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Egon Vielrose (1907–1984) – Demographer, Statistician, Econometrician¹

Abstract: Egon Vielrose was an outstanding Polish demographer, statistician and econometrician. He studied mathematics at Warsaw University and economics at the Higher School of Trade and then he qualified as an assistant professor at Warsaw University. His research interests focused on problems of demography, mathematical statistics, econometrics and socio-economic statistics. An important place in the work of Egon Vielrose is occupied by studies in historic demography, concerning mostly the natural movement which is a decisive factor in population development. The scientific output of Egon Vielrose encompasses over 200 works including 6 books and over 130 papers.

Keywords: historical demography, income distribution, mathematical statistics

JEL: B30, B31, N01



¹ Text not reviewed.

1. Biographical note

Egon Vielrose was born on December 30, 1907 in Dąbrowa Górnicza. In the years 1925–1930 he studied mathematics at Warsaw University and then at the Higher School of Trade where he majored in insurance. He graduated in 1933 and received a diploma after submitting a thesis *Financial System of Social Insurance in Poland* written under the supervision of professor Władysław Strzelecki; in 1939 it was acknowledged that the thesis satisfied the requirements necessary to grant its author a degree of master of economic and trade sciences. In 1940 he received a degree of doctor of philosophy in economic sciences on the basis of dissertation *Forecast of Development Series* (unpublished), which was supervised by professor Zygmunt Limanowski. He qualified as an assistant professor at Warsaw University in 1960 on the basis of an earlier publication titled *An Outline of Potential Demography* (1952). In 1927 he became a member of the Polish Academic Corporation Chrobotia and in the years 1930–1931 he held the function of the secretary and between 1932–1933 he was the vice-chairman of the Corporation².

Vielrose started his professional career in 1934 by working as an insurance technician for Insurance Group „Vita”. In the following years 1934–1938 he worked as an official in Department of Studies of the Central Bureau of Labour Fund in Warsaw and then in the years 1934–1944 as an accountant in the Pakulski Brothers factory „Wanda” in Warsaw. After the outbreak of the Warsaw Uprising in 1944 he ceased his professional activity. He lived temporarily in Pławno near Radomsko and earned a living as a private tutor. In the years 1946–1951 he worked for the Ministry of Finance as a senior councillor in statistics. In the decade of 1951–1961 he held the post of an editor of the Polish Scientific Publishers. Since 1962 he worked at the Institute of Labour in Warsaw, first as a consultant and then as the head of Department of Living Conditions.

The academic career of Egon Vielrose began in 1935 in the Main School of Statistics in Warsaw, where until 1939 he held the position of an assistant of the Department of Statistics and after the end of the World War II he assumed the post of a lecturer (1945–1949). In the academic year 1945/1946 he worked at the University of Lodz and in the Lodz branch of the Main School of Trade, and in the period of 1952–1961 in the Higher School of Economics (WSE) in Lodz. After the incorporation of WSE into University of Lodz, in the years 1961–1967, he was employed at the post of assistant professor, and in the period 1964–1965 he was the head of Department of Econometrics. Between 1959 and 1961 he also worked at Warsaw University as a senior lecturer and then as an assistant professor in the Department of Statistics. In the period of 1967–1978 he returned to Warsaw University. He was a member of Committee for Demographic

2 The Corporation was founded in 1922. Polish corporations – akademije – were student corporations active in Poland or in Polish circles abroad, which referred to romantic tradition of Filomats and Filarets and Polish Independence tradition (Wróblewski, 2018).

Sciences of the Polish Academy of Sciences and two foreign scientific societies: Econometric Society and International African Institute. In the years 1967–1984 he co-edited the journal “Demographic Past of Poland”, and simultaneously worked as its editor-in-chief. He also held the function of a consultant for the Department of Statistical and Economic Research in the Central Statistical Office, and was an active member of the Mathematical Commission of the Office (Berger, Gieysztorowa, 1987).

His six-month scientific scholarship in London in 1962, devoted to studying demographic problems of Black Africa, resulted in receiving an invitation from University of Ibadan in Nigeria, where in the years 1967–1974 he conducted research work and gave lectures on domestic product and planning at the Nigerian Institute of Social and Economic Research. The research results were presented in “Demographic Studies” and “Africana Bulletin”. After returning to Poland he conducted lectures in demography at Warsaw University until his retirement in 1978.

2. Scientific output in demography

The scientific output of Egon Vielrose encompasses over 200 works including 6 books and over 130 papers. His research interests focused on problems of demography, mathematical statistics, econometrics and socio-economic statistics. His most important works in the field of demography include: a monograph *Elements of Natural Movement* (1961); (also published in the English version), *An Outline of Potential Demography* (1952) and *Population of Poland from the 10th to the 17th Century* (1958).

An important place in the work of Egon Vielrose is occupied by studies in historic demography concerning mostly the natural movement which is a decisive factor in population development. In his two pre-war works he made an attempt to use armorials for statistical purposes seeing them as a substitute source in the times when primary sources were non-existent.

A short stay in Pławno at the turn of 1944 and 1945 allowed Egon Vielrose to study the local birth certificate registration and make a revealing statement that the doubling number of registered christenings in the years 1720–1800 did not mean the doubling of population number but merely a correction in registration. In 1955 he expressed his opinion in a discussion, which had been held by historians for years, and concerned the value of Peter’s Penny as a source of assessment of Polish population in the 14th century. He presented surprisingly ingenious research initiatives and excellent knowledge of the state of preservation of quantitative data on the Polish economic history. Two years later he outlined his vision of the development of population of the pre-partitioned Poland. He then turned to demography of the 19th century by publishing a study on statistics of Galicia

in 1828–1842, where he discovered underestimated mortality of the underage and overestimated death numbers among the elderly, as well as unjustified discrepancies between data on natural movement and subsequent population numbers, mostly at the “poviat” (county) level.

Egon Vielrose participated in an open discussion on the publishing of a study on birth certificate registration by A. Szczypiorski (today a leading trend in demographic-historic research worldwide), and he warned against statistical research into too small communities and encouraged to compare the results with research based on more correct population registration in other countries or in later periods. He also signaled theoretical relations between basic demographic parameters in *Some remarks on intensity of natural population movement in Poland in the 17th and the 18th century* (1962).

Vielrose’s experience connected with contemporary demography of developing countries revealed an analogy with conclusions reached by Polish historical demography, thus supporting its research capacity. After he had returned home, Professor Vielrose published three studies whose subject matter was related to the times of the Kingdom of Poland of the 19th century: two were devoted to educational issues *Estimation of Illiteracy in the Russian Partition* (1984), *Elementary Education in the Former Łomża Province in 1889* (1984), while the third one concerned a religious issue – *Jewish Population of the Former Łomża Province at the End of the 19th Century* (1983). Prior to that he published theoretical considerations on the population growth in Europe from Middle Ages to the end of 18th century – *Natural Movement in the European Countries from Middle Ages to the End of the 18th Century* (1982). The dissertation deserves to be admired for the scale of its research invention, yet it raises some doubts on the correctness of research assumptions and results. It is well-known that controversy and polemics constitute the driving force of research progress, therefore one of the greatest merits of professor Vielrose is providing dynamics for the circles of historians and demographers and broadening their methodological horizons.

3. Scientific output in statistics

In the field of mathematical statistics the following works deserve to be mentioned:

- 1) *Income Distribution According to Amount*, PWG, Warszawa 1960;
- 2) *Tables of Random Numbers*, GUS, Warszawa 1951;
- 3) *Statistical Methods and Calculations on Approximate Numbers*, PWG, Warszawa 1952;
- 4) *On Big Numbers*, PWN, Warszawa 1960, p. 113;

- 5) *Problem-solving in Mathematical Statistics*, PWN, Warszawa 1956, p. 138 – including probability calculus and statistics;
- 6) *Collection of Problems in Statistics* (co-author Bohdan Szulec), PWG, Warszawa 1950, p. 277.

In his monograph *Income Distribution According to Amount* (1960) Vielrose discusses three types of distribution: Pareto, normal and log-normal. The author states that „In theory one may propose a variety of different types of curves which could be consistent with statistical data on income. However, the consistency itself is not enough, and when choosing the type of function other criteria should be taken into account:

- 1) can the function type be derived from feasible assumptions,
- 2) is the function easy to use,
- 3) can the function parameters be interpreted in simple economic terms”.

According to the author the most important criteria are number 1 and 3. In the first one the author studies income distributions in the inter-war period of 1929–1938 and a few years after the war (1946). The research findings show that fund incomes (non-farmers and farmers) may be presented with a high level of accuracy in the form of the Pareto curve. However, in case of incomes of hired employees the distribution of low incomes is not consistent with the Pareto distribution. Analysis of income distribution according to income amount in the years 1955–1958 leads to the conclusion that the distributions are almost exactly log-normal. When the total distribution is taken into account for particular groups of workers (manual and white-collar, men and women in various sectors of industry) then it can be stated that it approximately corresponds to the log-normal distribution, too. In his work the author introduces the notion of similarity coefficient (currently known as Vielrose similarity coefficient). The coefficient expresses the level of consistency of similarity. In practice, the calculation consists in comparing numbers of individual intervals in both compared series and from each pair of sizes (corresponding with the same class of income) and choosing the smaller size. The sum of all these smaller sizes is called the similarity coefficient. It should be observed that if the average income level of two groups (e.g. arithmetic mean, median) is more or less the same then in such cases the similarity coefficient of distributions can be high. However, when the average income level in two comparable groups is very different then the distributions overlap to a much lesser extent.

Another work of Egon Vielrose which is worth mentioning is the book titled *Problems in Mathematical Statistics* (1956), which can be seen as the first textbook of mathematical statistics and representative method published in the Polish language. The book contains a collection of most important problems for those who study mathematical statistics as well as those who need more practice in application of methods of mathematical statistics. In the preface the author indicates the merits of the book: „It may be used by students of statistics in universities and

colleges as well as students of other faculties and courses, [...] where mathematical statistics is lectured. Therefore, the examples were taken from different areas". The biggest advantage of the book is the fact that problems to be solved contain empirical data from various fields and from over 60 scientific papers, mostly foreign ones. Each chapter contains formulas necessary to solve the problems and typical examples with full solutions; the book is annexed with the key to all 120 problems. The book is structured as follows:

- 1) selected probability distributions (binominal, Poisson, normal),
- 2) testing hypotheses on consistency of theoretical distribution with empirical one and hypotheses on independence,
- 3) testing hypotheses on mean values,
- 4) testing hypotheses on variance,
- 5) representative method.

An interesting and inspiring work in the field of econometrics was the study titled *An attempt to determine elasticity of demand for passenger transport by railway* (1963).

The author uses data on PKP (rail) transport before and after a rise of fares in order to determine elasticity of demand for passenger transport. He comes to the conclusion that too big a rise might lead to a fall in total passenger transport income. In the paper *On comparing family budgets* (1963) he propounded a concept of constructing a cost of living index based on a completely new basis where no information on amounts or prices of goods and services was needed. Another paper titled *Some remarks on time budgets of women* (1965) presents a method which allows for the examination of time budgets in a dynamic aspect. The central issue was the question of how the time budget of a working woman would change if the working day was shortened. The research outcome shows the needs which would arise in the case of shortening of the working day.

In his paper *Differentiation in birth frequency in Poland* ("Przegląd Statystyczny" 1965), Vielrose introduced econometric methods into the field of demography, stressing the fact of their usefulness.

Vielrose also conducted research on various problems of the Lodz region, namely:

- 1) mortality in the Lodz region,
- 2) trade in the area of Bełchatów.

His proficiency in both English and Russian enabled him to translate several fundamental publications in the field of statistics, demography and economics thus making them available to the Polish reader.

The most important works translated by Egon Vielrose include:

- 1) R.G.D. Allen, *Mathematical Economics*, PWN, Warszawa 1961, pp. 889;
- 2) Harvey Leibenstein, *Economic Development and Underdevelopment: Studies in Theory of Economic Development*, PWN, Warszawa 1963, pp. 310;

- 3) John E. Freund, *Fundamentals of Modern Statistics*, (co-author S. Czerwiński), PWE, Warszawa 1968, 1971, pp. 419;
- 4) Carlo M. Cipolla, *Economic History of the World Population*, PWN, Warszawa 1973, pp. 105;
- 5) J.H.P. Paelinck, L.H. Klaassen, *Spatial Econometrics*, PWN, Warszawa 1983, pp. 211;
- 6) Richard E. Bellman, Stuart E. Dreyfus, *Dynamic Programming*, PWN, Warszawa 1967, pp. 349;
- 7) Georges Rotter, *An Introduction to Econometrics*, PWE, Warszawa 1963, pp. 183;
- 8) Paul Samuelson, *Principles of Economic Analysis*, PWN, Warszawa 1959, pp. 427;
- 9) Richard Courant, Herbert Robbins, *What is mathematics?*, PWN, Warszawa 1962, pp. 654; Prószyński i S-ka, Warszawa 1998, pp. 520.
- 10) Edgar M. Hoover, *Location of Economic Activity*, PWN, Warszawa 1962, pp. 405.

The whole extensive and multi-disciplinary scientific output of Egon Vielrose shows not only his excellent methodological qualifications, wide-ranging interests and a high level of scientific standards but also his intuitive knowledge of contemporary problems which is highly useful in examining and managing social processes. This opinion on Vielrose was expressed by eminent professors: Lange, Strzelecki, Rosset, Ziomek and Kryński.

On a personal level professor Vielrose was a man of great modesty and kindness. He was extremely laborious, he had an insatiable passion for studying, an unusually concise way of expressing his thoughts and a great care for appropriate use of statistical methods for demographic and social research. He held a critical view on imperfection of sources of historic demography, yet made attempts to accommodate statistical methods and techniques in order to define basic parameters of population development on the territory of Poland against the European background, and show interdependences; life expectancy, fertility and mortality. Egon Vielrose died suddenly on 21 October, 1984 and was buried on the Augsburg-Protestant Cemetery in Warsaw.

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Egon Vielrose (1907–1984) – demograf, statystyk, ekonometryk

Streszczenie: Egon Vielrose był wybitnym polskim demografem, statystykiem i ekonometrykiem. Studiował matematykę na Uniwersytecie Warszawskim oraz ekonomię w Wyższej Szkole Handlowej. Habilitował się na Uniwersytecie Warszawskim. Jego zainteresowania badawcze dotyczyły problemów demografii, statystyki matematycznej, ekonometrii i statystyki społeczno-ekonomicznej. Ważne miejsce w jego dorobku zajmują studia z zakresu demografii historycznej, dotyczące głównie ruchu naturalnego, decydującego o rozwoju zaludnienia. Naukowy dorobek Egona Vielrose’a obejmuje ponad dwieście prac, w tym sześć książek i ponad sto trzydzieści artykułów.

Słowa kluczowe: demografia historyczna, rozkład dochodów, statystyka matematyczna

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