

BENEDIKT KORDA AND THE DEVELOPMENT OF ECONOMETRICS AND OPERATIONAL RESEARCH ON PRAGUE SCHOOL OF ECONOMICS

Ondřej Šimpach – Jan Kodera – Prokop Závodský

Abstract

The beginnings of the mathematical description of economic processes in the Czech lands can be noted already in the 20s and 30s years of the 20th century. Since the academic year 1946/47, econometrics was taught at the University of Special Sciences and at the Faculty of Science of Charles University. After the rise of the communist regime in February 1948, econometrics was sharply refused as “bourgeois pseudo-science”. But already at the end of the 50s, the application of mathematical methods in economics in Czechoslovakia developed again, and in 1959 a new department at the Prague School of Economics became one of the main centres. At first it was called the Department of Scientific Programming (it became the Department of Econometrics only in 1966) and in years 1959–1968 it was headed by Benedikt Korda. In 1961, a study field called economic–mathematical calculations was established at the Prague School of Economics, focusing on econometrics, operational research and statistics. In the 60s, the department developed rapidly its activities, at the end of 1967 it already had 17 members - let's name at least Jaromír Walter, Luděk Rychetník and Miroslav Mañas.

Key words: econometrics, operational research, Benedikt Korda

JEL Code: B16, B23, N33

Introduction

The history of statistics and mathematical methods in economics in our territory has not yet been comprehensively processed. The authors of this paper try to gradually contribute to the improvement of this situation through a number of partial articles on the development of these disciplines in the XXth century – Kodera, Závodský and Šimpach (2015), Závodský and Šimpach (2016, 2017, 2018, 2019) etc.

In this year, when the Faculty of Informatics and Statistics commemorates the 30th anniversary of its founding (1991), in our contribution we deal mainly with the first ten years

of the Department of Econometrics (1959-1969) and the work of its founder, prof. Benedikt Korda. We briefly recall some of its predecessors in the Czech lands, as well as the rejection of econometric methods after the beginning of the communist regime in 1948. A long-term employee and then the head of the Department of Econometrics, prof. RNDr. Miroslav Mañas, DrSc. also actively participated in the processing of the paper.

1 The beginnings of mathematical economics in the Czech lands

Already among the oldest theorists in economics in our territory we meet the first mathematical economist, which was Georg Franz von Buquoy (1781–1851). Besides, he was also businessman, mathematician, politician etc. He interpreted the theory of economics mathematically, using the apparatus of theoretical mechanics (*Die Theorie der Nationalwirthschaft*, Leipzig 1815). He significantly preceded his time, had no significant followers and today he is known only to specialists in the history of economic theories.

We encounter the systematic beginnings of the mathematical description of economic processes in our country in the 1920s and 1930s, especially in the works of Jan Stocký (1897–1959). He studied at Czech Technical University in Prague civil engineering in years 1914–1919. He received his PhD in technical sciences (Dr. techn.) in 1921 on the basis of a dissertation in the field of national economics. He also completed part of his studies at the Faculty of Law and the Commercial College. Besides, he studied sociology and national economics at the universities of Paris, Brussels and London in the 1920s.

Already during his studies, Stocký became (from October 1, 1918) an assistant of Czech Technical University, and from June 1, 1922 at the Institute of National Economy at the University of Special Sciences of the Czech Technical University. This institute, whose head was until his death prof. F. X. Hodáč (1883–1943), was one of the largest at the Czech Technical University, as he provided lectures and seminars for all fields of study at University.¹ At the end of 1927, Stocký, then an honored associate professor, obtained a *venia docendi* in the field of national economy on the basis of his work on the applications of mathematics in the national economy (Stocký, 1927).²

Jan Stocký's interest focused mainly on the theory of overall equilibrium, which remained virtually unnoticed in the field of Czech economic thought. However, worldwide, it

¹ In addition, lectures on financial science and a national economic seminar for students of the field of insurance technology (later statistical-insurance engineering).

² CTU Achive, cardboard 18.

had in the last third of XIXth century, several prominent representatives who worked at prestigious European universities.

Here we will very briefly list the personalities who inspired Jan Stocký the most. It is primarily Leon Walras (1834–1910), the founder of the theory of general equilibrium, who worked in the Department of Political Economy at the University of Lausanne from 1870 to 1893. His most famous work is a book *Eléments d'économie politique pure (Elements of Pure Economics)*. Another important figure was Vilfredo Pareto (1848–1923), who focused more on the theory of utility. In 1893, he succeeded Leon Walras as head of the Department of Political Economy at the University of Lausanne. His the most famous work was *Manuel d'économie politique (Manual of Political Economy)*. Jan Stocký was also concerned with the work of William Stanley Jevons (1835–1882). William Jevons has worked at the University of London since 1876. His significant work is *The Theory of Political Economy*. An important contribution to economic theory is his theory of exchange.

Jan Stocký was significantly influenced by the named economic theorists and contributed to the promotion of their work in Czech economic thought. However, the effect of Jan Stocký's efforts to acquaint the Czech scientific public with the theory of overall equilibrium was not great. The reason for this small success is that the Czech economic thinking between the world wars was under the stronger influence of Albín Bráf and he was strongly influenced by the Austrian school, but also by the German historical school. We present these personalities of Czech economic science because they were important authorities that significantly influenced the Czech economic thinking of that time. They did not know the thinking of the mathematical school of economics, but some of them, such as Bráf, recognized the contribution of mathematical economists such as Gossen, Jevons and Walras to the theory of economics. Engliš recognized the legitimacy of the use of mathematics. Overall, however, it can be said that the interest of the Czech economic community in the application of mathematics was not great.

Jan Stocký published seven major works on mathematical methods in the national economy. From a methodological point of view, his most recently published work is *Role matematiky v bádání národohospodářském (The Role of Mathematics in Economic Research)* (Stocký, 1927) is the most elaborated. In this book, right in the introduction, he emphasizes the motive of its publication, namely to acquaint the Czech scientific public with the use of mathematical procedures in a world where mathematical interpretation of economics is considered common. Stocký is therefore aware of a certain lag of Czech economic science in the use of mathematical methods. Although he does not explicitly state this in the book's

preface, he considers the first part of the book, in which he talks about the possibility and necessity of using mathematics in economics, to be crucial. The second part, where he talks about building a mathematical economic theory, is not a comprehensive presentation, which the author is aware of and he explicitly declares it.

Another significant personality who contributed to the beginnings of economic and mathematical methods in the area of the Czech Republic was Stanislav Kohn (1888–1933). He came from a Jewish family in Warsaw. He studied economics and statistics in St. Petersburg and then dealt mainly with theoretical and applied statistics. He later worked in Tiflis (Tbilisi), Paris and from 1923 in Prague, where he lectured statistics at the Russian Faculty of Law. His publishing activities also include the first original Czech textbook of statistical methods. At the 3rd Russian Academic Congress in Prague in 1924, Kohn gave a remarkable paper *On the probabilistic-statistical approach to the problems of economic theory*. He further developed these ideas the following year in two contributions to scientific proceedings – *On the "statistification" of political economy (On the critique of the theoretical constructions of P. B. Struve)*³ and *Mathematical and empirical focus in price theory*⁴. Kohn's international response is evidenced by the fact that in 1930 he became a founding member of The Econometric Society in the USA. The following year, S. Kohn became seriously ill and died two years later.

At the State Statistical Office, some executives seriously considered the possibilities of enriching Czechoslovak economic statistics with economic-mathematical modelling, which they became acquainted with in literature from abroad and at congresses of the International Statistical Institute. It was especially Robert Kollar (1884–1946) in the lecture *On the Tasks of Economic Statistics* (Kollar, 1936). Josef Mráz (1882–1934), vice-president of the State Statistical Office, also became a member of The Econometric Society in the USA as same as biometrician Václav Myslivec (1903–1976), who became a member during his stay in Great Britain during World War II.

After the resumption of activities of Czech universities, Stocký returned to the Czech Technical University in 1945, where he took over lectures from the national economy after the deceased prof. Hodáč. In October 1946, he was appointed (with effect from 1 October 1945) a professor and took over the management of the Institute of National Economy, Policy of National Economic and Financial Sciences at the University of Special Sciences.

³ In: Sbornik posvjaščennyj P. B. Struve. Prague 1925.

⁴ In: Russkij ekonomičeskij sbornik II (1925), p. 5-51 and III (1925), p. 31-49.

At this time of post-war euphoria, it was finally possible to expand the existing two-year course in insurance technology to a four-year university study of statistical insurance, starting with the academic year 1946/47. Similar studies took place in parallel at the University of Special Sciences and at the Faculty of Science of Charles University. Some lectures were common for students of both universities. In the 3rd year, prof. Stocký lectured the subject of Econometrics I for both semesters, in the 4th year prof. Schönbaum⁵ lectured on Econometrics II. Econometrics was one of the subjects of the second (professional) state examination at the University of Special Sciences. Preparations were also made here for the establishment of the Czechoslovak Econometric Society.

However, this development of econometrics lasted only for a short time. Soon after the communist coup in February 1948, the study of statistical and insurance engineering underwent radical changes. Actuarial mathematics and mathematical statistics were gradually reduced as "mathematical formalisms", econometrics was completely excluded from the study program and loudly condemned as "bourgeois pseudo-science". Prof. Stocký was already in the first wave of purges in March 1948 "released from active service" with immediate effect at the initiative of the University of Special Science Action Committee and put on holiday leave. A year later (at the age of 52) he was definitively retired by Minister Nejedlý on April 1, 1949. Prof. Schönbaum went into exile - to Latin America, where he already worked as an expert in the field of insurance during the Nazi occupation of Czechoslovakia.

The University of Special Sciences was abolished in 1952. Its successors were the newly established Faculty of Mathematics and Physics of Charles University, as well as the Faculty of Statistics of the Prague School of Economics, founded the following year.⁶ A total of 295 students completed their statistical studies at the University of Special Sciences in 1947–1952, including Jaromír Walter (1949) and Benedikt Korda (1951).

2 The beginnings of mathematical economics in the 1960s

The Faculty of Statistics of the University of Economics de jure existed from 1 September 1953 to 31 August 1959. It consisted of only two departments - statistics and mathematics and a single field of study – statistics. Beginning with the academic year 1956/57, the faculty actually ended. Formally, the Faculty of Statistics was abolished only in August 1959, when a new

⁵ Emil Schönbaum (1882–1967) was appointed as professor of actuarial mathematics at the Faculty of Science of Charles University in 1923.

⁶ More details in the publication Závodský (2017).

Faculty of Political Economy was established during the reorganization of the Prague school of Economics.

After the end of the Stalinist period, in the USSR, Poland, Hungary and also in Czechoslovakia gradually began the exploration of the possibilities of applying mathematics in economics. This issue concerned at the Faculty of Mathematics and Physics, prof. Josef Bílý (1905–1970) and prof. František Nožička (1918–2004), as well as several experts from the Institute of Economics of the Czechoslovak Academy of Sciences and at the Prague School of Economics doc. Korda and his collaborators.

On September 1, 1959, a new department at the University of Economics separated from the Department of Statistics with the working name of the Department of Applied Mathematics⁷. The Scientific Council of the University of Economics, Prague decided that "the name will be specified after discussion with experts". In the end, the name of the Department of Scientific Programming was chosen. It was a compromise, because at that time it was necessary to avoid names reminiscent of non-Marxist disciplines cultivated in economic schools in capitalist countries. The head of the department was appointed doc. Ing. Benedikt Korda, CSc., who until then (since 1955) headed the Department of Statistics and was shortly also the last Dean of the Faculty of Statistics.

From the study year 1961/62 (in agreement with the Prague School of Economics in Bratislava) a new field of study was established - economic-mathematical calculations (EMC).⁸ 22 students were admitted to the 1st year, students from other fields could transfer to higher years. In the following years, the number of students in the year was most often around 50–60. During their studies, students specialized semi-officially: either in economic-mathematical methods, which were then the content of the final state exam and diploma thesis, or in statistics. The study of the field was provided by the Department of Scientific Programming (usually to a larger number of students) and the Department of Statistics.

⁷ The proposal was approved by the Scientific Council of the University on 30 June. 1959 (Archive of the University of Economics, records of the Scientific Council of the University of Economics, Prague, June 30, 1959).

⁸ The establishment of the field was approved by the School's Scientific Board 13. VI. 1961. Old dogmatist prof. Oliva (1897-1977) again expressed "concern that the introduction of new subjects would place no greater emphasis on mathematical methods than on political economy, which would lead to the mathematization of political economy" and suggested postponing the decision and discussing the matter further. (Archive of the University of Economics, minutes of the Prague school of Economics Scientific Council, June 13, 1961).

To the new Department of Statistics moved with doc. Korda also Ing. Jan Zelinka (1930–1994)⁹ and graduated economist Luděk Rychetník (1933–2017)¹⁰. The department remained so miniature for only a short time. Miroslav Mañas (* 1935) joined in 1960, graduating from the Faculty of Mathematics and Physics, Charles University. Because since 1961 the department has largely provided teaching in the field of EMC and then "scientific programming" became a compulsory subject at the entire Prague School of Economics, the department expanded rapidly. In the year 1961 came from the Department of Statistics also doc. Jaromír Walter (1923–2001)¹¹. He was the only one who also attended lectures in econometrics at the University of Special Sciences.

Among others, let's name at least graduated economist Jiří Beck (graduate of economic studies in Leningrad), graduated economist Roman Hušek (graduate of the Prague School of Economics, then employed at the Statistical Office), graduated economist Věra Pelzbauerová, graduated economist Stanislav Havelka, graduated economist Milada Lagová and graduated economist Josef Lauber. In 1964, the Department of Scientific Programming had already 13 members, at the end of 1967 17 members, and three years later 19 members.

The application of mathematical methods in economic theory and practice provoked extensive discussions in the first half of the 1960s. They took place on the pages of the journal Political Economy in 1963, the polemical articles published by Felix Oliva and Benedikt Korda published here were the subject of extensive discussion at the Scientific Board of the Faculty of Political Economy on February 27, 1963 with Ota Šik, director of the Institute of Economics, prof. Jaroslav Hájek and many other personalities. The discussion between Benedikt Korda and Felix Oliva continued in 1964, when B. Korda published an article *O ekonomické vědě a výuce (On economic science and teaching)*¹². F. Oliva's answer is published in his book *Ekonomické studie 1943–1966*¹³.

Under more liberal conditions in the second half of the 1960s, the department could get a name, understandable abroad - the Department of Econometrics (decision of the Rector of

⁹J. Zelinka worked on Department of Statistics since year 1953.

¹⁰L. Rychetník joined the Department of Statistics after completing his statistical studies at the Prague School of Economics in 1955.

¹¹J. Walter graduated in statistical insurance engineering in 1949 at the University of Special Sciences (VŠSN) and at the same time worked there as an assistant since 1947 and published his first professional articles. He came to the Department of Statistics at the Prague School of Economics in 1953, and from the founding of the Prague School of Economics in the same year he served as Vice-Dean of the Faculty of Statistics (until its de facto abolition). After the transition of associate professor Korda to the new department, the Department of Statistics was led by J. Walter for two years. He became an associate professor in 1960.

¹²Political Economy, vol. 11 (1964), No. 4.

¹³Oliva, F. 1967. Prague: Svoboda, chapter Těž o ekonomické vědě (Also about economic science), pp. 381-390.

the Prague School of Economics in 1966). The proposal that the field of study EMC should also be given a more dignified name (statistics and econometrics) was not implemented at that time. The Faculty of Political Economy was renamed the Faculty of Economics in April 1968.

In 1964, the Economic and Mathematical Laboratory (EML) was established at the Institute of Economics of the Czechoslovak Academy of Sciences under the leadership of Ing. Jiří Bouška. Among other things, the laboratory had the opportunity to promptly publish reports from professional life and research results from various workplaces. Among dozens of thin pamphlets (ranging from 40 to 90 pages), the reports of L. Rychetník, J. Zelinka, M. Mañas, J. Walter, J. Beck and others have been published since 1964. The laboratory was also a reliable partner in organizing professional conferences and lectures for workers from economic practice. In 1965, EML, in cooperation with other domestic institutions, managed to establish the periodical *Ekonomicko-matematický obzor (Economic and Mathematical Horizon)*¹⁴. The journal published research and informative articles, about two thirds of them in Czech, as well as in English, German and Russian. Over time, the magazine gained a positive impact factor, which was a great success for the magazine with publications mostly in Czech.

Mathematical methods in economics also found their place in the then departments of political economy, which in the 1960s were at each of the three faculties of the Prague School of Economics, teaching was always divided into the political economy of capitalism and the political economy of socialism. The department at the Faculty of Political Economy had its own field of study of the same name. In 1965, Miroslav Toms (1944–1988) and Mojmir Hájek studied in this field, who dealt with growth theories and input-output analysis¹⁵, both declaring themselves as political economists of socialism. Their range of interests was also to some extent in line with the concepts of the then political economy of socialism, which in the 1960s represented a relatively open system. Growth theories and intersectoral analysis were included in the so-called theory of socialist reproduction, which was part of the political economy of socialism. That had its logic. Although growth theories and ultimately input-output analysis were part of the economic theory taught at Western universities, they could not become part of the political economy of capitalism, which was a closed system formed by Marx Capital and his predominantly Soviet interpretations.

3 Benedikt Korda

¹⁴ In the years 1965-1991, 27 volumes were published.

¹⁵ Hájek, M., Toms, M. 1965. Dva modely růstu (Two models of growth). Prague: Institute of Economics, Czechoslovak Academy of Sciences.

Of the Czech statisticians and econometricists, Benedikt Korda lived the longest and most adventurous life. He was born as Benő Kornreich on 31 May 1914 in Mukachevo (then Hungary) in the family of a Jewish construction businessman. He graduated from a grammar school here (already during Czechoslovakia) and continued his studies in Prague – first at the University of Special Sciences and then at the Faculty of Science, Charles University in Prague (mathematics and physics). He applied for the last part of the second state exam on December 1939, in the meantime the German occupiers closed the Czech universities. He was baptized, took the name Benedict, and married his evangelical girlfriend. From the racial persecution, he escaped to Hungary, which again included the former Subcarpathian Ruthenia. There he was called into the army labour division and deployed to dig trenches in present-day Romania. In 1944 he managed to go over to the Soviet side of the front. He worked there as an interpreter for the staff of the Soviet army (he spoke a number of Central European languages and Russian). After his release from the Red Army, he found out that most of his relatives had died in the Holocaust in 1944.

After the war, Benedikt Kornreich joined the Communist Party, chose the new surname Korda and worked as a statistician, then in a senior position at the Ministry of Fuels and Energy. He completed his studies in natural sciences and then studied statistical and insurance engineering at the University of Special Sciences (1949–1951). As it was prepared the establishing of the Prague School of Economics and the Department of Statistics, he probably decided not to wait for Zionist pests, responsible for economic difficulties, to be sought in the ministry according to Stalinist customs, and preferred to pursue a career as a university teacher in 1952. At the Prague School of Economics, he dealt mainly with economic statistics, as evidenced by the number of his publications from the period 1952–1959. In addition to a number of teaching texts and articles in journals, it was a monograph in the edition of the Czechoslovak Academy of Science *Ekonomické indexy (Economic indices)* (1954), which aroused the discussion of statisticians, as well as the brochure *Měření produktivity práce (Measuring Labor Productivity)* (1957). The popularizing publication *Statistika pro každého (Statistics for Everyone)* (1960, 1963) was published in two editions¹⁶. In 1955, B. Korda was the first to become a habilitator at the Faculty of Statistics and was appointed head of the Department of Statistics and Dean of the Faculty.

In 1959, Benedikt Korda moved to the newly established Department of Scientific Programming and became its head. In 1961 he was appointed professor. In 1965 he defended

¹⁶ A co-author was Václav Čermák.

his doctoral dissertation on the topic: *K problematice rozmístění výroby (On the issue of production distribution)* and obtained the title of DrSc. The dissertation is one of the first works on this topic in the Czech scientific literature. In the first part of the work, individual tasks for the spatial distribution of production are formulated. Mathematically, these are specific tasks of linear programming. However, the use of the simplex method is somewhat inefficient given the scale of the tasks. For this reason, a number of specific procedures are used. Most of the methods mentioned by the author are original. B. Korda's doctoral thesis is a proof of the level of mathematical-economic thinking of its time and the fact that Czech economic thinking in the field of mathematical methods in economics did not lag behind the world level.

In August 1968, prof. Korda on his personal experience from the war and the 1950s, decided to go into exile. He went with his wife and daughter to Canada, where he taught economic statistics at the University of Alberta in Edmonton. In May 1990, prof. Korda received both of his former departments, to which he later sent a consignment of specialized literature from his library. Towards the end of his life, he wrote down his memoirs, which, however, did not receive publication. He died after many years of severe illness on 16 December 2010 at the age of 96 in a Jewish nursing home in Edmonton¹⁷.

Conclusion

After 1968, a problematic period arose not only for the Department of Econometrics, but for the entire scientific activity in the field of mathematical economics. It was fortunate that a number of outstanding personalities were active in this area, who managed not only to maintain the current level of research, but also to ensure the further development of these disciplines.

Prof. Jaromír Walter was appointed as the head of the Department of Econometrics from September 1968. He also served as Vice-Rector for Scientific Activities. (He resigned on this position on 8 January 1970.) Department under the leadership of prof. Walter survived the following period of inspections and the beginnings of rigid normalization.

References

CTU Prague. (1947). *Program na školní rok 1947-48*. Prague 1947.

CTU Prague archive, fond Personal files of CTU professors and associate professors.

¹⁷Mañas (2004).

Kodera, J., Závodský, P. & Šimpach, O. (2015). Jan Stocký, Southern Bohemia and Mathematical Methods in Economics. In: *Applications of Mathematics and Statistics in Economics – AMSE 2015*. Prague: University of Economics, Prague, pp. 1–11.

Kollar, R. (1936). *O úkolech hospodářské statistiky*. Prague: Nákladem České společnosti národohospodářské.

Mañas, M. (2004). Životní jubileum Benedikta Kordy. *Statistika*, vol. 41, no. 5, pp. 456–459.

Šimpach, O. & Závodský, P. (2019). The State Statistical Office and the First Czech Textbooks on Statistical Methods. In: *The 13th International Days of Statistics and Economics 2019*. Slaný: Melandrium, pp. 1499–1507.

Stocký, J. (1927). *Role matematiky v badání národohospodářském: Úvod do početních stránek národního hospodářství*. Prague: Jan Stocký.

Závodský, P. & Šimpach, O. (2016). The Development of Provincial Statistical Office in Bohemia in Historical Context. In: *The 10th International Days of Statistics and Economics 2016*. Slaný: Melandrium, pp. 2096–2106.

Závodský, P. & Šimpach, O. (2017). The development of statistics in the first decade of Czechoslovak Republic. In: *The 11th International Days of Statistics and Economics 2017*. Slaný: Melandrium, pp. 1903–1913.

Závodský, P. & Šimpach, O. (2018). The Origins of Municipal Statistics in Bohemian Lands. In: *The 12th International Days of Statistics and Economics 2018*. Slaný: Melandrium, pp. 2024–2053.

Závodský, P. (2017). Fakulta statistiky a její historické kořeny. *Dějiny VŠE v Praze II. VŠE v Praze na přelomu 50. a 60. let v kontextu dějin vysokoškolské výuky ekonomických oborů ve střední Evropě*. vol. 1. Prague: Oeconomica, 640 p. ISBN 978-80-245-2192-3.

Contact

Ondřej Šimpach ^{a)}, Jan Kodera ^{b)} and Prokop Závodský ^{c)}

Prague University of Economics and Business

W. Churchill sq. 4, 130 67 Prague 3, Czech Republic

^{a)} ondrej.simpach@vse.cz, ^{b)} jan.kodera@vse.cz, ^{c)} prokop.zavodsky@vse.cz