

GERGELY KŐHEGYI

An Attempt to Ground Central Planning on a Scientific Basis

János Kornai and the Mathematical Theory of Planning*

Introduction: The Institutional Background

Before the Second World War, two main traditions dominated the analysis of economic problems in Hungary: the German Historical School and the Austrian School of Marginalism. While top-down government intervention and even *dirigisme* was an inherent part of economic theory in the former, these were largely rejected in the latter. Regarding the role of mathematical reasoning, both refused it as a misleading methodology, and normally excluded formal models from economic analysis. The only area where quantitative reasoning found acceptance was the systematization of empirical data and rudimentary economic dynamics. In these fields, the works of Kálmán Kádas and Ede Theiss were the most significant.

After the communist turn, economic analysis and planning was built on four main institutional pillars, i.e., four principal organizations: (1) the Karl Marx University of Economics (Marx Károly Közgazdaságtudományi Egyetem), (2) the National Planning Bureau (Országos Tervhivatal), (3) the Central Statistical Office (Központi Statisztikai Hivatal), and (4), the Institute of Economics of the Hungarian Academy of Sciences (MTA Közgazdaságtudományi Intézete).

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Despite internal debates on the role of mathematics, Béla Krekó, professor of mathematics at the Karl Marx University, received permission to select the best 15–20 students in mathematics and invite them to a new specialization called the “Mathematics of Planning” (*tervmatematika*). Mathematics of Planning soon became a prestigious program, gathering young generations of economists for whom mathematical models offered a natural approach to the analysis of economic phenomena. However, the curriculum had nothing to do with Political Economic Theory, and the department was also institutionally separated from the responsible departments dealing with theoretical economics.

From 1966 onward, the Karl Marx University’s Mathematics of Planning program provided good-quality human resources for the National Planning Bureau; the same applied to their collaboration with the Institute of Economics of the Hungarian Academy of Sciences.

The main institution responsible for the conceptualization and practice of planning was the National Planning Bureau, founded in 1947. The main task of the office was coordination among the various ministries before entering into plan negotiations with firms in the respective sectors of the economy. In this hugely influential organization, the practice of planning was dominated by a “traditional” political-economic approach without any mathematical modelling. This dominant approach characterized the role of this institution in Hungarian economic policy from the beginning to the end of the communist period, although innovative attempts had been made to integrate scientific tools into the practice of planning.

In 1964, Miklós Ajtai, then the president of the Bureau, claimed that they would need, on the one hand, a solid scientific background of their own and, on the other, a high-performance computer. Four years after the Institute of Planned Economy (Tervgazdasági Intézet) and the Computational Center (Számítástechnikai Központ) were founded, both were attached to the Bureau. In 1971, this Center possessed the highest-performance computer in Hungary (the ICL-4/70). The first

staff of about 40 operators were trained in London. Besides infrastructure, the researchers were also of high professional quality; the staff included such emblematic figures as Mária Augusztinovics, and partly also András Bródy and János Kornai.

In spite of all these innovations, mathematical models played a major role only in long-term planning in the practice of the Bureau. An open-minded approach to long-run perspectives remained exceptional during the communist period as a whole, and the everyday operation of the Bureau was based on traditional material balances.

Statistical work at the state level and the education of mathematicians and statisticians in Hungary had a long tradition. The disciplinary university programs and the spirit of the German Historical School reinforced this tradition, and the Central Statistical Office, established in 1867, provided a strong institutional background for it.

After the Second World War, the office was reorganized by György Péter, who filled the position of the president of the Office from 1948 to 1968. He thought that one of the main roles of his institution was to support the work of Central Planning Bureau. He knew the theory of input-output analysis and thus understood the needs of the Planning Bureau exactly.

Péter not only prepared and managed the censuses of 1949 and 1960, but also developed an entire observation system to measure the performance of state-owned firms. In collaboration with the Central Planning Bureau, the Statistical Office made a proper decomposition of the productive sectors to create the Social Accounting Matrix (SAM) of Hungary. This systematically elaborated matrix served as the verification of input-output calculations of the Planning Bureau. Following Soviet methodology, Péter coordinated the first calculation of the national income of Hungary as well.

His modern approach and deep knowledge of international methodological trends largely contributed to the evidence-based analysis of the Hungarian economy. Péter also encouraged the employees of the Office to make scientific research and take

part in international conferences. He also frequently attended economic debates of the period under scrutiny, criticizing over-industrialization, and emphasizing the role of profit incentives and market forces in general. He became one of the first reform economists in Hungary, although he and the chief economist of the Office, Júlia Zala, seldom joined any political interest group.

In 1953, at the beginning of Imre Nagy's New Course, the Party complained about the lack of professional economic knowledge to support central planning. As a consequence, the Institute of Economics of the Hungarian Academy of Sciences was established in 1954. It published the journal *Economic Review* (*Közgazdasági Szemle*), the main scientific monthly of the discipline in Hungary. The first director of the Institute was István Friss, who was delegated by the conservative faction of the Central Committee. However, most of the researchers sympathized with Nagy's reform program, and many of them used mathematical research techniques from the very beginning. András Bródy and János Kornai organized special departments for conducting such research projects, attracting many talented young economists.

The collaboration among these institutions was not the same in all directions. The mathematical economists and mathematicians of the Central Statistical Office, the Computational Center, and the Institute cooperated with no friction. Cooperation was based on personal relationships without special control. However, the University protected itself from these new intellectual waves. The students of the Mathematics of Planning program became acquainted with certain tools, but these were not related to economic theory. The deputy director of the Institute, Tamás Nagy, who was proud to ignore mathematical economics, taught political economy courses at the University. György Péter taught statistics without any (dangerous) theoretical references. Neither Kornai, nor Bródy, nor Augusztinovics, nor their pupils were permitted to teach at the University.

Aside from the above-mentioned scholars, there were many other researchers in the field, such as Rudolf Andorka, Ferenc Jánossy, György Kondor, Gábor Kőrösi, Béla Martos, András Nagy, György Szakolczai, Márton Tardos, and Margit Zierman, who worked in the same institutions or smaller research units (e.g., the Institute of Market Research, Konjunktúra- és Piackutató Intézet) affiliated with various ministries.

Among the scholars and experts at the four institutions, one of the most influential persons was János Kornai. He affected the research interests, methodology, and even the worldview of many researchers, including those in mathematical economics.

Kornai did not believe (and was not even interested) in the labour theory of value, but acknowledged the efficiency of planning. Although he was not a mathematical economist, in a certain period he also chose the neutral language of mathematics to develop the theory and practice of planning. Since mathematics was also the language of mainstream economics, he contributed to the dialogue between the East and the West.

János Kornai: An Easterner in the West and a Westerner in the East

János Kornhauser¹ was born in Budapest in 1928 as the son of a lawyer. His father worked at the German Embassy and dealt with the legal issues of German companies in Hungary. This profession provided an outstanding level of well-being for the whole family, to János and his two brothers and sister. They lived in a luxury apartment in the downtown of Budapest, and had a German nurse. The father was Jewish, thus, after Hitler's accession to power, he gradually lost most of his business contacts but maintained the family's living standard until his deportation.

János entered the German Imperial Gymnasium (*Német Birodalmi Gimnázium*) in Budapest in 1933, where he studied

¹ He changed his surname to Kornai in 1945.

every subject (including mathematics and physics) on a very high level in German language. Members of the Budapest intelligentsia sent their children there; this is how Kornai came to know one of his best friends, Péter Kende, who became a political scientist in Paris after the 1956 revolution. In 1941, Kornai had to switch to an ordinary public high school, where surprisingly the segregation of Jewish pupils was much stronger than in the German institution. After the occupation of Hungary by the German army in 1944, his father was transported to Auschwitz. János escaped from forced labour service and hid in a Jesuit Monastery until the Soviet army reached Budapest.

After his graduation in 1945, he entered the Hungarian Federation of Democratic Youth (Magyar Demokratikus Ifjúsági Szövetség, MADISZ) directed by the Hungarian Communist Party. Kornai started studying the works of Stalin and Lenin and later the German original of Marx's *Das Kapital* with his friend Péter Kende. Kornai was impressed by these books and also by charismatic communists like József Révai, editor-in-chief of the most important party daily newspaper, *Szabad Nép*, and his later boss. Kornai had worked as an employee of MADISZ until 1947 when he was invited to be a journalist at *Szabad Nép*. In two years, he was appointed head of its economic section although he did not have a university degree.² Many of his articles were commissioned by the head of the Economic Committee of the party, István Friss, who became Kornai's superior at the Institute of Economics in 1955. (Prior to that, Kornai, a follower of Imre Nagy, was fired from *Szabad Nép*.)

The dominant research methodology of the Institute could be labelled as naïve empiricism,³ and Kornai adhered to this approach by using empirical data for a simple but impartial description of economic phenomena. Before the 1956 revolution, Kornai was mostly influenced by György Péter, who brought

² He entered the Faculty of Arts at the Eötvös University of Budapest, but never finished his studies.

³ György Péteri, "New Course Economics: The Field of Economic Research in Hungary after Stalin, 1953–6," *Contemporary European History* 3 (1997): 295–327.

him textbooks and journals from the West, and Péter Kende, with whom he had long conversations about the consistency of Marxian political economy.⁴ After the revolution, in a very disappointed state of mind, he set for himself a new goal to achieve: namely, joining Western economics.⁵ He started reading mainstream literature on his own. First, he read the introductory books of Paul Samuelson⁶ and Erich Schneider,⁷ both in German, and simultaneously learned to read English. Then, he studied Arrow (1951), Arrow-Karlin-Scarf (1958), Hicks (1946), Tinbergen (1957),⁸ and became acquainted with the “socialist calculation debate” by reading Hayek (1935), Lange (1936–37), Lerner (1944), and Bergson (1948),⁹ as well as the works of Eucken, Haberler, Pigou, Stackelberg, and Tinbergen.¹⁰ He explained his break-up with Marxism over its inconsistency and unscientific character.¹¹

Kornai’s first scientific publication was his dissertation on over-centralization.¹² The defence of the dissertation took place

⁴ János Kornai, *A gondolat erejével* [By Force of Thought] (Budapest: Osiris Kiadó, 2004), 88.

⁵ *Ibid.*, 144.

⁶ Paul A. Samuelson, *Economics: an introduction analysis* (New York: McGraw-Hill, 1948).

⁷ Eric Schneider, *Einführung in die Wirtschaftstheorie* [Introduction to Economics], (Tübingen: Mohr, 1949).

⁸ Kenneth J. Arrow, “Alternative approaches to the theory of choice in risk-taking situations,” *Econometrica: Journal of the Econometric Society* (1951): 404–437; Kenneth J. Arrow, S. Karlin, and Herbert E. Scarf, *Studies in the Mathematical Theory of Inventory and Production* (Stanford: Stanford University Press, 1958); John, R. Hicks, *Value and Capital* (Oxford, Clarendon Press, 1946); Jan Tinbergen, *Ökonometria* [Econometrics] (Budapest: Közgazdasági és Jogi Könyvkiadó, 1957).

⁹ Friedrich A. Hayek, ed., *Collectivist Economic Planning* (Clifton, N. J.: A. M. Kelly, 1935); Oskar Lange, “On the Economic Theory of Socialism: Parts One and Two,” *The Review of Economic Studies* 4 (1936): 53–71, and in *ibid.* 4 (1937): 123–142; Abba P. Lerner, *Economics of Control: Principles of Welfare Economics* (New York: Macmillan and Company Limited, 1947).

¹⁰ János Kornai, *A gondolat erejével*, 134.

¹¹ *Ibid.*, 94.

¹² János Kornai, *Overcentralization in Economic Administration: A Critical Analysis Based on Experience in Hungarian Light Industry* (Oxford, New York: Oxford University Press, 1994). This dissertation earned him the degree of Candidate of Science, an equivalent of PhD in the Soviet-type educational

one month before the outbreak of the 1956 Revolution, when Hungary still seemed to be on her way to a major economic reform. Many economists and politicians endorsed Kornai's work. However, it was published after the Soviet invasion and regarded as a "revisionist" attack against the communist system. Not only leading party officials but also some former supporters, including the director of the Institute of Economics, and one of the most influential political manipulators of the Rákosi regime, József Révai, reconsidered their formerly positive positions on his work. Kornai found himself in a difficult situation, aggravated by the fact that he did not "re-enter" the Hungarian Socialist Workers' Party after the revolution.

Following an investigation by a committee chaired by the rector of the Karl Marx University, László Házy, Kornai was fired from the Institute of Economics but, surprisingly, István Friss helped him continue his research at the Planning Office of Light Industry (Könnyűipari Tervező Iroda), and later at the Research Institute of Textile Industry (Textilipari Kutatóintézet). Light industry provided him with the first evidence and motivation to deal with incentives and optimization. In that period, Kornai sympathized with mainstream ideas, and together with Tamás Lipták started working on the mathematical modelling of planning theory. Later, as an employee of the Computational Center of the Hungarian Academy of Sciences, he also tried to apply their model of two-level planning to the practice of central planning.

At the same time, an émigré took the Hungarian manuscript of the book on over-centralization and its English-language abstract to England. Anthony Jasay, a Hungarian-born economist read and sent it to the central figure of neoclassical economics, John Hicks, who proposed the book to Oxford University Press for publication.¹³ While *Overcentralization* was

system. The original Hungarian version was published as a book in 1957: János Kornai, *A gazdasági vezetés túlzott központosítása. Kritikai elemzés könnyűipari tapasztalatok alapján* (Budapest: Közgazdasági és Jogi Kiadó, 1957).

¹³ János Kornai, *Overcentralization*.

not considered a scientific work by Western standards, it was celebrated as the first credible description of how the command economy works.

After the publication of the book, Kornai was invited to the London School of Economics (LSE) by head of the Economics Department, Ely Devons. However, his application for a passport was refused several times. The first occasion for him to travel abroad came in 1962, when he took part in conferences in the GDR, Poland, and Czechoslovakia. In 1963, Edmond Malinvaud, a main organizer of a conference of the International Economic Association, invited him to Cambridge. The topic was “Activity Analysis in Long Term Growth and Planning.” Kornai received the permission to participate, but the secret police followed him closely.¹⁴ At the conference, he met Tjalling C. Koopmans, Leonid Hurwicz, Robert Dorfman, Frank Hahn, Richard Stone, Maurice Allais, Nicolas Káldor, Joan Robinson, and many other authors of his previous readings. Moreover, Ely Devons invited him again to the LSE to give a course on planning theory and practice. He spent a couple of months in London in 1964, where he met Alfred Zauberman and attended lectures by William Phillips, Laurence Klein, and Robert Solow. Later, Arrow invited him to Stanford, Koopmans to the Cowles Commission, Albert Hirschman to Princeton, and he spent one month in Washington at the World Bank in 1973.

When Kornai was in Stanford and at the Cowles, he showed the draft of his *Anti-Equilibrium* to Arrow and Koopmans. In this book, he intended to give a comprehensive criticism of general equilibrium theory. Although Arrow and Koopmans, two protagonists of the theory, helped strengthen his arguments, this book¹⁵ caused a major break in Kornai’s scientific career. The most conspicuous episode of the backlash was Frank Hahn’s devastating review article, in which he criticized Kornai’s naïve methodological standpoint, stressing that the critic failed to make a distinction between the consistency of a theory and

¹⁴ János Kornai, *A gondolat erejével*, 175–180.

¹⁵ János Kornai, *Anti-Equilibrium* (Budapest: Közgazdasági és Jogi Könyvkiadó, 1971).

its applicability.¹⁶ Seeing the fiasco of *Anti-Equilibrium*, Kornai turned to a research program that shows resemblance with the old institutionalist school, and became a highly esteemed expert of the economics of socialism but not of economic theory as such.

In 1967, István Friss took him back at the Institute of Economics. There, Kornai organized a team following Western research standards and started working with mathematically well-trained younger economists. He was not allowed to hold official courses at the University of Economics until the collapse of communism, but gave informal seminars and lectures to university students, for example, at the László Rajk College for Advanced Studies. In contrast to the Robinson Crusoe-like research practice that characterized economic research in Hungary at the time, he instructed many younger scholars to read literature for him, to formulate his ideas in a mathematical form, or to analyse empirical evidence and see whether it proved his hypotheses.

These joint efforts resulted in a number of projects and publications in the field of forced growth,¹⁷ control with non-price signals or “vegetative control.”¹⁸ The *Economics of Shortage*, a book he considers his magnum opus, introduced the concept of the “soft budget constraint.”¹⁹ This concept, motivated by consumer’s theory in microeconomics, was intended to represent the situation where a socialist firm is bailed out by the centre when the revenues do not cover the costs. Kornai regarded this phenomenon as a basic building block of socialist economies. In 1984, he was appointed professor of Harvard University. Although he never cut his relations with Hungary,²⁰

¹⁶ Frank H. Hahn, “The Winter of our Discontent,” *Economica* 159 (1973): 322–330.

¹⁷ János Kornai, *Rush versus Harmonic Growth: Meditation on the Theory and on the Policies of Economic Growth* (Amsterdam, London: North-Holland, 1972).

¹⁸ Béla Martos and János Kornai, “Gazdasági rendszerek vegetatív működése [Autonomous Control of Economic Systems],” *Szigma* 4 (1971): 35–50.

¹⁹ János Kornai, *Economics of Shortage* (Amsterdam: North-Holland, 1980).

²⁰ From 1984 to 2002, he would spend half of the year in Cambridge, Massachusetts, and the other half in Budapest.

claiming that his research material lies on the Eastern side of the so-called Iron Curtain, he had the chance again to work with mathematicians and mainstream economists. The mathematical model of the soft budget constraint was developed first by Jørgen Weibull and later by Eric S. Maskin and Mathias Dewatripont at Harvard.

In 1988, Kornai began to work on a synthesis of his all former studies of the socialist economy. However, the *Socialist System* was published only after the 1989 revolutions.²¹ In 2002, Kornai returned to Hungary for good. Sometimes, he comments on changes in the Hungarian economy, gives advice in concrete questions but, similar to András Bródy, never takes part in policy making.

Scientific Communism: The Mathematical Theory of Planning

In his dissertation, which can be considered as the starting point for all his later works, in the field of both mathematical economics and the institutional analysis of socialism, Kornai provides a descriptive analysis of central planning based on mandatory planning targets. The book resulting from the dissertation (*Overcentralization*) is based on surveys and interviews with the managers of socialist firms. It summarizes the planning experiences of real production in light industry instead of providing an idealistic model of mandatory planning. Although there are no reform proposals or explicit criticisms in the dissertation, it contains some implicit value judgements on the overcentralized system. The book is intended to be a simple objective description of primary facts and hence it does not use Marxian terminology.

The focus is on the incentives of firms to fulfil a plan. Kornai points out that the most influential manual of production is the quarterly plan, which is determined by the branch ministries

²¹ János Kornai, *The Socialist System: The Political Economy of Communism* (Oxford: Oxford University Press, 1992).

and thus the firm's decisions are never independent of politics. The conditions of decisions are embedded in a huge ambiguity and uncertainty. Since the planned system of reward and punishment always motivates the firms to manipulate the "value of production," which is an exclusively quantity-based index, there are no incentives to increase the quality or to make innovations; just the other way round, a simple increase in material-intensive products in the plan is much more advantageous for the firm. Moreover, firms are never motivated to increase production over the planned quantities because of the "ratchet effect."

In doing research on planning in the light industry, Kornai kept dealing with the role of incentives, but turned to abstract modelling from descriptive analysis. At that time, increasing the share of profit in total revenue implied rewards for the managers and workers. This was a reformist attempt to ameliorate incentives. Kornai recognized that this program would have different outcomes as compared with that of simple profit maximization, which he thought to be the optimal solution. Allegedly, he tried to illustrate the difference by formulating two rudimentary linear programming models,²² but he was not sufficiently trained in mathematics to accomplish his task. Then, he started working with a mathematical genius, Tamás Lipták, who helped Kornai to formulate his research problems and to examine their mathematical properties. Moreover, Lipták gave him private courses in mathematics, which grounded his later research activities in the field of mathematical economics.

The formulation of incentive compatible optimization models led to very complicated nonlinear programming problems where the solution methods and even the analysis of solvability are not trivial. Although Lipták was arrested²³ in 1957, Kornai managed to publish their research results with the support of

²² János Kornai, *A gondolat erejével*, 147.

²³ He took part in printing an underground paper (*Hungaricus*) on the 1956 revolution and spent one year in prison, where he made an unsuccessful suicide attempt.

the Ministry of Light Industry (Könnyűipari Minisztérium).²⁴ When Lipták was released from prison, they wrote an English-language paper and, without asking their colleagues to check it, sent it by mail to *Econometrica*. The co-editor of the journal Edmond Malinvaud proposed the paper for publication in unchanged form.²⁵

The paper was written in the style of a Western journal article in mathematical economics, since Lipták was familiar with the formal requirements of mathematics journals in the West. The authors stressed that they focused on a very special problem that cannot be generalized to interpret the whole socialist system, not even the Hungarian economy.²⁶ They used both linear and nonlinear methods to clarify the differences between the “sum incentive” and “ratio incentive” settings with an additional analysis of price regulations and concluded that in the case of ratio incentives “firms never raise total output above normal capacity and often stay under it. On the other hand, it is worthwhile for the firms to produce whatever prices are.”²⁷ The sum incentive setting is much simpler in terms of programming properties because the problems can be solved by decomposition and simple ordering, while the ratio incentive setting needs much more complicated iterative methods of computation; and finally, the sum incentive setting is also easier to be implemented by the administration.

Parallel to theoretical research, Kornai—inspired by the works of Koopmans and Dorfman, Samuelson, and Solow²⁸—launched an applied project to use linear programming methods

²⁴ János Kornai and Tamás Lipták, *A nyereségérdekeltség matematikai vizsgálata* [The Mathematical Analysis of Profit Incentives]. Mimeograph (Budapest: Közgazdasági és Jogi Könyvkiadó, 1958).

²⁵ János Kornai and Tamás Lipták, “A Mathematical Investigation of Some Economic Effects of Profit Sharing in Socialist Firms,” *Econometrica: Journal of the Econometric Society* 1 (1962): 140–161.

²⁶ *Ibid.*, 161.

²⁷ *Ibid.*, 160.

²⁸ Tjalling Koopmans, *The Construction of Economic Knowledge. Three Essays on the State of Economic Science* (New York: McGraw-Hill, 1957), 127–166; Robert Dorfman, Paul R. Samuelson, and Robert Solow, *Linear Programming and Economic Analysis* (New York: McGraw-Hill, 1958).

in planning practice. First, he organized a group of light industry planners, engineers, experts of international trade, and mathematicians/IT experts to model the choice between different technologies in cotton industry. More concretely, they investigated the most important exogenous variables of the outcomes, such as interest and exchange rates, technological parameters, etc. The emergence of this group generated competition between “linear programmers” and “input-output analysts.” The latter group, led by András Bródy and later by Mária Augusztinovics, already had experience in this field, but Kornai emphasized that the endogeneity of technology should be the key concept, which was not incorporated in the input-output models with fixed technological coefficients.²⁹

The success of using these optimization models in the planning of light industry motivated Kornai to extend this approach to that of the whole economy by decomposing the principal planning problem into linear programming subproblems. However, he recognized soon that the daily practice of the National Planning Bureau is different. There macro-indices are planned and then decomposed into sectorial indices. The sectoral ministries analyse these figures and a bargaining process between the sectors modify them. During this process, the Central Planning Bureau reallocates the resources among the sectors and re-optimizes the planning targets.

This phenomenon of iterative bargaining served as the basic idea of two-level planning. Kornai constructed an economic model where the central planner allocates input and output quantity requirements among the sectors. Then, the sectoral planners solve their own optimization problem with some programming technique and send a feedback to the central planner in the form of shadow prices received from the solution of the dual problem. The feedback signals serve to balance the initial quantity allocations following the principles of market clearing process by price adjustment. A new round of sectoral optimization and a second phase of feedback iteration follow

²⁹ János Kornai, *A gondolat erejével*, 150.

the reallocation of quantities. The iteration continues until the optimal plan is reached on both macro and sectoral levels.

The mathematical model for these procedures was re-built by Tamás Lipták. He proposed to reformulate the bargaining part of the problem in a game-theoretical framework. This was a really innovative idea, because in the early 1960s game theory was not widely used in Western mathematical economics either. The paper containing this combined programming and game-theoretical method was once again sent to *Econometrica*, which published it in 1965.³⁰

In the paper, the authors introduce, on the one hand, the “over-all central information problem (OCI)”³¹ represented by a primal-dual pair of linear programming models. On the other hand, Kornai and Lipták introduced the sectoral programming problem analogously to OCI for every sector.

In the first step of the two-level planning procedure, the central planner determines the set of optimal central programs. In the second step, at the sectoral level, every sector solves its problem for each optimal central program. The third step is the composition of the central problem’s solution set as a combination of the sectoral solution sets.

Thereafter, the authors reformulated the level planning problem as a “polyhedral game”³² in which the agents are the central planner and the sectoral planners. Lipták proved first that there exists a bounded nontrivial solution for the two-level planning problem if the corresponding OCI problem is solvable. He claimed that the optimal strategy in the polyhedral game coincides with the optimal central program in the two-level planning problem and the optimal sectoral strategies, in which all sectoral components are equal, forming an optimal shadow price system in the two-level planning problem.

³⁰ János Kornai and Tamás Lipták, “A Mathematical Investigation of Some Economic Effects of Profit Sharing in Socialist Firms,” *Econometrica: Journal of the Econometric Society* 1 (1965): 140–161.

³¹ *Ibid.*, 144.

³² *Ibid.*, 151.

This paper became Kornai's most influential work in mainstream economics. The reason for the success was due to the model's similarity to the mathematically reformulated Lange model of market socialism published by Malinvaud in 1967.³³ However, in the Lange-Malinvaud model, top-down information from the centre is mediated by prices, in contrast to the Kornai-Lipták model where it is communicated by quantities. The bottom-up information coming from the sectoral planners is transformed by quantities in the Lange-Malinvaud model to make the size of excess demand or supply transparent while in the Kornai-Lipták model this feedback is mediated by (shadow) prices.

Beyond theorizing, Kornai was also interested in the application of his new model. In the period of political thaw, in 1962–63, he secured a new job at the Computational Centre of the Hungarian Academy of Sciences, where the first mainframe computer had been installed in Hungary. There, in collaboration with the Research Institute of the Planned Economy, he organized a team to implement the two-level planning concept. As a first step, they built one central and 18 sectoral models and created many sub-teams to work out the details of their own fields. In the most productive period of research, about 200 employees worked on this project and Kornai edited information brochures to make the method popular among decision makers and funders.

He deliberately avoided confrontation with politics, and never questioned the legitimacy of weights assigned to different sectors. Instead, he treated them as constraints, and the objective function of the model was a neutral index such as the balance of current account.³⁴ Moreover, his purpose was to contribute only to the long- and medium-term plans and not to the yearly directives.

³³ Edmond Malinvaud, "Decentralized procedures for planning," in *Activity Analysis in the Theory of Growth and Planning*, edited by Edmond Malinvaud and Michael Bacarach (London: Palgrave Macmillan, 1967), 170–208.

³⁴ János Kornai, *A gondolat erejével*, op. cit., 165.

During the application of the two-level planning concept, it turned out that finding the solution of the original model is complicated in terms of computation, hence, one had to radically simplify the model and create a simpler version to illustrate its utility for decision makers. The results of the simplified version were much less precise, the input data were unreliable, and the policy makers always changed and never clearly declared the objectives and even the constraints. Moreover, the computation process was too slow to support decision-making in such an environment and the impact of analysis was also ambiguous because policy makers took the results seriously only if those supported their preconceptions. Therefore, the enthusiasm of the team decreased and following five years of hard work, Kornai abandoned leadership.

After 1965, the collaboration between Lipták and Kornai was interrupted. Lipták, who suffered from a serious mental disease emigrated to the UK, and did not continue scientific research. Later, Kornai summarized the experience of implementing their model³⁵ and tried to review the theory and practice of mathematical planning,³⁶ but at the end of the 1960s he basically left behind mathematical economics forever.

Conclusion

In this paper, I gave a review of the main building blocks of mathematical thinking in Hungarian economics, especially those that concern the theory of planning. I focused on four main institutions that played a significant role in the transfer of knowledge, which was a necessary condition for the grounding of planning on a scientific basis. Besides the institutions, some exceptional personas managed to build a hub that supported

³⁵János Kornai, *Mathematical Planning of Structural Decisions* (Amsterdam: North-Holland Publishing Co., 1967 [1965]).

³⁶János Kornai, *Agazdasági szerkezet matematikai tervezése* [Mathematical Planning of Structural Decisions], with contributions by Tamás Lipták and Péter Wellisch (Budapest, Közgazdasági és Jogi Könyvkiadó, 1973).

not only the practice of planning but also the scientific research related to optimal planning. These kinds of networks generated the most important channels of knowledge transfer.

Probably the most influential among these key personas was János Kornai. To understand his motivation, I sketched his early life and career, following his way to mathematical theory and the practice of planning. As we have seen, his network was also extended with Western relations that significantly improved his importance on the one hand, and the potential success of realizing a scientifically-based centralization on the other.

To sum up my conclusion: despite original discoveries, high-quality cybernetic applications, and far-reaching Western relations, mathematical methods did not exert significant impacts upon the practice of central planning and changes in economic institutions and policies in Hungary during the state socialist period.

Abstracts

GYÖRGY FÖLDES:

Economic Reform, Ideology, and Opening, 1965–1985

In the middle of the 1960s, preparation for economic reform began in Hungary. As part of this process, new principles and methods of economic governance had to be accepted by Hungarian society. This was the task of propaganda. Another important aspect was the reconciliation of the reform with Marxist-Leninist ideology. The successful completion of this exercise was the precondition that the Hungarian Socialist Worker's Party, and leadership of allied communist parties, accepted the prevalence of the laws of commodity production in the socialist economy. The situation was even more complicated by the fact that the détente of the two world systems came onto the agenda in these years. This political and economic opening could not mean abdication of socialist principles and goals. This was the challenge of the time for official ideology in Hungary.

Key words: ideology, Marxism-Leninism, laws of commodity production in socialism

MELINDA KALMÁR:

The Decades of Détente

The notion of détente is a constantly discussed topic in contemporary history writing. There are several theories on

periodization and no fewer definitions of the phenomenon. The Helsinki Final Act is one of those significant examples which can prove quite clearly that most of the spectacular Cold War turning points are embedded deeply in the course of a long, antecedent process of a particular Cold War resilience. This meant that both sides, East and West, wanted to adjust themselves to the *permanent* character of the prolonged Cold War context. Thus, the Helsinki Final Act has no unique status in the Cold War constellation; it was not the result of the dynamization of East-West relations in the early 1970s, but in reality was a necessary consequence of a long-term process that started in the mid-1950s. During the decades of East-West contact, the intentions and institutions of one camp frequently strengthened and motivated the other, slowly developing into new types of political, strategical, economic, and cultural interdependencies between the two rival camps.

Key words: Helsinki Final Act, political and cultural interdependence, European security system, Cold War ideologies, information policy, political resilience, common European identity, Eurasia concept

RÓBERT TAKÁCS:

Hungarian Foreign Policy and Basket III in the Cold War Confrontation from Helsinki to Madrid

This paper interprets the efforts of Hungarian (cultural) foreign policy that relate to the ominous “Basket III” from the signing of the Helsinki Final Act in 1975 to the end of the second follow-up conference in Madrid in 1983. Topics covered by Basket III are generally viewed as Western terrain in the intensifying ideological battle of the 1970s; however, Hungary was more or less able to cope with the stipulations of the Helsinki Final Act and received little pressure from NATO (and Western neutral) countries both in Belgrade and Madrid as compared to other Soviet bloc governments. Hungarian foreign policy was able to run an active campaign relating to the Final Act through written

bilateral proposals submitted to all Western participant states. In addition, the Hungarian government could also successfully manage Hungarian topics on the international scene, the most peculiar of which was the promotion of the culture of small and less studied languages.

Key words: cultural contacts, human rights, Helsinki Final Act, Basket III, Hungarian foreign policy

SZABOLCS LÁSZLÓ:

Promoting the Kodály Method during the Cold War: Hungarian Cultural Diplomacy and the Transnational Network of Music Educators in the 1960s and 1970s

Cold War cultural diplomacy projects represented a dynamic mixture of the geopolitical and transnational processes that shaped postwar history. The worldwide dissemination of the Hungarian music education system, known as the “Kodály method,” provides an instructive example of how these different agendas interacted within the larger framework of twentieth-century global integration. The chapter examines the transnational collaborations of Hungarian and American music educators that led to the construction of the Kodály method as an internationally marketable and adaptable model for teaching music in the 1960s and 1970s. It traces how pedagogues from the two countries, like Erzsébet Szőnyi and Denise Bacon, forged professional ties through participation at conferences and summer courses—and explores the process through which the Hungarian model was adopted in the U.S. in the form of institutional arrangements like the Kodály Musical Training Institute, established in 1969 in Wellesley, Massachusetts. Furthermore, the article analyses how the Hungarian communist authorities gradually incorporated the Kodály method into their domestic and foreign policy frameworks. Although it initially emerged as a product of transnational exchanges that cut across the Iron Curtain, by the mid-1970s the method eventually became an official Hungarian cultural

diplomacy project, representative of a small state's effort to gain international recognition and legitimacy. However, this process of appropriation compelled the Hungarian authorities to accept and accommodate a truly global phenomenon—and to recognize the ideas and practices of a transnational network of pedagogues and researchers as culturally valuable and politically salient.

Key words: Cold War, geopolitics, cultural diplomacy, transnational history, Zoltán Kodály, music education

PÉTER CSUNDERLIK:

From Criticising 'NATO History-Writing' to the Triumph of 'Comecon History-Writing': A Change of Attitudes in Hungarian Historiography after 1956

The study presents the modernization and change of attitudes in Hungarian historiography after 1956 and the process by which Hungarian historians moved from the rejection of Western "bourgeois" historical literature to the utilization of Western results due to the loosening of ideological constraints and the strengthening of Western relations. It points out that research on the history of the Habsburg Empire played a major role in this process because Hungarian historians could become involved in the circulation of international historical science once more.

Key words: historiography, Habsburg Empire, Austro-Hungarian Monarchy, transfer history, economic history, social history, cultural history

ERZSÉBET TAKÁCS:

In the Mantle of Professionalization. The Openness and Confinement of Family Sociology in Hungary during the 1970s and 1980s.

The aim of this paper is to examine the possibility of the adaptation and institutionalisation of sociology of the family in Hungary during the 1970s and '80s from a domestic point of view.

I look at the ways in which family-sociological “paradigms” of the time were adopted. I analyse this research context in Hungary by looking at relevant papers in *Demográfia*, *Szociológia*, *Szociológiai Figyelő*, *Társadalmi Szemle*, and *Valóság*, as well as recollections, research reports, and interviews. Family sociology proves to be an especially interesting field in terms of contemporary research on adoption and reception, since there was a paradigm shift on the international scene at the time. In addition, there were three significantly different research institutions which focused in part on the sociology of the family: the Hungarian Central Statistical Office (KSH), the Hungarian Academy of Sciences (MTA), and Eötvös Loránd University (ELTE).

Key words: History of Hungarian sociology, family, adaptation, reception

ATTILA ANTAL:

The Re-institutionalization of Political Science in Hungary

This paper investigates the procedure by which political science in Hungary was institutionalized in the 1970s and 1980s. Political science in Hungary has been subordinated to politics since the 1980s, which is why, despite adapting to Western European standards, it has not developed any critical approaches of its own. The institutional integration of political science in Hungary was planned into the Socialist-Communist framework from the second half of the 1970s. On the other hand, due to the weakening of the Communist regime, scientific elites from other fields among the social sciences constantly widened the boundaries of the system. This opened up opportunities for the application of the achievements of Western political science to Hungary.

The paper interprets how the political sciences was reorganized in Hungary during the Communist era. Political science began to emerge in the scientific frameworks in the 1970s with the contribution of samizdat literature of the 1980s,

which represented the rehabilitation of the genre of political journalism. The study examines the role of the International Political Science Association's World Congress of 1979 in Moscow. In the paper, it is emphasized that political science began to institutionalize as a branch of social science in the academic sphere, which neither had a background in higher education nor a professional organization system. The situation was further complicated by the fact that the background of the discipline was provided by the MSzMP Central Committee's Institute for Social Sciences

Key words: Hungary, political science, institutionalization, MSzMP Central Committee, Institute for Social Sciences, social sciences

GERGELY KŐHEGYI:

An Attempt to Ground Central Planning on Scientific Basis.

János Kornai and the Mathematical Theory of Planning

In this paper, I give an overview of the main building blocks of mathematical thinking in Hungarian economics with a special emphasis on planning. I focus on the role of the institutions and on the one of the most important original progenitors, János Kornai. I sketch his early life and career to understand his motivations for turning to the mathematical theory of planning. After that, I outline Kornai's most influential achievement in this field and the short history of trying to practice it for the ends of long-run planning, i.e., the story of the ascension and decline of science-based communism in Hungary.

Key words: History of economic thought, Hungarian mathematical economics, economic planning, Eastern European history of economics, economics under communism

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The central virtue of an “ordinary” ideology is not exactly being open and inclusive. It is particularly true in the case of such a radical ideology that anchored its truths in rigid theses as Marxist-Leninism. It had to face much more important requirements than openness. It is enough here to remind the reader of those that made opening specifically difficult. Marxist-Leninist ideology had to *prove the superiority of socialism* over capitalism. This applies to ideas, society, politics, culture, morals, and, last but not least, the economy. From this aspect, the reality of the “bourgeois” system of the 1960s—its welfare state, parliamentary democracy, and its standard of living—formed a major challenge for communist theorists and politicians. Capitalism did not seem to have suffered a general crisis, nor did the Western working class seem to have become impoverished. Therefore, *an ideological struggle against “bourgeois” ideology remained particularly important*, which was further complicated by recognition: the superpowers must avoid war and try to give way to peaceful coexistence and the improvement of economic, political, and cultural relations.

(György Földes: Economic Reform, Ideology, and Opening, 1965–1985)

Budapest was among those who were solidly committed to the preservation of the Helsinki process, as it corresponded to its more open nature and foreign policy strategy. It paid attention—in internal and foreign politics—to prove its (even if small, but) clear progress in all issues relating to the Final Act, and also targeted Western participants with foreign policy actions to be able to define the agenda in its favour. Hungarian foreign policy was among those that strived for compromise, however as a disciplined ally of the Soviet Union it went by Soviet policy—as opposed to Romanian foreign policy, which frequently challenged Warsaw Pact coordination. Nevertheless, Budapest pursued its own priorities successfully.

(Róbert Takács: Hungarian Foreign Policy and Basket III in the Cold War Confrontation from Helsinki to Madrid)

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