

## Zbigniew Pawłowski's 90th birth anniversary

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Zbigniew Maria Pawłowski was born on November 22, 1930 in Lviv as the son of Leopold Pawłowski and Maria née Krukowska. After a few years, the Pawłowski family moved to Poznan. During the turmoil of the Second World War, he initially found himself with his mother in Romania, and then in Algiers, where he attended junior high school, first in Polish, then in French. In 1946, Pawłowski and his parents moved to Warsaw. In 1949 he passed the matriculation examination. Later, in 1949, he began studying at the Main School of Planning and Statistics SGPiS (currently the SGH Warsaw School of Economics) in Warsaw. In 1950, he started working there as a deputy assistant at the Department of Statistics. In 1952 and 1954, he completed his bachelor's and master's degrees, respectively. His thesis for his doctoral studies (1954–1957) was titled *Selected classes of complex hypotheses verified with the Wold sequence test in statistical quality control*. From 1957 to 1958, having gained a scholarship from the Ford Foundation, he completed a research internship at the Institute of Statistics of the University of Uppsala, under the supervision of a well-known econometrician, prof. Herman Wold. In the academic year of 1960/1961, he worked under the guidance of the later Nobel Prize laureate, John Richard Stone, at the Department of Applied Economics at Cambridge University. There, he had the opportunity to participate in the process of devising the first econometric model of the British economy (called the Rocked Model). In 1962, the Council of the Faculty of Finance at SGPiS awarded him the degree of habilitated doctor in economic sciences after he wrote his monograph *Econometric methods of researching consumption demand* (PWN, Warsaw 1961). Finally, in 1967 and 1972, he received the titles of professor and full professor, respectively.

From 1962, Pawłowski continued his scientific work at the Higher Educational School of Economics in Katowice (WSE – currently the University of Economics in Katowice), where he was appointed head of the Department of Statistics. In 1969, he became the Director of the Institute of Economic Account Methods and in 1974 the Director of the Institute of Econometrics. The structure of the Institute itself reflected the Professor's broad competences, as the Institute's staff were involved in a wide range of subjects, including econometrics, statistics, mathematics, operations research and linear programming.

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Professor Zbigniew Pawłowski also held positions within the university administration. He was the Vice-Dean of the Faculty of Industry and the Vice-Rector of the WSE in 1963–1965 and 1968–1974, respectively. He was an active member of the Economic Sciences Committee (from 1966), of the Statistics and Econometrics Committee (as deputy chair, starting from 1972), and of the 'Poland 2000' Research and Forecasting Committee. He was also a member of the Editorial Committee of *Przegląd Statystyczny. Statistical Review*, the Scientific Council of the Department of Statistical and Economic Research of Statistics Poland and the Mathematical Committee of Statistics Poland (as its chair from 1978).

This outstanding scientist is regarded by Polish econometricians, mathematicians, and statisticians as one of the pioneers of econometrics in Poland. In his lectures, monographs and textbooks, Professor Pawłowski presented, often as the first scientist in Poland, the basic methods of estimating and verifying hypotheses which were useful in the construction and inference of econometric models. He shared his expertise in a simple and accessible way, encouraging the study of statistics and econometrics. Almost all his publications were in Polish, but some academic textbooks were translated into Russian, Hungarian and German. He was a recognised expert in the field of econometrics. Professor Pawłowski also researched many specific issues in econometrics and statistics, which was reflected in his academic lectures and scientific articles and monographs. His interesting analyses and original ideas are still frequently referred to. He was mainly interested in econometrics, forecasting, mathematical statistics and survey sampling methods. His co-workers and students continued and developed his ideas. I had the honour to be one of them.

The Professor educated many scientists. He was the promoter of 25 doctoral dissertations and the tutor of many habilitations. He published approximately 200 papers, 149 of which were scientific papers, including nine monographs and four textbooks. A full list of his scientific publications is provided by A. S. Barczak (1983). Professor Pawłowski reviewed most doctoral and postdoctoral dissertations as well as professorship applications for both faculty councils and the Central Qualification Committee. Professor Pawłowski was also an excellent lecturer. Professor Jan Kordos (1981) emphasised his great merits in improving the methodological level of statistical applications in the work of Statistics Poland. The Professor was also a member of the Polish Economic Association and the Econometric Society. His hard work was well appreciated and earned him numerous ministry awards. He was awarded the Cross of the Order of Polonia Restituta, the Gold Cross of Merit and the Medal of the National Education Commission.

Professor Pawłowski was a polyglot: he spoke French, English, Russian and German. He enjoyed playing bridge, chess and hiking. He also took interest in classical music.

Professor Pawłowski's activity went beyond purely scientific pursuits. He co-organised numerous scientific conferences, including the renowned annual conference of the Departments of Statistics, Econometrics and Mathematics of the Higher Educational Schools of Economics in Katowice, Cracow and Wrocław, held annually since 1965. The outcome of the conferences included strengthening the role of statistics in economic research and propagating the subject of statistics in all Polish universities of an economic profile. During one of these meetings, Professor Pawłowski initiated an important undertaking: the creation of a field of study called informatics and econometrics. It was intended for graduates of this field of study to join highly qualified staff dealing with quantitative analyses in enterprises. For this purpose, students were taught the necessary IT skills and statistical inference, which is useful for forecasting, survey sampling and data analysis. Moreover, Professor Pawłowski initiated the organisation of the Summer Econometric School in Ustronie Wielkopolskie, where young scientists were given an opportunity to broaden their knowledge.

Professor Pawłowski maintained professional contact with foreign scientific centres, especially with the Netherlands Economic Institute in Rotterdam, where many young employees of the University of Economics in Katowice were able to complete research internships. The Professor, commissioned by the United Nations, also delivered a series of lectures at the National Institute of Statistics and Applied Economics in Rabat. His foreign activity also included collaboration with the International Institute for Applied Systems Analysis in Austria, the Humboldt University in Berlin, and the UNESCO office in Paris.



Image: Department of Statistics, Econometrics and Mathematics, University of Economics in Katowice

The original scientific achievements of the Professor have become inherent in the methodology of statistical inference. Professor Z. Hellwig (1981) described Professor Pawłowski as a gifted and the most consistent student of Oskar Lange (a well-known Polish economist), who continued Lange's ideas in the field of quantitative methods in economics, and as a distinguished Polish statistician. There are many examples of his achievements in the field of statistics and economics. Below is a presentation of selected research papers describing the Professor's findings, with the titles translated from Polish to English.

Professor Pawłowski's publications concerning mathematical statistics include the textbooks *Introduction to mathematical statistics* (PWN, Warsaw 1965, 1966 and 1969), which was translated into Russian: *Statistika* (Moscow 1967) and German: *Verlag der Wirtschaft* (Berlin 1971), and *Mathematical statistics* (PWN Warsaw 1976 and 1980). Many scientific papers written by the Professor concern the construction of econometric models, their estimation and practical application. He is the author of numerous scientific articles, textbooks and scientific monographs on this subject, including *Econometrics* (PWN, Warsaw 1969, 1972, 1975, 1978, 1980), which was translated into Hungarian – *Közgazdasági es Jogi Könyvtári* (Budapest 1970), *Elements of econometrics* (PWN, Warsaw 1981), and *Econometric methods of researching consumption demand* (PWN, Warsaw 1961 and 1971). He examined the application of econometric models in supporting production management, mainly in the book entitled *Econometric analysis of the production process* (PWN, Warsaw

1971 and 1976). Professor Pałowski devoted a major part of that publication to modelling the impact of the so-called organisational effect on production efficiency. He also wrote about this issue in an article entitled *The production function considering the organisational factor* (*Ekonomista* 1970 issue 4, pp. 711–719).

Professor Pałowski's numerous fields of interest included econometric modelling of macroeconomic phenomena in practice. He led a team of specialists who built one of the first models of the Polish economy. The results of this work were published in a collective work under his editorship – *The econometric model of the economy of the People's Republic of Poland* (PWN, Warsaw 1968). In several of his papers, including *A demoeconometric model of Poland and its application to counterfactual simulation* (IIASA, Laxenburg 1980), Professor Pałowski drew attention to the need to consider demographic variables in the construction of economic macro-models.

The scientist also recognised the need to develop inferences based on non-simple samples, which resulted in the publication of a textbook on the survey sampling method, entitled *Introduction to the survey sampling method* (PWN, Warsaw 1972). In the light of the latest trends in the development of survey sampling methods, it can be argued that the methodology used in econometrics, especially the one relating to prediction, proves useful in the so-called model approach, which is now commonly applied in the field of small area statistics and in some other fields as well. Moreover, models taking into account (spatial) autocorrelation are used in the course of replicated population studies (conducted, e.g., on the basis of rotation samples). It is a well-known fact that some issues related to statistical quality control are similar to those encountered in the survey sampling method. In this field, Professor Pałowski analysed the usefulness of statistical inference. A good example of such analysis could be found in his article *Examining a selected class of hypotheses formulated by means of the Wold sequence test in statistical quality control* (*Zeszyty Naukowe SGPiS* 1959, issue 11, pp. 231–272).

Professor Pałowski's scientific achievements in the area of forecasting are also deemed highly significant. Apart from the well-known classical prediction principles, he also promoted the principle which leads to the determination of a forecast near the dominant of the variable whose value is predicted. He suggested that this principle could be especially useful in forecasting for short periods into the future. He proposed interesting concepts of determining the 'optimistic' and 'pessimistic' forecasts, which depend on favourable or unfavourable systems of values of the model's explanatory variables. Almost all the ideas the Professor implemented in this field can be found in several monographs, including *Econometric prediction* (PWN, Warsaw 1973) and *The theory of econometric forecast in a socialist economy* (PWN, Warsaw 1968 and 1974), and in a collective publication he edited, entitled *Econometric methods of forecasting the execution of economic plans* (PWN, Warsaw 1979) and

*Principles of econometric prediction* (PWN, Warsaw 1982). The last two were published in the series 'PWN Econometric Library', to which Professor Pałowski largely contributed.

The Professor considered the method for predicting 'turning points' in the course of time series in the article entitled *Prediction based on control cards* (*Statistical Review* 1969, pp. 3–4). He proposed a definition for the concept of predictor flexibility and methods of its evaluation. This is of particular importance from the point of view of the selection of a predictor for forecasting time series characterised by an unstable trend course. Professor Pałowski introduced many interesting considerations on the forecasting horizon in the work *On the concept of the prediction horizon* (*Systems Science* 1979, issue 1, pp. 81–90).

Professor Pałowski developed the concept of alternative forecasts in papers including *The use of alternative predictions in long-term inference into the future (with special reference to water demand)* (IIASA, Laxenburg 1978) and *Contribution to the theory of alternative predictions* (*Oeconomica Polona* 1977, issue 3–4, pp. 381–400). He also greatly appreciated the value of ex post analysis of forecast errors, especially useful in selecting a method for forecasting phenomena in subsequent periods of time. He analysed this problem in several articles, including *Predictive ex post information and its use* (*Statistical Review* 1980, issue 3/4, pp. 239–255) and *On the use of ex post information in econometric prediction*, in Contributed Papers to the 40th Session of the International Statistical Institute in 1975.

Professor Pałowski also formulated an interesting problem of determining the admissible values of the explanatory variables of the econometric model when the value of the dependent variable exceeds the desired level. He referred to this issue as a discriminatory prediction and wrote about it in, e.g., the work entitled *Discriminatory prediction and its relation to optimum control of economic systems* (*Control and Cybernetics* 1979, issue 1, pp. 55–66). In the article *Methods of analysing forecast sequences* (*Ekonomista* 1974, issue 4, pp. 847–874), Professor Pałowski examined the possibility of determining a consistent forecast. This issue can be simplified to the problem of producing, for example, a forecast that is a common part of interval forecasts prepared on the basis of different methods. In this context, he also analysed the 'incoming forecasts', i.e. those which are developed successively, as the forecast period approaches.

One of the most interesting proposals put forward by Professor Pałowski is a statistical test aimed to verify the hypothesis of the occurrence of autocorrelation in time series, whose description can be found in the article *The nonparametric test for autocorrelation* (*Statistical Review* 1973, issue 1, pp. 3–10) and in the article *The nonparametric test for the simultaneous verification of hypotheses for several autocorrelation coefficients* (*Statistical Review* 1974, issue 2, pp. 189–209).

In the article *The power of a certain test of normality in large samples* (*Statistical Review* 1959, issue 2, pp. 141–150), the Professor introduced a test to verify the hypothesis based on Geary's theorem on the independence of the mean and variance from a sample drawn from normal distribution. In this article, he also demonstrated his outstanding skills by analytically evaluating the power of these tests.

Professor Pawłowski's co-workers have emphasised that he had always had a never-ending supply of original scientific ideas and their potential applications. The Professor's work continues to inspire doctoral students and their collaborators to this day.

Sadly, Professor Zbigniew Pawłowski passed away prematurely at the age of fifty, on August 4, 1981 in Katowice, and was buried at the Powązki Cemetery in Warsaw.

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