



KUNGL.
VETENSKAPS-
AKADEMIEN

THE ROYAL SWEDISH ACADEMY OF SCIENCES

Press Release

15 October 1985

THIS YEAR'S ECONOMICS PRIZE AWARDED FOR PIONEERING STUDIES OF SAVING AND OF FINANCIAL MARKETS.

The Royal Swedish Academy of Sciences has decided to award the 1985 Alfred Nobel Memorial Prize in Economic Sciences to Professor **Franco Modigliani**, Massachusetts Institute of Technology, USA, **for his pioneering analyses of saving and of financial markets.**

Franco Modigliani's research has been primarily directed towards household saving and the functioning of financial markets. The achievements for which Professor Modigliani is now to be rewarded concern the construction and development of the life-cycle hypothesis of household saving, and the formulation of the Modigliani-Miller theorems of the valuation of firms and of capital costs. These two closely-related achievements both deal with the management of household property, one referring to total value, the other to its composition.

The Life-Cycle Hypothesis

One of the cornerstones of the British economist J.M. Keynes' general theory, presented in 1936, is the relationship between consumption and national income. According to Keynes, it is a "psychological law" that "households increase their consumption as their income increases, but not as much as their income increases". One consequence of this "law" is that the proportion of national income represented by saving increases during periods of economic growth.

Keynes' theory of saving was generally accepted by his contemporaries. However, in 1942 Simon Kuznets showed that the theory did not agree with empirical facts: in the U.S., the long-term saving: income ratio had not increased over time. This supposed paradox became the object of a number of studies during the years that followed, and several new approaches to the theory of saving were presented. However, it was not until 1957, when Milton Friedman formulated his "permanent income" hypothesis, that a rational explanation of the Keynes-Kuznets contradiction was given within the framework of a general, well-defined theory of consumer demand over time. The characteristic feature of Friedman's hypothesis is that a person's income is assumed to consist of two parts, one permanent and one transitory, and that it is the permanent part that is the determinant of decisions about consumption and saving. Friedman argued that Keynes' proposition was incorrect since it was derived from empirical observations of cross-section data referring to total, not to permanent, income. Friedman's ideas were well received by most economists, and for several years the permanent income hypothesis played a dominating role among existing theories of aggregate saving.

Three years before Friedman published his theory of saving, Franco Modigliani, together with Richard Brumberg, a student of his who unfortunately died some years later, had already presented the life-cycle hypothesis. Like Friedman, Modigliani and Brumberg assumed that



households strive to maximize their utility of future consumption. The decisive difference between the two theories concerns the length of the planning period. For Friedman, this period is infinite, meaning that people save not only for themselves but also for their descendants. In the Modigliani-Brumberg version, the planning period is finite: people save only for themselves. From the postulate of utility maximization it follows that consumption is evenly distributed over time and this, in turn, implies that the individual during his active period, builds up a stock of wealth which he consumes during his old age.

The life-cycle hypothesis is a purely microeconomic theory. However, Modigliani has shown in a number of later works - some of which were produced in collaboration with others - that the hypothesis has a number of macroeconomic applications. A few of these are identical with those of the permanent income hypothesis, for instance the idea that the aggregate saving ratio is constant in the long term and that capital gains affect consumption only slightly. However, some of the macroeconomic implications differ completely from those of earlier theories. The most central one is that aggregate savings depends primarily upon the rate of growth of the economy. Other distinguishing implications are that aggregate saving is endogenously determined by economic as well as demographic factors, such as the age structure of the population and the life expectation; and that an increase in the rate of economic growth entails a redistribution of income in favour of younger generations.

The life cycle hypothesis has been used as a theoretical basis for many empirical investigations. In particular, it has proved an ideal tool for analyses of the effects of different pension systems. Most of these analyses have indicated that the introduction of a general pension system leads to a decline in private saving, a conclusion in full agreement with the Modigliani-Brumberg hypothesis.

The underlying idea of the life-cycle hypothesis - that people save for their old age - is of course not new; nor is it Modigliani's own. His achievement lies primarily in the rationalization of the idea into a formal model which he has developed in different directions and integrated within a well-defined and established economic theory, and secondly in the drawing of macroeconomic implications from that model and in performing a number of empirical tests of these implications. These achievements are important contributions to economic science.

The life-cycle model has had a great impact on the development of later theoretical and empirical research. It represents in fact a new paradigm in studies of consumption and saving, and is today the basis of most dynamic models used for such studies.

The Modigliani-Miller Theorems

While the life-cycle hypothesis concerns household saving decisions, the Modigliani-Miller theorems concern decisions about aspects of the composition of the accumulated savings stock. Although closely related, these two subjects are usually regarded as belonging to two different disciplines: economics and corporate finance.

Up to the middle of the 1950's, the literature of corporate finance consisted mainly of descriptions of methods and institutions. Theoretical analysis was rare. It was not until



Franco Modigliani and Merton Miller, in 1958, presented their now-famous theorem, and at about the same time James Tobin (Nobel Prize 1981) and others started to develop the theory of portfolio selection, that a scientific theory emerged concerning the connection between financial market characteristics and the financing of investments, debts, taxes, etc. Once established, this theory developed very rapidly.

The first Modigliani-Miller theorem concerns the question of how the market value of a firm is affected by the volume and structure of its debts. The central proposition of the theorem gives a clear answer to this question: neither the volume nor the structure of the debts affects the value of the firm provided that the financial markets work perfectly, that there are no taxes and that there are no bankruptcy costs.

Modigliani and Miller define the value of a firm as the sum of the market value of the equity stock and the market value of its debts. Their theorem states that this value is equal to the discounted value of the flow of its expected future returns, before interest, provided that the return on investment in shares of firms in the same risk class is used as the discount factor. This implies that the value is completely determined by this discount factor and by the return on existing assets, and is independent of how these assets have been financed. It further implies that average capital cost is independent of the volume and structure of the debts and equal to the expected return on investment in shares of firms in the same risk class.

In a later paper, Modigliani and Miller formulated another theorem stating that, for a given investment policy, the value of a firm is also independent of its dividend policy. A dividend increase, for instance, certainly increases shareholder's incomes, but this is neutralized by a corresponding reduction in share value.

The two Modigliani-Miller theorems hold good, irrespective of individual differences between shareholders' valuations of risk, leverage effects, durability of loans, etc. The logic of the theorems rests in fact upon the assumption of perfect markets, namely that a shareholder can always, through his own borrowing or lending, compose his asset portfolio as he sees fit and that he can, without costs, give it the composition he desires with respect to risk, leverage, etc. If for instance the risk level of a firm's assets is increased, the shareholders can neutralize this by lowering the risk of other assets in their portfolios.

The Modigliani-Miller theorems have had important implications for the theory of investment decisions. One is that such decisions can be separated from the corresponding financial decision. Another implication is that the rational criterion for investment decisions is a maximization of the market value of the firm, and a third is that the rational concept of capital cost refer to total cost, and should be measured as the rate of return on capital invested in shares of firms in the same risk class.

The Modigliani-Miller theorems represent a decisive break-through for the theory of corporate finance, and have had a great impact on later research in this area. Thus the scientific value of the authors' work is by no means limited to the formulation of the theorems, but refers to a great extent also to the introduction of a new method of analysis within the discipline of corporate finance. While the idea of treating financial decisions as a



KUNGL.
VETENSKAPS-
AKADEMIEN

THE ROYAL SWEDISH ACADEMY OF SCIENCES

market allocation problem is perhaps not completely new, it was Modigliani and Miller who first used it for stringent analysis, thereby laying down guidelines for further research in this area.