

EMIL SCHOENBAUM

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Abstract

Emil Schoenbaum studied at the Faculty of Philosophy of Charles-Ferdinand University in Prague. In 1906, at the request of Masaryk, he moved to Göttingen to study actuarial mathematics. In 1919, Schoenbaum received a habilitation for actuarial mathematics. In 1923 he was appointed full professor of actuarial mathematics at the newly established Faculty of Science of Charles University. His conception was called the Czechoslovak Actuarial School. The economic turmoil after WW1 forced a reform of the social security system. The expert responsible for the construction of the actuarial part of the Social Insurance Act was Schoenbaum, his technocratic argumentation played an important role in the discussion of the law in parliament in 1924. This contributed to the growth of Schoenbaum's domestic and foreign reputation, and his authority remained unshaken despite the economic crisis. As an actuarial expert of the International Labor Organization, he went abroad in 1939 and took part in social security reform in a number of American countries (e. g. Bolivia, Mexico, USA, Canada). In the years 1945–48 he returned to Czechoslovakia, worked at the Faculty of Science of Charles University. He emigrated again after February 1948, becoming an employee of the *Instituto Mexicano del Seguro Social*.

Key words: Emil Schoenbaum, actuarial mathematics, International Labor Organization, Charles-Ferdinand University, Charles University

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Introduction

Emil Schoenbaum was undoubtedly one of the most important figures in Czech actuarial mathematics. Although he also has an important place among the First Republic professors of the Faculty of Science of Charles University in Prague, very little is known about his life and work. His career was marked not only by the Nazi occupation, but especially by the involuntary exile after 1948 according to Kotůlek (2017) and Coufal (2006).

The economic turmoil after the First World War forced a reform of the social security system. The main expert responsible for the construction of the actuarial part of the Social

Insurance Act was Emil Schoenbaum (1882–1967), a professor at Charles University. Schoenbaum's technocratic argumentation also played an important role in the parliament's deliberations. The explanatory memorandum to the law was published and also translated into several languages. This contributed to the growth of Schoenbaum's domestic and foreign reputation, and his authority remained unshaken despite the economic crisis, which brought fierce disputes over the form of social security. Schoenbaum was therefore an indispensable member of all other reform commissions, held important positions in social insurance administration (General Pension Institute, Central Social Insurance Agency), professional organizations (Social Institute, Union of Czechoslovak Mathematicians and Physicists) and led a two-year actuarial course at Charles University.

In 1930, he co-founded the internationally oriented journal *Actuarial sciences* (Aktuárské vědy in Czech). Between the world wars about the Czechoslovak school of actuarial mathematics, whose main representative was Schoenbaum, who was followed by his students. He emigrated again after February 1948, becoming an employee of the *Instituto Mexicano del Seguro Social* in Mexico City.

1 Period until the end of World War I.

According to Bílý et al. (1948) and Rys (2014) Emil Schoenbaum was born on June 10, 1882 in Benešov near Prague, where he also graduated from high school. During his high school studies, he became interested in mathematics, so he studied it at the Faculty of Philosophy of the Czech Charles-Ferdinand University in Prague. During his university studies, he dealt (under the influence of Prof. Petr) mainly with number theory. He graduated in 1905, when he also defended his dissertation, from which field he chose the theme for his thesis: *Algebraic bodies and ideally theoretical functions* [x], devoted to number theory, he was graduated as PhDr. The first published works of Schoenbaum, of which we mention especially the paper *Fermat's Theorem and the works of Kummer* (Schoenbaum, 1906), are also on the theory of numbers.

In the year 1906, his deep interest in mathematics led him to Göttingen with a scholarship for the study of insurance mathematics; there he studied under Klein, Hilbert, Minkovski and others. The library of the mathematical department of Charles' University contains the notes of Hilbert's lectures on mechanics made by Schoenbaum. On the request of T. G. Masaryk, at that time deputy in the Austrian parliament, in whose journal *Naše doba* Schoenbaum published two articles in the years 1905 and 1906 on the theory of probability

and statistics, Schoenbaum began to take an interest in social insurance. In Austria at that time, in the year 1906, pension insurance of salaried employees became law and Masaryk wished to have Czech specialists for the social insurance of manual workers the introduction of which was then being prepared. Schoenbaum began to deal with social insurance. In addition to social insurance, Schoenbaum followed with keen interest also private insurance which was experiencing a quick development in the direction of more accurate computation methods and more just distribution of the profits of the insurance companies; his *Three lectures concerning life insurance* of the years 1909 to 1912, published in book form in Schoenbaum (1903), demonstrate how fine was his command over this field. From 1912 to 1939 he was an employee of the General Pension Institute (GPI). He dealt with the mathematical theory of pension and health insurance.

In actuarial mathematics and mathematical statistics, Schoenbaum devoted himself to difficult theoretical problems. His two basic books, *The use of Volterra's integral equations in mathematical statistics* (Schoenbaum, 1917) and *Concerning certain integro-differential equations* (Schoenbaum, 1920) resulted from these studies, and also the paper *On the mathematical theory of disability insurance*. In the first of this works, Schoenbaum sets out from the concrete problem concerning the mathematical theory of the disintegration of a homogeneous group of active persons during a certain time, if the disability and mortality among active individuals are dependent on age, and if the mortality and recovery of invalids are dependent on age and the duration of the disability. He then solves this problem generally, using the theory of integral and integro-differential equations, for any population of individuals undergoing a similar process of disintegration. In the second work, he broadens the original assumptions, including the return of individuals to the original population from one or more partial populations. These works, of fundamental importance for the dynamics of statistical populations with which Schoenbaum here for the first time dealt, roused lively interest in international actuarial circles and formed the basis of many other works.

2 The years from 1918 to 1939

According to Bílý et al. (1948) when he applied for a habilitation in the spring of 1918, he could already prove his studies in actuarial mathematics with Professor Alfred Tauber at the University of Vienna, defending his dissertation in number theory with Prof. Karel Petr, internships at the University of Göttingen and the German Imperial Insurance Institute for Employees, the practice of an insurance technician in several pension funds, the secretary of

the mathematics department of the General Pension Institute, but also extensive publishing and popularization activities. Schoenbaum took over the chair of actuarial and mathematical statistics at the newly established Faculty of Science, Charles University in March 1923, when he was appointed full professor and took over responsibility for two-year actuarial courses¹. In this function he trained a number of able workers in insurance mathematics and mathematical statistics (Šimpach et al. 2019). Schoenbaum always maintains his lectures on a high standard and continually supplements and modifies them in the light of the most recent technical literature on this subject. However, Bohumil Bydžovský remained the chairman of the examination commission for state final examinations throughout the first Czechoslovak Republic. During his time at Charles University in Prague in 1923–39, he donated a salary for the purchase of books to the Mathematical Institute of Charles University. Schoenbaum led an actuarial seminar where he was able to educate a number of students. Other papers of Schoenbaum also deal with the application of the mathematical theory of the disintegration of populations together with the solution of practical problems of the mathematics of social insurance. Of these we mention *A contribution to the theory of disability insurance* (Schoenbaum, 1918 et 1918a), and *A contribution to the theory of pension insurance* (Schoenbaum, 1921). Of the remaining mathematical papers of Schoenbaum it is necessary to make special mention of *A contribution to the use of differential equations in insurance mathematics* (Schoenbaum, 1923 et 1925) and *Contribution à la théorie de l'ajustement mécanique* (Schoenbaum, 1928) presented to the Congress of mathematicians in Bologna, 1928.

He was the author of the draft pension laws of 1920 and 1929, the financial plan of the Social Insurance Act (1924)². Social insurance laws, which he initiated and drafted together with others, concerned working hours, works councils, the minimum wage, collective (tariff) agreements, labor justice, etc. The most important was the Social Insurance Act (1924), through which Czechoslovakia became an example for many other European countries in the second half of the 1920s. For the first time in European history, Schoenbaum has unified workers' sickness, health and pension schemes. It is necessary to mention that social insurance led Schoenbaum to a study of wage and population problems about which he has written many articles and given many lectures.

In the interwar period he was a member of the State Council of Statistics and the Social Institute of the Czechoslovak Republic (1935–39 chairman), a member of the Royal

¹ In the academic year from 1932 to 1933 he was the dean of the Faculty of Science of Charles University.

² I.e. he was the author of the calculations.

Czech Society of Sciences and Arts a number of other scientific organizations and social associations. In the year 1930 he was co-founded and together with Havlik edited journal Czechoslovak Journal of Actuaries (see Aktuárské vědy, 2021, Paláček et al., 2017). The fact that the International Labor Office appointed him their adviser is an indication of the esteem in which Schoenbaum was held abroad (see Rys, 2014 et 2019). At the suggestion of this Office he was in 1930 entrusted with the task of working out the financial bases and the bill on social insurance in Greece, where he was recommended by a senior official of the International Labor Office (ILO) and a Czech native Osvald Stein.

Despite strong political pressures and the economic crisis of the 1930s, the Czechoslovak social system survived in relatively good shape. In the late 1930s, however, more in-depth reform began to be considered; Schoenbaum, as chairman of the Social Institute of the Czechoslovak Republic, organized a series of lectures published in 1937 as Contemporary Problems of Social Insurance.

3 From 1938 to 1948

According to Kotůlek (2017), Rys (2014 and 2019), after the Munich dictatorship, which caused changes in social insurance due to changes in borders and population movements, state expenditures were reduced. In an atmosphere of growing anti-Semitic propaganda, Schoenbaum became the target of one of the attacks by right-wing journalists. The headlines in the extreme Sunday newspaper (Nedělní list in Czech) announced the revelation of the regime's sins at the GPI and held it responsible for the alleged billions in losses. Under media pressure, the government issued several decrees, in December 1938 a new board of directors was appointed to the GPI and in January 1939 a new president František Ježek (1890 - 1969). In March 1939, Schoenbaum had to retire from active service at the university. His student, Associate Professor Truksa, was commissioned to replace his lectures. After the establishment of the Protectorate, Schoenbaum also asked - in anticipation of things to come - to retire at the GPI. Here his position remained vacant, Truksa, his deputy and the director of the mathematics department of the GPI Institute took over the duties again.

He was able to travel to Geneva, the ILO headquarters, in October 1939 for connections at the ILO. The ILO sent him first to Ecuador to reorganize social insurance there; on the completion of this task, Schoenbaum received the highest recognition of the Ecuador government as a consultant to the Instituto Nacional de Previsión in Quito. He worked on the reform of the entire social system, in three years he assembled a team of

capable domestic collaborators, he also relied on the former German emigrant Peter Thullen (1907 – 1996). In 1941 the Mexican government invited Schoenbaum to build up their national insurance. The result of his work was an Act which in many respects resembled the former Czechoslovak Act on social insurance, but avoided the deficiencies of the latter. In one of its resolutions the International Conference on Social Insurance held in Santiago de Chile recommended this Act as a model for all American republic. Then followed invitation to Bolivia to restore miners' insurance to solvency, then to Chile, Paraguay, Costa Rica, and in 1943 again to Mexico, to the USA and to Canada. From the fall of 1943, he worked directly at the headquarters of the ILO in Montreal. After the tragic death of Oswald Stein, he was appointed rapporteur on the Social Security Commission at the 26th International Labor Conference in Philadelphia in April 1944. Schoenbaum was along with Minister Jan Masaryk one of the Czechoslovak delegates at the International Conference of Labor at Philadelphia and was elected there to be in charge of social insurance. He continued to function as adviser to the ILO until in 1944 he was recalled to London by the Czechoslovak government to work out a proposal for the reconstruction of Czechoslovak social insurance (published in London in book form in Czech, English, French and Spanish).

After his return to Montreal, Schoenbaum conducted a course to which were invited many outstanding American specialists. The Director of the ILO thanked in particular the Czechoslovak government for freeing Schoenbaum for this task and in the speech of thanks to the Czechoslovak government, Schoenbaum was proclaimed the Father of American Social Insurance. In doing so, he prepared a textbook on the mathematics of social security in English (see Rys, 2014 and 2019), assisted by an assistant, another native of Prague, Leo Wildman (1912 – 1977), later Secretary General of the International Social Security Association (ISSA). The textbook apparently remained in the manuscript. During his stay in America he published a number of papers on insurance mathematics in technical journals and in all countries in which he worked he left behind many devoted pupils. Despite the wishes of the American states that Schoenbaum should stay with them, he returned to Prague in december 1945 to his previous teaching position. However, the ministry exchanged that Schoenbaum would have no other obligations, which greatly limited its official influence on the preparation and implementation of the post-war reform of the social system. Thanks to his personal influence, he managed to enforce the main ideas of the reconstruction plan into the National Insurance Act with the help of his former pupils.

In the period 1945–48, he returned to Czechoslovakia and continued to work at the Faculty of Science of Charles University and at the College of Special Sciences (field of

statistical insurance engineering) of the Czech Technical University in Prague. Schoenbaum devoted special attention in his lectures and tutorial classes to the applications of mathematics to national economics; in 1946 he introduced special lectures in econometrics at Charles' University.

4 After 1948

According to Rys (2014 and 2019), Zelenka (1965) and Díaz-Leal (2004) After the February coup in 1948, Schoenbaum hastily arranged an internship at the *Instituto Mexicano del Seguro Social*, where he had already worked during the war. He watched from a distance the scientific policy of the new regime and tried to find a place at an American university. In Mexico, the climate did not suit him at all, and at the age of 68, he wanted to return to the *calmer work of a university teacher*. Due to complications with the issuance of a visa, he could not go to the Econometric Society's congress to Cleveland in December 1948, due to health complications he did not go on a lecture tour to Chicago in April 1949, so in December 1949 he wrote to Václav Hlavatý that he would probably stay in Mexico (Durnová et al., 2017).): "... *News from home convinced me that developments across Eastern Europe are going in the opposite direction than we expected from our upbringing.*" Impressed by the arrests of acquaintances and the dismissal of colleagues from the university, he decided to extend his contract with the Mexican Constitution.

The Czechoslovak authorities responded in September 1950. Schoenbaum was expelled from the university for leaving the service and proving a "*hostile attitude towards the Czechoslovak People's Democratic Republic*". In December 1950, Schoebaum acquired Mexican citizenship and worked in Mexico until his death on November 16, 1967.

5 Schoenbaum's publishing activity

SCHOENBAUM, E. (1905). Několik kapitol z nauky o číslech. *Časopis pro pěstování matematiky a fyziky* **34**, No. 3, pp. 265 – 300

SCHOENBAUM, E. (1906). Fermatova věta a Kummerovy práce. *Časopis pro pěstování matematiky a fyziky* **35**, No. 4, 367-376

SCHOENBAUM, E. (1911). Z vystěhovalecké statistiky. *Naše doba*.

SCHOENBAUM, E. (1911a). Přirozený lidský rozum a matematika. *Časopis pro pěstování matematiky a fyziky* **40**, No. 3, pp. 361-368

- SCHOENBAUM, E. (1913). *Tři přednášky ze životního pojištění*. Praha : Spolek českých pojistných techniků.
- SCHOENBAUM, E. (1917). *Použití Volterrových integrálních rovnic v matematické statistice*. Praha : ČAVU.
- SCHOENBAUM, E. (1918). Příspěvek k matematické teorii invalidního pojištění [I.]. *Časopis pro pěstování matematiky a fyziky* **47**, No. 2 – 3, pp. 104-112
- SCHOENBAUM, E. (1918a). Příspěvek k matematické teorii invalidního pojištění [II.]. *Časopis pro pěstování matematiky a fyziky* **47**, No. 4 – 5, pp. 287-294
- SCHOENBAUM, E. (1920). *O jisté integrodiferenciální rovnici*. Praha : ČAVU.
- SCHOENBAUM, E. (1920a). Náhradní ústavy pensijního pojištění. *Sociální revue*.
- SCHOENBAUM, E. (1921). K matematické pensijního pojišťování. *Časopis pro pěstování matematiky a fyziky* **50**, No. 4 – 5, pp. 255-264
- SCHOENBAUM, E. (1923). Příspěvek k použití diferenciálních rovnic v pojistné matematické [I.]. *Časopis pro pěstování matematiky a fyziky* **52**, No. 1 – 2, pp. 148-156
- SCHOENBAUM, E. (1924). Příspěvek k matematické teorii pensijního pojištění. *Časopis pro pěstování matematiky a fyziky* **53**, No. 1 – 2, pp. 163-173
- SCHOENBAUM, E. (1924a). Anwendung der Volterra'schen Integralgleichungen in der mathematischen Statistikschrift. *Skandinavisk Aktuarietidskrift*.
- SCHOENBAUM, E. (1925). Příspěvek k použití diferenciálních rovnic v pojistné matematické [II.]. *Časopis pro pěstování matematiky a fyziky* **54**, No. 4, pp. 341-347
- SCHOENBAUM, E. (1926). Dr. Winter a sociální pojištění. *Sociální revue*.
- SCHOENBAUM, E. (1928). Contribution à la théorie de l'ajustement mécanique. *Atti del Congresso Internazionale dei Matematici*, Bologna
- SCHOENBAUM, E. (1929). K teorii mechanického vyrovnávání. *Časopis pro pěstování matematiky a fyziky* **58**, No. 1 – 2, pp. 95-98
- SCHOENBAUM, E. (1930). Pracovní trh a pokles porodů. *Naše doba*.
- SCHOENBAUM, E. (1935). O matematické statistice. *Časopis pro pěstování matematiky a fyziky* **64** (*Sjezd matematiků zemí slovanských*), No. 5, pp. 124-131
- SCHOENBAUM, E. (1935a). Odvození finančních systémů sociálního pojištění z diferenciální rovnice. *Časopis pro pěstování matematiky a fyziky* **64** (*Sjezd matematiků zemí slovanských*), No. 6, pp. 216-217
- SCHOENBAUM, E. (1935b). Nezaměstnanost mladých a starých. *Sociální revue*.
- SCHOENBAUM, E. (1945). *Návrh na reformu sociálního pojištění v ČSR*. Londýn : Čechoslovák

Conclusion

Till this day, Emil Schoenbaum, unlike the Czech Republic, is a well-known figure on the American continent (see Zelenka, 1965, or Díaz-Leal, 2004). One of the authors of this article, whose mother Schoenbaum taught actuarial mathematics at the College of Special Sciences of the Czech Technical University in Prague from 1945 to 1948, would like this article to represent the repayment of our state's debt to this personality, which represented a radiant an example of the use of complex mathematical theories in actuarial mathematics (see Zweifel et al., 2011).

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References

- AKTUÁRSKÉ VĚDY. (2021). The Czech Digital Mathematics Library (DML-CZ), URL: <http://dml.cz/handle/10338.dmlcz/144495>
- BÍLÝ, F., & TRUKSA, L. (1948). Prof. Emil Schoenbaum [the sixty fifth birthday commemoration]. *Aktuárské vědy* **8** (2), 49 – 52. URL: <http://dml.cz/dmlcz/144717>
- COUFAL, J. (2006) Emil Schoenbaum. *Aktuárske vedy v podmienkach poisťného trhu Slovenskej republiky. 2005 June 27 – 30, Virt, Slovak Republic – Conference Proceedings*. Bratislava : EU FHI, p. 5.
- DÍAZ-LEAL, A. A. (2004). Profesor Emil Schoenbaum. *Revista CIESS* **7**, 9 – 32
- DURNOVÁ, H., KOTŮLEK, J., & ŽÁDNÍK, V. (2017). *Václav Hlavatý (1894-1969): cesta k jednotě*. Brno : Masarykova univerzita. 185 p. ISBN 978-80-210-8920-4
- KOTŮLEK, J. (2017). K historii pojistné matematiky na Karlově universitě – Emil Schönbaum (1882-1967). *Matematika na vysokých školách. 11.–13. září 2017, Herbertov – Sborník semináře*. Praha : ČVUT v Praze a JČMF, pobočný spolek Praha. ISBN: 978-80-01-06179-4
- PALÁČEK, R., & KOTŮLEK, J. (2017). History of the Czechoslovak Journal of Actuarial Sciences. *Systemy Wspomagania w Inżynierii Produkcji* **6** (4). 300 – 305. Warszawa : STE GROUP. ISSN 2391-9361

RYS, V. (2014). Stoupenci české sociální školy v mezinárodních organizacích – Emil Schönbaum (1882-1967). in: Jan Kotous et al. *Velké osobnosti české školy sociální politiky*. Praha: PF UK. 89 – 96.

RYS, V. (2019). Emil Schönbaum (1882-1967): the man who guided the ILO's transition from social insurance to social security. *Message Four Lives in the History of ILO* 65. 146 – 149. Geneva : ILO.

ŠIMPACH, O., & ZÁVODSKÝ, P. (2019). The State Statistical Office and the First Czech Textbooks on Statistical Methods. *International Days of Statistics and Economics* [online]. Praha, 05.09.2019 – 07.09.2019. Slaný : Libuše Macáková, Melandrium, pp.. 1449–1507. ISBN 978-80-87990-18-6. DOI: 10.18267/pr.2019.los.186.150.

ZELENKA, A. (1965). In memoriam Professeur Emile Schoenbaum, *Revue Internationale d'actuariat et de statistique de la Sécurité sociale* **IV** (11). 5 – 20.

ZWEIFEL, P., & EISEN, R. (2011). *Insurance Economics*. Berlin : Springer. ISBN 978-3-642-20547-7

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