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# FINANCIAL INTERMEDIATION AND THE FUNCTIONING OF CAPITAL MARKETS

by

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## I. Introduction

This paper seeks to redress a seeming imbalance. In recent years a number of positive theories of capital market equilibrium have obtained wide currency, but these models seem, at first glance, to say very little about financial intermediaries: In particular, why do they exist, and what is their function in the capital market?

Inasmuch as such firms as banks, thrift institutions, and insurance companies and organized securities markets are observed to be important actors in the capital markets, an attempt is made here to analyze their role and function in the context of capital market theory. We show that intermediation is a service performed both by marketable secondary securities and by claims issued by institutional intermediaries. The existing structure of the provision of these intermediary services follows directly from the interaction of demand and supply, demand viewed as the aggregation of individual demands for security attributes in a portfolio context and supply being a function of the structure of the costs of transacting.

The plan of the paper is as follows. Section II reviews several threads of relevant literature, concentrating on pointing out the various loose ends that the paper tries in some measure to tie together. Section III presents a model of individual asset allocation behavior under uncertainty. This section introduces the notion of security "attributes." The distinction between pure equity securities and artificial, or "service," securities is made. Section IV builds on the model of the previous section and explores the equilibrium that results from the interaction of aggregate demands and the nature and structure of transactions costs, including information as one of these costs.

## II. Review of Prior Work

It has been customary in the literature of finance to treat financial intermediaries as firms. This treatment has led to a number of conceptual problems. Few models of financial intermediation treat the intermediary as a neo-classical profit or share-price maximizing entity as does, for example, Pringle's analysis of commercial banks [10,11]. Often, the notion of an institutional utility function is invoked in order to explain the behavior of financial institutions.[1] Historically, the emphasis has been on the substance of financial intermediaries rather than on the process of financial intermediation. Notable exceptions have been the various "mutual funds" theorems, such as the work of Cass and Stiglitz [2], which have demonstrated that properly designed financial securities can efficiently intermediate real assets and individual portfolios.

The monetary literature, on the other hand, has emphasized the beneficial effects of a more complete, and therefore "better" system of financial intermediation. Gurley and Shaw [6] find intermediation to be positively related to investment and savings. Goldsmith [5] has many statements to the same effect. Patinkin [9] implies that non-banking intermediaries contribute to the well-being of the individual investor. Yet Eckaus [4] correctly states that these statements are not grounded firmly in either a theoretical model or an empirical observation.

In the following sections we try to examine some of these common notions in the literature and depict financial intermediation as well

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[1] Cf. Hart and Jaffee [7].

as intermediaries within the framework of capital market theory.

## III. A Model of Financial Intermediation and the Allocation of Consumption Over Time

The unlevered ownership of a real asset or group of such assets can be usefully thought of as a pure equity security. We view a pure equity security as consisting of a linear combination of underlying attributes. An attribute is a primitive component of a security. The term is defined as any security characteristic which is both separable in principle and for which a separate demand exists.

Some examples may help to clarify this concept of security "attributes." In a world of certainty the only attribute is maturity. Any future date with respect to which there was a current demand for consumption would be an attribute. The attribute vector would be represented by all future dates for which there was a separate demand for claims. Any capital asset or security could be fully described by the amount of wealth it provided as money claims across future dates. Such a security would be completely described by the relative amounts of each attribute and its value in perfect capital markets would be the sum of the amount of each attribute times the value of a unit of the attribute, which in the case of certainty could be thought of as a standardized payment of one unit of account.

In principal, as is evident in the case of certainty, attribute dimensions, such as maturity, can be continuous. This is not to imply, of course, that even in a costless world there would be an infinite number of securities; the maximal number of distinct securities would be the number of wealthholders in the society, for a security could be identical to an individual's optimal portfolio. (Any particular security

could have an uncountably infinite number of payoffs.) But even this result, though finite, is not very interesting. Furthermore, when transaction costs of various types are introduced into capital market equilibrium, for reasons discussed below, a much smaller number of securities is likely to result. Consequently, the remainder of this paper will deal with a finite attribute set.

Another example of the attribute notion can be usefully drawn from the state-preference approach to capital market equilibrium under conditions of idealized uncertainty developed by Arrow [1], Debreu [3], and Hirshleifer [8] among others. In a costless world there could be a security representing a claim to consumption at any future date in conjunction with the occurrence at that date of a particular state of nature. An attribute would then be such a time-state combination; and any complex security could be viewed as a package of particular quantities of these attributes.

The geometry of the notion of security attributes is rather appealing. Consider a world in which all real capital assets, or pure equity securities, can be fully described by holdings of n distinct attributes. Any particular security, or indeed any combination of securities, can be viewed as a point in n-space. Any combination of m securities ($m < n$) would be an m-1 dimensional hyperplane.[2]

While any rational individual would have a strict preference ordering over portfolios, it is neither useful nor meaningful to think of an indirect n-dimensional utility function in attribute space. What is important to note, however, is that financial intermediation can be viewed as the production of divisions, or more likely, linear combinations of pure equity

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[2]Cf. Cass and Stiglitz [2] in the context of the state-preference approach.

claims. Financial intermediation is then the process of making the financial asset opportunity set more dense in terms of the attribute space. The new securities that result are "service" claims that meet individual portfolio balancing needs. It is this expansion of the opportunity set that makes security production, or "financial intermediation," of value to investors; for constrained optima improve as constraints become less binding.

In a market with no transaction costs, including free and complete information, financial intermediation could take place through either bilateral or multilateral trade among individual investors. An excess demand for a particular attribute will create an incentive for some individual investor to "produce" the necessary supply of an attribute or of a vector of attributes. He will do so by combining different pure equity securities and by issuing a new security. This new security represents an act of financial intermediation. As information is assumed to be free and complete, one market price will exist for any such security, which represents an array of attributes, at any given instant of time, for the market will be continuously in equilibrium.

In such a world financial intermediation allows for a more efficient allocation of individual wealth over time. By making the investment opportunity set more dense in terms of the available combinations of attributes, it affects the individual's consumption over time and thus his expected utility of lifetime consumption, and also presumably alters the relative prices of consumption in different states of the world.

To examine the effects of these two factors on the individual wealth allocation decision, let us assume a three-period certainty

model. Moreover, let us assume that there is only a single available pure equity security in this model and that it has a fixed proportion pay-off pattern over the two future periods. Thus any given individual can either consume all his wealth in the first period or consume nothing in the present and a fixed proportion in the second and in the third periods or, more likely, some combination of the two. If we introduce financial intermediation into this model, where the attribute vector is that of future time periods, individual investors can attain any desired pattern of consumption over the three periods that meets their budget constraints. They will achieve their desired proportion of future consumption either by bilateral or multilateral trade with other individuals, i.e., by financial intermediation.

The results of introducing financial intermediation in this example are both in terms of the overall utility of the individual investors (analogous to an "income" effect) and in terms of the relative prices of future and current consumption. The overall utility has increased following the introduction of financial intermediation because individuals are no longer restricted to a fixed ratio of future consumption in the second and the third periods. Moreover, the price in terms of current consumption in the future period which provides the greater marginal utility has declined for any individual consumer investor who prefers a different distribution of future consumption over time than the one represented by the pure-equity security. Some individuals, of course, will be "poorer" as a result of the change in the price vector, but they are no worse and probably still better off as a result of the introduction of costless financial intermediation. Although it is reasonable to expect that the

introduction of financial intermediation into a three-period certainty model will increase the level of savings (that is the ratio of future to current consumption) for most individuals, this result will not hold for every individual. The determining factor, in addition to the relative prices, is the partial derivative of future consumption to a given change in the investment opportunity set.

The implications of the introduction of financial intermediation via bilateral and multi-lateral trade remain the same in the general case where attributes are defined in a n-dimensional space and the certainty assumption is dropped but the assumption of zero transaction costs is retained.

Individuals will be better off as a result, though they may have less wealth inasmuch as relative prices of attributes may change. The effect of financial intermediation on the allocation of wealth over time is a function of the aggregate changes in individual security demands. Without specific information or a given set of assumptions pertaining to individual behavior no definite conclusion as to the effect on the pattern of investment can be reached.

## IV. Financial Intermediation and the Cost of Transacting -- The Evolution of Organized Financial Intermediation

In a world without transaction costs, financial intermediation as we have used the term will be carried out by individuals as part of the portfolio selection process of their intertemporal consumption-investment decision. Once transaction costs, in the form of the costs of information processing, transacting and contracting, and bookeeping, are introduced, individuals are not necessarily the most efficient conduits for financial intermediation.

The analysis of the previous section leads directly to an assessment of the efficiency of a system of financial intermediaries. When transaction costs are introduced, buyers and sellers of securities face different prices. Consequently, the volume of transactions constituting financial intermediation is reduced compared to the no-transaction costs world. Moreover, the new two-price system (bid and ask price) will result in a lower level of utility for both the buyer and the seller. Transaction costs are regarded as "costs against nature," if the original endowment of the buyer or the seller is not coincidentally identical to the transactions costless optimal portfolio. The more efficient is the system, in terms of the narrowness of bid-ask spreads, the greater will be the volume of intermediary claims as a proportion of individuals' total wealth holdings.[3] These wealth holdings should be measured gross, not net, of liabilities. In principle, of course, allowance should be made so as to abstract from intermediation produced solely as a result of tax factors.

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[3] Cf. Goldsmith's "financial intermediation ratio" [5].

In a costless world of perfect intermediation, the equilibrium security holdings of individuals are equivalent to attribute combinations that could be issued to wealthholders by a single zero-cost financial institution that in turn held all pure equity claims in the economy, having received them in exchange. Under these conditions of complete intermediation, the gross asset portfolios of all individuals will consist exclusively of intermediary claims. At the other extreme would be an economy so primitive, in terms of its financial market, that not even bilateral trades take place, and individual wealth holdings consist entirely of pure equity endowments.

The process of financial intermediation can be related to an idealized process of economic development in the following way. In the first stage individuals merely consume their equity endowments. In the second stage, a modest amount of trading in financial claims take place. Individuals engage in searching for other individuals with whom they can trade financial claims or to whom they can issue financial claims. Obviously they will do so only to the extent that such bilateral trade contributes to their utility in excess of the costs of transacting.

In the third stage of development multilateral trades take place through intermediaries in the form of financial institutions and organized markets. Securities and intermediary claims represent the results of attempts to economize on the various costs of bilateral trade and constitute attribute bundles demanded by many market participants.

The riskless asset is a useful example with which to analyze this development scenario. In the first, primitive state an individual's holding of the riskless asset will be the minimum terminal return provided

by his pure equity endowment. In the second stage the individual will consider trading with other investors, one potential result of such behavior being an increase or decrease in the minimum terminal return. In the third stage of development the general demand for riskless claims will produce something like bond markets and depositary institutions and perhaps other financial intermediaries. Insurance intermediaries can be viewed as issuing claims that turn, for the individual's purposes, human and physical wealth into riskless assets.

As individuals' endowments and preference functions differ widely, one would expect to find various forms of financial intermediation within the same capital market. Where there is a strong demand for one particular attribute, one would expect the emergence of "special purpose" financial intermediaries like particular institutions or organized markets for specific securities. Other attributes, characterized by a weak and sporadic demand over time, will be supplied, if at all, through bilateral or multilateral trade among individuals.

## Summary and Conclusion

Financial intermediation is a service function that has the effect of expanding individual investors' portfolio opportunity sets. Intermediaries of various types engage in the issuance or transfer of attribute combinations usually referred to as securities or as financial claims. The nature of the existing structure of financial intermediation results from the interaction of individual attribute endowments and preference functions with the structure of the costs of transacting.

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