Michael Keren

Network Models in Economics

Born in Berlin in 1931, emigrated to Israel (then Palestine) in 1933. Studied Economics and Political Institutions at the University of North Staffordshire (later renamed Keele University). After working for six years (1956-1962) in the Ministry of Commerce and Industry in Jerusalem on development problems, took his M. A. in Development Economics in Williams College and his Ph. D. at Yale. At the Hebrew University of Jerusalem since 1968 (Professor of Economics since 1984). A research fellow at the Institute of International Studies at the University of California in Berkeley in 1971/72, visiting at the University of Pennsylvania in 1976/77 and 1981/82, and Wolfson Fellow at St. Antony's College at Oxford for a part of 1977. — Address: Department of Economics, The Hebrew University, Mount Scopus, Jerusalem 91905, Israel.

My plans for my work at the Wissenschaftskolleg were to work on the use of network models in economics. Neoclassical economics has lately begun to incorporate institutional elements into its models, and thus to try to come to terms with its rival, the institutional school. One way in which this can be done is by using networks as descriptions of institutions, i.e., of humans or groups of humans and their interactions, and superimpose them on the economic model. One aspect which should receive particular attention is the dynamic properties of such networks, which consist of humans who gain new skills through repeated contacts: this clearly throws up elements of investment in human capital and of learning through doing. The network model is particularly well suited to the study of economic systems and their evolution, e.g., for the study of the causes of the collapse of the East European socialist economies and of their transitional paths out of the bureaucratized planning system. In particular, it underlines the difficulty of the Big Jump, the sudden shift to market economies: this requires the construction of new institutions, something that requires heavy investment in human (and other) capital, and time.

Events in eastern Europe, the sudden collapse of the old order of centralized management in most countries of the former Soviet block, and in particular the collapse of the Wall in Berlin and the disappearance of the

GDR, on whose economy I had based the empirical part of my work, occurred while I was packing up to come to the Kolleg. It was already clear that while the political and social changes were quite radical, most state enterprises in the block did not change their mode of operation: although it was clear that enterprises that did not become profitable had no chance of long run survival, they did not introduce the radical changes in the goods they produced and in their production methods that the new conditions required. My research plans would have made me go into the economics of the firm in general and the Soviet-type enterprise in particular; this now became the central focus of my work at the Kolleg. I have worked on a complex of problems that tries to understand the Soviet-type enterprise as a firm that functions in an environment that differs from that of a capitalist firm, where the environment is composed of institutions which take time and resources to build. These problems have been dealt with in a number of separate papers on which I have been working at the Wissenschaftskolleg.

The basic paper is provisionally entitled "A Simple Model of the New, Non-optimizing Firm which the Capital Market, but not Bureaucracy, may lead to Invest Wisely", a title that may perhaps reveal much of its context. It argues that eastern European events cannot be squared with a view of the firm as a rational, hence optimizing, organism. If it were one, the ex-GDR enterprise would have changed its mode of operation once the changeover to a market economy took place upon the formation of the Currency Union with the Federal Republic in July 1990. If they did not, it must have been some friction, some costs of change, which inhere in the economic environment of eastern Europe's countries and made it difficult for them to change their policies. The models of Nelson and Winter, *NeW* in the title, provided a building block for a different model of the firm. Each organization has a policy, consisting of a sequence of investments as well as programmed responses to foreseeable circumstances. This policy is embedded in its human capital, and to change it and introduce another one requires investment, i.e., time and resources. These are the elements of friction in the model. Which policy will be selected from those known to the firm's management depends on the environment, and here the capital market plays a major role. The threats of takeover or bankruptcy force most firms in the competitive market to adopt the most profitable policies. Not all: a family firm or a cooperative are exempt from this sanction and need not aim at maximizing profits.

A paper "On the Impossibility of Market Socialism" continues this theme and asks whether the state which abolishes the capital market can assign its tasks to one or many state organizations, e.g., to its economic hierarchy. It uses arguments on the lack of competition and bureaucrati-

zation, the latter advanced by Tirole, to show why a large hierarchy finds it difficult to wind up a firm or even change its management. This fact by itself provides the firm with a near assurance of continued existence and a soft budget constraint (Kornai). As a result, the socialist firm is not constrained by the market to maximize profits, develops an aversion to change and reacts sluggishly to changes in market conditions, or, in other words, has a very low supply and demand elasticity. It is this latter that forces the hierarchy to take upon itself the task of allocating resources, of maintaining balance in the economy through a system of material balances.

A paper on "Games Planners Play" provides a game theoretical explanation for the low supply and demand elasticity of the socialist firm, which functions in an environment from which the capital market is absent. It also shows why material balancing makes planners provide incentives which deviate markedly from profit, or firm value, maximization. A paper on "The Socialist Firm, the Value of Capital, and Transition to Capitalism" explains how the asymmetric incentives affected the process of investment and the accumulation of capital in the countries of eastern Europe in a way that makes the transition to a well functioning market economy slow and arduous.

My work on this complex of problems is by no means complete, and the papers are in various phases of completion, as are some others which I have worked on but space does not permit me to elaborate on here. I shall also have to find some other time to work on the basic network view, which has been relegated to a rear position by the work that I mentioned above. This time they will not be able to thrive on the extraordinary environment of the Wissenschaftskolleg, which provided the conditions in which work could progress so well.

References

Nelson, Richard R., and Winter, Sidney G. (1982). *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.

Tirole, Jean (1986). "Hierarchies and Bureaucracies: On the Role of Collusion in Organizations". *Journal of Law, Economics, & Organization* 2,2 (Fall): 181-214.