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978-0-521-63323-9 - Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium
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PART ONE

RAGNAR FRISCH AND HIS CONTRIBUTIONS TO ECONOMICS

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CHAPTER 1

Ragnar Frisch at the University of Oslo

Jens C. Andvig and Tore Thonstad

1 A Difficult Decision?

During the spring and summer of 1931 Ragnar Frisch had to make one of the most difficult decisions of his life: Should he accept an offer from Yale University to become a full professor at that prestigious and internationally important university, or should he become a professor in economics at his old school, the provincial University of Oslo? He chose the University of Oslo. In this essay we shall indicate some reasons for that decision and record some of his more important activities influenced by or influencing that institution. In particular, some of the consequences of his choice for the subsequent teaching of economics and economic research in Norway will be described. The history of economics in Norway and Frisch's own research probably would have taken different directions had he remained at Yale.

In the spring of 1931, Dean Furniss at Yale sent Frisch a letter offering him a full professorship in economics, including a fairly large yearly grant that he might use for traveling and other research expenses.[1] Frisch was granted the summer before making his final decision. His answer was delayed until October:

> Shortly after I had returned to Oslo, in June this year, representatives of the Rockefeller Foundation came to Oslo to discuss with the University authorities and professor Wedervang and myself a plan for organizing an economic research institute at the University of Oslo. This plan had been outlined by Wedervang and myself already before I left the States in 1930, and it had been submitted to the Rockefeller Foundation by the Norwegian representative of the foundation, Professor Stang. This conversation, the subsequent correspondence and the attitude taken by Norwegian circles, both inside and outside the University, have given us the impression that there is a very real possibility for

[1] Letter from Furniss to Frisch, April 25, 1931; Frisch archives at the "Frisch Room," Department of Economics, University of Oslo, hereafter cited as "Frisch archives." There are also some Frisch archives in the main library at the University of Oslo.

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> organizing the institute. Needless to say such an institute would be of vital importance for Norwegian economic science and would offer great opportunities for quite a number of young economists. To some extent the chances for obtaining Rockefeller support for this depends, as I gathered from our conversation with the Rockefeller representatives, on my staying in Oslo.
>
> On the other hand I have recently been brought in contact with the head of the Norwegian government in preliminary pourparlers regarding means and organs of creating unity in the work for better economic conditions in Norway.
>
> This being the situation, I would feel it more or less as an act of disloyalty if I should at the present moment accept a permanent professorship at Yale.

2 The Student Years

Ragnar Frisch was born March 3, 1895. He completed his "examen artium" in 1913; it was also the entrance examination to the only university in Norway. He passed with excellent results.[2] However, he did not begin to study at the University of Oslo before 1917, or possibly 1916. His grandfather and father were both goldsmiths, and Frisch planned to follow them in the family firm (Frisch, 1970, p. 205):

> When I was planning my future it was more or less taken for granted that I should follow the gold and silver tradition. For that purpose I started as an apprentice in the workshop of the famous Oslo firm David Andersen, and at the end of the apprenticeship in 1920 I completed my handicraftsman's probation work as a goldsmith.
>
> After the beginning of my apprenticeship my mother got a strong feeling that the trade would not be satisfactory for me in the long run. She insisted that at the same time as I completed my apprenticeship I should take up a university study. We perused the catalogue of the Oslo University and found that economics was the *shortest* and *easiest* study. So therefore, economics it became. That is the way it happened.

However, even before entering the university, Frisch taught mathematics for the Student Union's socially oriented educational program. After entering the university as full-time student, while at the same time working as an apprentice, he still participated in student activities. Inter alia he was active in establishing an information office to inform foreign students about study conditions in Norway and Norwegian students about conditions abroad.[3] That information office evidently was part of an international movement that arose after World War I for strengthening intellectual links across borders. In 1919, Frisch was sent by the university to Copenhagen to study the organization of the Danish

[2] *Universitetets Matrikul 1913*.
[3] Frisch archives.

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student-information office. He wrote a report and at once established a Norwegian office, which he managed until 1921.[4]

In the autumn of 1917 he passed the introductory examinations in Latin and philosophy, once more with outstanding marks. In the spring term 1919 he passed the final examination in economics. He was only the second student to pass that examination with "distinction" since the course was introduced in 1905.

At that time, the main task of the university was generally considered to be education of government officials and professionals: priests, medical doctors, lawyers, college teachers, and so on. Medicine and law were the large disciplines, registering about 500 students each in 1919. At that time there were 149 students in economics, a surprisingly large number compared with the 129 students of science. We should note that economics was an exceptionally short study in Oslo at the time, only 2 years of study, as compared with the normal 5–6 years or so for the other disciplines, where the students received an *embetseksamen* (literally, "the official's exam") as preparation for government positions.

As was the case in many universities in continental Europe, economics was organized as a part of the Faculty of Law.

Oscar Jaeger (1863–1933) was the most influential teacher in economics at that time. His doctoral thesis had been a study of Adam Smith, but he apparently had been strongly influenced by the Austrian version of neoclassical economics. Thorvald Aarum (1867–1926) had been educated as a lawyer, had written a doctoral thesis about wages, and seems to have been strongly influenced by Marshall. They were the only two professors in economics at the university in Frisch's student days. Neither was known outside of Scandinavia. The most intellectually demanding lecture series in economics in the years 1917–19 probably was a series conducted by Jaeger concerning interest on capital and rent on land.[5]

The regular curriculum consisted of five parts: theoretical economics, applied economics, public finance, descriptive statistics, and actuarial science. Actuarial science encompassed theoretical statistics and the mathematical theory of probability. The regular teacher was Alf Guldberg (1866–1936), who was an internationally active and competent mathematician. He was a specialist in difference equations. Guldberg evidently had a lasting effect on Frisch, for Frisch presented some of his ideas at the Econometric Society's meeting in Lausanne in 1931.[6] The economics examination was compulsory for the actuarial students. For

[4] Frisch archives.

[5] See *Det kgl. Frederiks Universitets Årsberetning* (*University of Oslo, Annual Report*) for the relevant years. Note that the report followed the academic year, which lasted from July 1 to June 30. Hereafter we shall call it *University of Oslo, Annual Report*. In that annual report, all the lectures had to be reported, with estimates of the average attendance.

[6] Frisch archives.

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an economics student, the examination questions in actuarial science must have appeared quite difficult. It is conceivable that the study of actuarial science and statistics in Oslo was sufficiently inspiring to have turned Frisch's mind toward the mathematical aspects of economics.

His examination reports have survived. They are quite impressive, particularly the one on public finance, which inter alia contains a sharp criticism of Schønheyder's ideas about progressive taxation.[7] After Frisch had mentioned the need to measure the marginal utility of income in order to determine the rate of progressivity of the income tax, toward the end of that report he formulated his own overriding future research policy: "Man must not be afraid of what seems impossible to do. History has shown that the human beings possess a wonderful gift of being able to obey the saying of Aristotle: 'Measure the nonmeasurable'" (our translation). Somehow, during his 2-year study of economics at the University of Oslo, the young man who had entered that study through a random process had found a definite goal for his future career as an economic scientist, a goal he seemed to pursue from the day he finished his examinations in economics until the end of his life.

3 Advanced Studies Abroad

Frisch completed the apprenticeship as a goldsmith in 1920. In 1921 he began systematically to qualify himself for research. He followed in the footsteps of the many distinguished Norwegian mathematicians who during the preceding century had visited Paris in order to study and present their results. Frisch remained in Paris from the spring of 1921 until the spring of 1923. He then visited London and stayed there for most of the autumn, finally making brief visits to Germany and Italy. In the meantime he had received the so-called Manthey scholarship. Frisch made a report to the university.[8] He had studied the theory of functions and some mathematical statistics, and he conducted a rather extensive bibliographic study. Mathematical studies dominated, but he had at least begun two projects that would occupy his later research in economics: measurement of the marginal utility of income, and time-series analysis. By the end of that period he had become a competent mathematician and mathematical statistician, and he was soon to publish several articles in those fields.

What was remarkable about his career to that point was not those mathematical contributions, but rather the fact that he, despite his mathematical gifts and the intellectually inspiring environment of mathematicians to which he had been exposed both in Paris and in Oslo, still

[7] Schønheyder probably was theoretically the most ambitious Norwegian economist before Frisch. However, he was inadequately trained.

[8] Report from Frisch to the university, Frisch archives.

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considered himself to be an economist and that he remained loyal to the fairly provincial group of economists in Oslo. Only 3 of his first 18 published works were in economics, however, and only one made a substantial contribution.

In the spring of 1924 Frisch was back in Oslo. In addition to research, he did some private tutoring. Some of Frisch's written preparations for that work have survived. They show how he used his teaching to educate himself more broadly in various fields ranging from mathematical statistics to economic history.[9]

4 Academic Positions at the University of Oslo

In 1925 Frisch became *universitetsstipendiat*[10] at the University of Oslo, thus joining the regular academic track at the university. In the autumn he lectured on graphical and analytical methods in economics.[11] In the spring of 1926 he organized classes in probability theory and mathematics. In the autumn he was exempted from regular lectures, but nevertheless held his first series of lectures in economics that were to become influential, namely, those in the mathematical theory of production.

In the autumn of 1925 Frisch actively participated in the Sixth Nordic Congress of Mathematicians, presenting two papers.[12] He was by then internationally recognized among European statisticians. Although he had not yet published internationally in economics, his interest in economics was already well known among the few mathematical economists in Europe.[13] In 1927 and the first part of 1928 Frisch toured the United States with a Rockefeller scholarship and became well known among American statisticians and mathematically inclined economists as well. Still the major bulk of his work was in mathematical statistics, but the focus had shifted from the study of mathematical distributions to time-series analysis.

In the meantime, Frisch received his doctoral degree from the Faculty of Science at the University of Oslo, October 16, 1926, published by the

[9] Frisch archives.

[10] Literally, "university scholarship," a scholarship that was granted by the university. In practice, it was not much different from an assistant professorship at an American university today. It was a temporary but very free position, with permission for travel and exemption from teaching duties being freely given.

[11] *University of Oslo, Annual Report 1925–26*. Students were not greatly interested in the lectures; only eight attended regularly, whereas 40–60 attended W. Keilhau's popular lectures.

[12] Frisch archives.

[13] Somewhat later, in July 1926, Slutsky wrote to Frisch that he had been told that in Italy, "pure economics is not studied eagerly any longer. It makes me happy to discover in your person an exponent of this science, since I am convinced that pure economics has a great future in store." Frisch archives (our translation from German).

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Norwegian Academy of Sciences. The subject was mathematical statistics, and the title of his thesis was *Sur les semi-invariants et moments employés dans l'étude des distributions statistiques* (Frisch, 1926a). His formal qualification period had ended.

On March 16, 1928, Frisch was appointed *docent*[14] in economics and statistics at the University of Oslo. However, among his scientific contributions until then, as we have mentioned, the mathematical and statistical ones dominated. Except for the article about utility theory (Frisch, 1926b), an attempt to make one of Schønheyder's business-cycle theories precise (Frisch, 1927), and a methodological paper (Frisch, 1926c), Frisch had not published anything in economics. Nevertheless, the committee was not in doubt. Jaeger, who knew Frisch, wrote as follows:

> All Dr. Frisch's works indicate that however brilliant he masters his mathematics, it is for him only an instrument for solving the most difficult theoretical problems in economics. It is the questions of economics and statistics that have caught his scientific attention, and he possesses a thorough knowledge of both these sciences, where his knowledge of the literature is also very extensive.
>
> His output compared to his age bears witness to a passionate interest in science combined with an extraordinary working capacity.[15]

Frisch then, for the first time, remained for three semesters in a row at the university, giving lectures each semester. His lectures in basic economic theory were mimeographed (Frisch, 1929/30). Again the theory of production was central, but he also lectured extensively on the principles of stock-flow analysis. In addition, he shared with Schønheyder a series about business-cycle theory and statistics in the spring of 1929. During those three semesters he had some impact: Complaints were voiced that economics was becoming increasingly difficult.[16]

[14] *Docent* was a tenured position somewhat like an associate professorship. Frisch was competing with Kristian Schønheyder and Thomas Sinding. The evaluation committee was appointed by the Faculty of Law and consisted of O. Jaeger and I. Wedervang (who both taught economics at the university) and L. Birck (who was the only outsider, a professor in economics at the University of Copenhagen). The evaluation report probably was written mainly by Jaeger. The job description was changed from a position in "statistics" to "statistics and economics."

[15] *University of Oslo, Annual Report, 1927–28*, pp. 16–17 (our translation). Although Jaeger's evaluation proved to be true, it was not easy to reach that conclusion on the basis of Frisch's published works. Jaeger had read many of Frisch's unpublished works, however, including his examination reports, and knew about and believed in his aspirations.

[16] Ten years later, in a very polemic speech directed against the development that Frisch and Wedervang had headed, Sinding said that "after 1928 followed a gradual reshaping and extension of the '*statsøkonomisk*' exam. But this extension represents a dark chapter in the history of the University. From 1928 on, one breaks, without further ado, the law and the resolution addressed to the Faculty of Law, that regulate the size of the economics curriculum" (Sinding, 1939, p. 12, our translation). Sinding was then an associate professor with the special responsibility of teaching economics to law students.

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Frisch again went abroad for the spring semester of 1930, serving as a visiting professor for one year at Yale University. He then taught at the University of Minnesota in the spring 1931. At Yale he experienced a burst of productive activity. In addition to all his research activities, he held at least four series of lectures: on the theory of production, methods of utility measurement, economic dynamics, and statistical verification. They were all typewritten and distributed, an output of more than 450 typewritten pages. In addition, he wrote articles and directed a research workshop on time-series analysis, where his own methods were applied to different kinds of data, including astronomic data.

While Frisch was abroad, Professor Jaeger and Professor Wedervang had begun an intensive campaign to establish a personal professorship for him in Oslo, a great honor.[17] Jaeger convinced Saeland, the *rektor* (president) of the university, to contact the prime minister to petition the government to establish a personal professorship for Frisch.[18] Jaeger and Wedervang succeeded. On June 5, 1931, Frisch was appointed professor at the University of Oslo, beginning July 1, 1931. He was elected a member of the Norwegian Academy of Sciences the same year.

Furthermore, early in 1932, the Institute of Economics at the University of Oslo was established, with Frisch and Wedervang serving as directors until 1941.

5 Organizational Aspects of Frisch's Research in the 1930s

Compared with an ordinary department, the Institute of Economics was a pure research entity, financed outside the university budget. Its main sponsor was the Rockefeller Foundation, which at a board meeting on December 15, 1931, granted $50,000 for the period 1932–37 (i.e., $10,000 per year, $5,000 being granted unconditionally, and $5,000 being granted on the condition that a similar amount be obtained from Norwegian sources).[19] At the time of the grant, the exchange rate was about 4 kroner

[17] In Norway, the procedure for appointing a professor used to be quite formal. In principle, there should be an open, public competition. Exemption would be granted only when a person was acknowledged to possess outstanding academic qualifications. Hence it was an extraordinary honor for Frisch to be appointed to a personal chair in economics and statistics.

[18] Letter from Jaeger to Frisch, December 19, 1930, Frisch archives. While not being a front-rank economist, Jaeger's openness of mind was exemplary. In the same letters in which he reported his efforts to have Frisch made a professor, he fiercely contested Frisch's criticism of the German economist Engländer. That criticism of Frisch was implicitly a criticism of Jaeger himself for lacking logical rigor. Furthermore, when Frisch was away, Jaeger actually lectured on Frisch's new theory of production for a whole semester.

[19] *University of Oslo, Annual Report, 1931–32*. Both Frisch and Wedervang had established good relations with central representatives of the Rockefeller Foundation, mainly because the foundation wanted to support modern, quantitatively oriented social sciences. A brief description of the major shifts in the research policies of the Rockefeller Foundation with respect to economics in the years between the wars has been presented

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Norwegion (4 NKr) to $1 (U.S.) so when a Norwegian research foundation, Norsk Varekrigsforsikrings Fond, granted 10,000 NKr, and its board assisted in getting a further 10,000 NKr from various private sources, the institute at the beginning was financed wholly from sources outside the university. That funding made it possible for Frisch to organize his empirical research as he desired. It required lots of calculations, and therefore, given the technology of the time, the process consumed much manpower.

The activity at the institute was often intense, but not yet on any large scale, as compared with other leading statistical laboratories at the time.[20] Partly through the efforts of the Rockefeller Foundation, the institute entertained a considerable number of foreign visitors, and some of them, such as T. C. Koopmans, stayed for fairly long periods. After 1937, activity increased further when the institute received new, additional funding from the Norsk Varekrigsforsikrings Fond and a few more economists had been trained and could be hired on a more permanent basis.

On October 15, 1936, the politically active industrialist Johan Throne Holst gave an important speech before The Norwegian Federation of Industries (Norges Industriforbund).[21] Holst repeated his proposal at a board meeting of the Norsk Varekrigsforsikrings Fond that "the board considers it to be of the utmost importance to acquire a survey of our production possibilities and their inner relationships" (our translation). The outcome of Holst's initiatives was that the Institute of Economics was asked to make such an overview and to initiate the first large-scale social-science research project in Norway, a project that was to become the starting point for the Norwegian national accounting system.

The institute received funds in 1936 for the purpose of developing a plan for the project, called "A Structural Survey of the Norwegian Economy" (Frisch, Keilhau, and Wedervang, 1936). The project started in earnest in 1937, when the private financing was matched by government funds. The total cost of the project was planned to be 200,000 NKr, a huge project for its time. The project was divided into four separate parts, where three were to investigate different industries and one was to be a coordination unit, headed by Frisch.[22] By March 4, 1938, 12

by Craver (1986), and for the social sciences in general, see Bulmer and Bulmer (1981). The policies of the Rockefeller Foundation were very important for the development of the social sciences in both Europe and the United States during the interwar years. We note that this foundation also showed up at the crossroads of Frisch's academic career.

[20] This is the impression gained from Koopmans's letter to Jan Tinbergen, August 21, 1935. Koopmans stayed in Oslo during the autumn semester, 1935. Albert Jolink, Erasmus Universiteit, Rotterdam, has kindly given us information on Koopmans's stay in Oslo.

[21] *Økonomisk orientering og videnskapelig forskning*, Norges Industriforbund, Oslo, 1936.

[22] The heads of the different departments were then Frisch, Keilhau, Wedervang, and Skaug. The project had a separate advisory board, appointed by Norsk Varekrigsforsikrings Fond, consisting mainly of leaders from various industries and a representative from the trade unions (Andvig, 1977, pp. 11–12).

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economists were engaged in the project, in addition to the calculating staff.[23] This project bears witness to the entrepreneurial powers of both Wedervang and Frisch, although Throne Holst's contribution was also essential.

A later initiative by Throne Holst that eventually led to the creation of a separate Faculty of the Social Sciences, of which the Institute of Economics was to be a part, came to nothing at the time, largely because of the imminent threat of war.[24]

The Institute of Economics continued to receive support from the Rockefeller Foundation until the autumn of 1940, when Frisch and Wedervang had to ask the University of Oslo for money so that they would not have to discontinue work immediately.

6 Frisch's Teaching and the Study of Economics in Oslo in the 1930s

The first period when Frisch taught more or less continuously for a long period without any significant breaks was during the 1930s:

> When he started his work as professor at the University of Oslo . . . it was as if the study of economics was shaken in its very foundations, at least when seen from the student's point of view. . . . In 1931 he thus began to lecture the partly bewildered students that if one would like to make any progress with economic analyses, one would first have to make the assumptions explicit, write down the model used for the reasoning, and stick to the assumptions throughout. [Haavelmo, 1974, pp. 2–3; our translation]

Frisch's lectures can be divided into at least two types. In one type he reported from his own research. Sometimes that produced excellent results. As an example, his lectures in macrodynamics, held in the autumn of 1933, were considered excellent and on the whole were accessible at

[23] "The Institute was to become a busy working place. As part of his work for the quantification of the economic relationships, Frisch needed to accomplish extensive numerical calculations. The calculation capacity was quite different from what the situation is today. At that time a large number of calculation assistants were sitting and turning the hand-driven calculator machines. Frisch even constructed a kind of weighing machine that could perform 180 multiplications simultaneously, a project worth a chapter on its own." (Haavelmo, 1974, p. 3; our translation).

[24] On November 1, 1938, Throne Holst (and other industrialists) asked the University of Oslo to appoint a committee to elucidate the future development of the social sciences in Norway. The university appointed a committee consisting of professors at the university and a secretary, Arvid Brodersen, on November 12, 1938 (*Universitetets Journal*, Universitetet i Oslos Arkiver, Journal nr. 2315–2629, Riksarkivet, Oslo). While Frisch was not formally a member of the committee, he became a consultant. According to Brodersen (interview with J. Andvig, February 1995), Frisch had a strong impact on the deliberations. The committee's report was delivered March 7, 1940, a month before the German occupation of Norway.

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