practice of management imposes certain restrictions on the extent or intensity of use of mathematics in economics. Used mathematical apparatus should not be complicated and should be accompanied by large econometric costs. Once these econometric costs (costs associated with construction and solution of certain economic and mathematical functions or equations) are greater than the economic benefit we get, say, by increasing the accuracy of certain economic decisions, immediately the practice of management through the criterion of economic benefit, which it always and consistently guided in its development or operation, “rejects” this too complicated mathematical apparatus. It alone (without participation of economists, mathematicians) is the “filter” that can not allow to raise the level of complexity. This objective fact is not understood by the majority of economists, mathematicians,

especially representatives of the mathematical direction of econometrics. They think that the more complex mathematical apparatus they use, the better. Perhaps better, but less profitable (in many cases) for the practice of management. It never wanted to use too difficult mathematical algorithms, solving certain economic problems because it can significantly and adversely affect the economic benefit. Economic benefit is not only a major motivation for economic activities of the economy, but some “mathematical filter”. Some of the recommendations of economists, mathematicians look stupid, not because they are mathematically incorrect, but because economically unprofitable (in the process of practical implementation metrological costs far exceed the economic benefit, which potentially can be received).

The overall conclusion is as follows. Objective economic development imposes restrictions on the use of mathematical tools. And, secondly, its use should be based on a preliminary study of the principles of objective economic parameters, their formation, which uses real practice of management, rather than that which we find in the mathematical analysis of economic and mathematical models or functions. Whatever complex and perfect mathematical device is used in the econometric analysis, its value will be small if the initial conditions for the construction of economic and mathematical models are inaccurate or incorrect. Realization of those objective circumstances forces us to conclude the necessity of becoming of new trend in the development of econometric science, which we flagged as theoretical.

**The modern direction of econometric researches.** This theoretical (recent) trend of econometrics in a broad sense began to emerge only in the last third of the twentieth century. Near its origins were known Soviet economists, mathematicians L.V. Kantorovich, V.V. Novozhilov, V.S. Nemchynov and other representatives of the Central Economics and Mathematics Institute, USSR Academy of Sciences. But really this trend began to emerge after their deaths, and gradually became known as “economic metrology”. The subject of this latest version, or variant of econometrics is to study the principles, rules and algorithms for formation and change of economic parameters. This is so to speak, purely theoretical part of econometrics in a broad sense (in the broadest sense, this research covers

econometrics in its empirical sense, mathematical economy, or economic mathematics, and actual economic metrology or econometrics in its theoretical meaning). The necessity of its formation and development was substantiated by the author of this book back in the 80 years of the twentieth century. The necessity of its formation was justified in his doctoral dissertation "Economic measurement: the politico-economic problems of the general theory", where first the need to develop the theoretical foundations of econometrics occurred objectively, and without it the constructive development of this science is impossible, and its rebirth in mathematics or its part will further increase. The author of the book made a significant contribution to the development of theoretical foundations of econometrics, focused attention on the fact that it is high time to face the actual practice of economic measurement and look for new principles and approaches to various economic parameters.

In our works with Professor I.M. Kopych gradually appeared understanding of metrology as a specific qualitative theory of quantitative analysis in economics as the theory, the direct object of study are not certain economic and mathematical models but real practice of economic measurement, real metrological behavior of entities. There we should seek "answers" on what rules or principles certain parameters are derived. Such a turn in the practice of econometric research in the direction of management practices is extremely important, for its successful implementation basic knowledge of mathematics is not enough, one should feel the actual practice of management, real "pulse" of economic development, with the transition to a deeper theoretical research in econometrics era "of mathematical speculation" expires. At the forefront is the ability to deeply "feel" metrological behavior of entities, see in it certain principles or approaches to economic variables. Metrology should develop economically, based on a broad combination or synthesis of mathematical methods (in general) with historical approach. Since in an objective history of the practice of management (and practice of economic measurement) we should seek answers to the nature of economic transformation processes that ultimately contribute to the real degree of accuracy the process of economic measurement. In this study we attempted to practically implement

the synthesis of historical and mathematical approaches to econometric research.

**Conclusions.** On the basis of generalization of the practice of econometric studies at the present stage of economic science development the author of this article reaches the conclusion that econometrics has failed to evolve in the theory of economic measurement, as it was "intended" initially by its "founders" – Pavlo Tsiompa, Ragnar Frisch and Jan Tinbergen. And not only the practice of economic measurement could not become such a theory, but also the science of "econometrics", which avoided in its development such a problem as scientific monitoring of economic measurement practice, metrological behaviour of economic activity entities. Key economic parameters, as the author of this article sums up, are formed not "in the market" (although with the help of it or through its mechanism), and not through the mediation of so-called economic-mathematical models (although through them as well, but not in the first place and only indirectly) but through appropriate metrological behaviour of business activity entities, based on appropriate economic behaviour and, in particular or especially, motivational behaviour. The latter, like metrological behaviour in general, is determined by capital scales in the "environment" of which a certain economic firm is formed and develops. These scales, as is proved by the author of the article, are the very factor, strictly an economic factor, which determines the "volume" (determines through subjective metrological performance of business activity entities, not by itself) both of the main "ekonometer", the functions of which are fulfilled by money, and such basic economic parameters as economic value and an economic price.

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