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NEW ECONOMY – NEW CHALLENGES FOR STATISTICS

Mirosław Szreder[1]

1. Introduction

Congress of Polish Statistics organized in April 2012 seems to be a good opportunity for analyzing and evaluating processes to which statistics in Poland was exposed over the last 22 years, during the period of building democracy and the market economy. Fundamental changes in politics and economics commenced in 1989 have strongly influenced not only Polish public statistics, its institutions and activities, but also have become a new challenge for the science of applied statistics, and for the practice of statistical surveys. This paper involves a condensed description of new tasks which were taken up by Polish statisticians in new circumstances of the market economy, and gives an outline of some new challenges which they will face in the near future. Special attention is paid to statistical surveys.

2. Origins and directions of changes in statistical surveys

Considering sources of the evolution in designing and conducting statistical surveys in Poland over the last 22 years one should take into account two important processes. The first one covers deep changes that affected political, social and economic lives caused by transition from the centrally planned economy to the market economy. The other process, acting independently of the former one, was the general development of the theory of statistics and applied statistics, which in this period was especially fast, and was strongly supported by the progress in IT. An analysis of particular effects of changes which took place in the practice of statistical surveys in Poland, enables one very rarely to identify the single reason. More frequently, a combination of the two described processes, and some other factors, account for those changes.

1 University of Gdańsk.

The main results of the evolution in statistical surveys in Poland after 1989 can be classified into three groups which involve:

1. significant increase in the areas of economic and social activities where quantitative (statistical) research gained the predominant position among all research works applied in those fields;
2. stronger harmonization of developments of the theory of statistics with practical needs of statistical surveys;
3. increasing efforts of statisticians aimed at providing high quality results of conducted surveys to large parts of the society, especially in topics which attract attention of many people.

In my opinion, the above three groups of the effects of Poland's transformation in statistics have had some impact on the economy and the social life, as a kind of feedback, and additionally they have influenced statistical education within the society.

3. Statistical surveys in new areas of economic and social activities

A system of democracy and principles of the market economy required essential changes in the rules of political and economic lives. The transformation also caused new institutions which were established and new fields of social and economic activities to need more advanced statistical descriptions and analyses.

Soon after the beginning of transformation processes in 1989, many economists and market analysts realized that there was a growing demand for marketing surveys and also for reliable market forecasts both at macro- and micro levels. It was connected, among others, with the needs for preparing business plans for various purposes, including enterprise restructuring and new investments. A development of market research and marketing surveys attracted a genuine interest in statistical surveys, and in statistics as a whole, among increasing number of market specialists. Consumers' needs and preferences constituted a new field of application of statistical surveys which virtually did not exist in the centrally planned economy. Initially, simple statistical techniques were employed in this kind of research, however in response to more complex and more dynamic market phenomena which gradually started to appear, more advanced methods were used. Marketing research created a strong stimulus for including more statistics in university curriculums for students studying economics and management. This, in turn, was accompanied by increasing amount of research output focused on quantitative measurements of market processes.

Another area of economic activity, which succeeded to attract attention of many statisticians was financial market with all its components, including stock exchange, banking system, and rapidly developing processes on this market. That was a new reality in Poland's economic life after 45 years of another economic system which did not need an exchangeable currency or financial markets.

Particularly interesting for statisticians become problems connected with stock exchange, investment funds, currency markets, and insurance. The amount of new issues which required professional analyses was so large that many scientists specializing in mathematics and physics joined the group of economists and statisticians who dealt with the new challenges. Majority of them gained new qualifications and remained in this circle for long, as Poland become a part of the international financial market, and had to cope with all new processes which developed there in the following years. Nowadays, it is difficult to imagine analyses of financial phenomena without applying adequate statistical techniques and tools. And although the applied methods and techniques are sometimes called financial rather than statistical, it is obvious that statistics is the science which works out and develops methods of discovering regularities or patterns in mass phenomena, including the ones which are hidden in financial series. It is worth noting that many advanced methods of economic modelling or statistical inference finds their initial applications in the field of finance. Recent turbulences on the world's financial markets enhanced the demand for proper standards and high quality of statistical analyses concerning processes developing on the domestic financial market. This is a challenge for Polish statisticians for today, and no doubt, also for tomorrow.

Out of many areas of social life, where statistical measurements and research play a crucial role, the most spectacular increase of interest in statistics has occurred in opinion polls. In democracy, the voice of public opinion is important not only for the society but for those who govern the country as well. It is essential that both these groups obtain reliable and accurate measurements of the state of public opinion, mainly expressed by opinion polls. "*Opinion polls enable people to count themselves, in order to find out how many (or how few) of them are there, and the awareness of the number is a starting point for building public opinion*" – says Professor A. Sułek, a Polish sociologist (see Sułek [2011], p. 331). In first several years after 1989, the field of opinion polls was left in Poland entirely to sociologists and pollsters. It did not manage to attract much interest of statisticians. This attitude has changed gradually, when the consecutive national elections brought campaigns with a large number of poor quality polls and disappointing election forecasts. Widespread criticism of the methodology used in opinion polls referred also to statisticians, who eventually took up the challenge. Common efforts made by sociologists and statisticians to improve the quality of opinion polls resulted in more accurate and more precise polls in following years. Higher standards in designing and performing polls have been adapted by majority of pollsters operating in Poland. There are some measurable effects of improved methodology used in opinion polls, which involve decreasing amounts of errors in election surveys and forecasts. For instance, the total error in exit poll conducted during the 2011 parliamentary election was five times smaller than the corresponding error in exit poll performed during the EU referendum in 2003. It seems very likely that in the following years ahead opinion polls will remain an interesting area for statisticians whose competences will be engaged in solving

newly aroused methodological or practical problems, such as increasing proportion of non-response.

4. Adequate response of the theory of statistics to the needs of practice

A newly established political and economic system in Poland after 1989 caused an increase in the number of statistical surveys performed beyond the system of public statistics. Needs of economic practice have become an important factor which determines directions of the development of applied statistics, and defines specific issues which ought to be solved in various kinds of statistical surveys. This refers particularly to problems that appeared in quantitative market surveys, in analyses of financial phenomena, and in studies of the activities of small and medium-sized enterprises. Many statistical surveys related to social or economic issues have been carried out for local authorities.

As a response to practical needs one could observe an increasing interest of Polish statisticians in small domain inference (including small area estimation). This is one of the issues which have attracted research interests of statisticians representing both official and commercial statistics. A number of valuable scientific achievements in this field have their roots in original works carried out in Poland's Central Statistical Office (GUS). Therefore, some initial applications of new techniques representing small domain statistics can be found in surveys designed by institutions of public statistics. There also exist several academic institutions in Poland which have been successful in developing small domain methods and techniques. Taking into account increasing information needs expressed by many institutions and enterprises, including local authorities, one should expect further development of this branch of statistics in the future.

One of the crucial challenges for the practice of statistical surveys remains the problem of nonresponse which increasingly strongly affects the results of many surveys. This is the problem which refers to all kinds of statistical surveys, in every country. Efforts of statisticians focused on careful designing of a survey is frequently wasted due to large proportion of respondents who refuse to cooperate, as a result the obtained observations may create the sample structure which is significantly different from the designed one. Furthermore, a large proportion of nonresponses undermine rationality of applying classical inference based on this kind of data. It seems that many professionals who deal with designing and conducting surveys, and also statisticians who try to find efficient techniques which would compensate for the lack of observations realize that "*Today, nonresponse is a normal (but undesirable) feature of the survey undertaking*" (C.E. Särndal, S. Lundström [2005], s. IX). If this is the case, one can expect that the problem of dealing with nonresponses will remain one of important challenges for statisticians in the future. There has been a great deal of research output obtained in this field, including interesting proposals of new imputation and calibration techniques presented by Polish statisticians.

Eventually, however, additional non-sample information seems to be a decisive factor for the efficiency of all those techniques. In my opinion, further studies in this area will concentrate on searching for methods and techniques which would be combine the increasing amount of information, prior and sample one, about various populations that are investigated.

I think that the market economy in Poland, unlike the centrally planned economy, has inspired researchers to respond with new statistical ideas and new solutions to the needs of practice. Moreover, during the last 22 years there has been a tendency for widening the area of social and economic lives, in which statistical surveys have been successfully used on a regular basis. This process is likely to be continued, as the economic and social realities generate new information needs.

5. Statistical education in the society

One of the important challenges for statistics is to work out such measurement and description techniques which would, on the one hand, be adequate to increasingly more complex phenomena, and on the other, be easily and properly understood within the society. Reliable and good quality statistical data are sought not only by enterprises or administration units. In democratic societies, statistics should support new people's initiatives with data and methods of data analysis. It relates, among others, to activities of non-government organizations in such areas as: environment protection, labour markets, vocational education, health-care and poverty. Promotion of high quality data and results of statistical analyses representing these areas can essentially help people or civic organizations reach the goals in their voluntary activities. Without a clear and credible description of the particular problem which they want to solve, their efforts are likely to be less productive. Quantitative descriptions are preferred at first stages of dealing with a problem, because numbers are able to define the problem more precisely and unambiguously. Polish statistics has been more accessible than in the past, and much has been done in order to provide the required statistical information to various organizations and groups of people whose intention is to do something good for a certain community. However, more can be done in this field, especially by official statistics.

Statistical education which would enable citizens to use and interpret quantitative facts properly is another important challenge. Unprepared people confronted with increasing amount of statistical information in mass media and elsewhere can feel lost or confused, if their individual observations do not confirm the data. This, as a consequence, can create suspicion that statistics generates inadequate pictures of the reality. Lack of confidence, which in such cases can be explained by lack of statistical education, may interfere communication within the society. In the long run, possible lack of trust in statistical data, or in methods of gathering and analyzing them, would be a serious

problem in communication between democratic institutions and members of the society. Therefore, the problem of statistical education is now, and likely is going to be in the future, a challenge not only for statisticians but also for political and government bodies.

6. Conclusions

New challenges for statistics in Poland after 1989 have been created by processes connected with building democracy and the market economy, and also by world-wide tendencies like globalization and fast development of IT, which accelerated the need for higher standards of statistical research and surveys. In the last 22 years statistical research and surveys have come up in many new fields of social and economic activities. Statistical description and quantitative explanation of many processes in those fields have become more popular than qualitative ones, which were preferred in the past. The new circumstances constantly create new challenges for the applied statistics and for the theory of statistics. Special care should be paid to statistical education in the society which helps people understand quantitative description of the environment to which they belong.

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