

1 Introduction

Finance has become an academic field over the past forty years. Before the 1950s, finance was mostly a descriptive field. In the 1950s, a few economists began asking (and answering) some fundamental finance questions. Since the 1950s, finance has grown to become either the largest subfield of economics or a field of its own. Finance has become large enough to have its own subfields.

It is useful to understand how the different pieces of finance fit together. This lecture note describes the major subfields of finance and explains (briefly) how they relate to each other.

1.1 Market Efficiency

Probably the first conjecture of finance to be systematically studied was the idea of market efficiency. Market efficiency is the notion that market prices are set conditional on all available information. In the old market efficiency studies, people assumed that to earn returns higher than the market return on average, or to "beat the market," was impossible. As asset pricing theory has developed, people have come to believe that "while you can make excess returns, you cannot make excess utility," or that you may be able to beat the market return, but you cannot do so without taking on more than market risk and hence sacrificing some utility.

The intuition behind market efficiency is that stock picking and market timing are both competitive industries. Therefore, their economic profit in the long run (by the competitive industry paradigm of economics) should be zero. If markets are not efficient, there must be profit opportunities out there. The market efficiency literature is mostly an empirical literature, but whether markets are efficient or not does have some theoretical implications. For the most part, we assume that markets are, in some sense, efficient.

1.2 Asset pricing

The second oldest sub-field in finance is known as asset pricing. Asset pricing is the field that asks how the expected rates of return on various assets are determined. The answer that has emerged from asset pricing theory is that riskier assets must pay higher returns on average to compensate people for holding them. The big issue in asset pricing is how to measure risk properly. Put another way, asset pricing seeks to determine which risks people care about and demand compensation for, and which risks do not matter to people.

Asset pricing began with portfolio theory, the theory that describes the optimal way to combine assets into a portfolio. Markowitz (Journal of Finance, 1952) noticed that when assets are combined into portfolios, the variance of the resulting portfolio return is much smaller than the average of the variances of the returns of the assets in the portfolio. Further, the variance of a portfolio's return depends much more on the covariances of its assets returns with each other than on their individual variances. Portfolio theory explained why people were forming portfolios. The intuition that you "should not put all your eggs in one basket" was around long before Markowitz came up with a mathematical model to describe diversification. A few years after Markowitz's findings became known, several authors simultaneously derived what is known as the Capital Asset Pricing Model, or the CAPM.

As soon as the CAPM was developed, eager Ph.D. students began testing the theory with stock return data. The CAPM has been rejected for various reasons through the years. Nevertheless, it is still the model that many academics and practitioners think of when they think of asset pricing. Since researchers rejected the CAPM, asset pricing theory has largely been concerned with generalizing the model to come up with something more realistic.

The first generalization that asset pricers came up with is called no-arbitrage pricing. Pricing rules can be derived simply by not allowing people to make infinite trading

profits. Since these pricing rules rely on fewer assumptions than the CAPM, they are somewhat more believable. Examples of no-arbitrage models include the APT and the Black-Scholes option pricing model, both of which we will discuss this semester.

Asset pricers have come up with a number of models that vary by the strength of the assumptions that they require and the generality of their implications. Typically, stronger (or more restrictive) assumptions lead to more specific models. Most of the models that theorists have come up with have been tested empirically. The long-run goal of all researchers is to determine which models describe the data and which fail. When a particular model fails empirically, we can always relax some of the assumptions underlying the model and move to the next level of generality. Most asset pricing models have failed empirically, so models have become more and more general over time.

1.3 Corporate Finance

Corporate finance is the subfield of finance that deals with the interrelation between investors and firms. It originally dealt with the optimal way to finance a firm and the optimal dividend policy to follow. Modigliani and Miller (1958, *American Economic Review*) started corporate finance by asking whether or not it matters if corporations raise money by issuing bonds rather than selling stocks. They were perhaps the first economists to use a no-arbitrage argument to establish an important theory (asset pricers later borrowed the no-arbitrage idea). The Modigliani-Miller theorem says that it should not matter how firms raise capital, and it should not matter if they pay out large or small dividends. To some extent, all the reasons that Modigliani and Miller might be wrong has preoccupied corporate finance ever since.

Researchers in corporate finance have raised agency problems (the manager of the firm might not act in stockholders' interest), information issues, institutional details (like the legal system and tax effects), and all sorts of other reasons to reject the

Modigliani-Miller theorem.

Corporate finance is related to the other subfields of finance by the firm valuation techniques that it uses. As explained above, the Modigliani-Miller theorem relies on a no-arbitrage argument. The corporate topic of capital budgeting (deciding which investments you should take and which you should avoid) requires making an appropriate valuation of both the firm and the project under consideration. To value firms and projects, you must forecast their cash flows and discount those flows appropriately. The discount rate you use to value a firm (or project) should depend on the firm's risk. Measuring risk properly is the goal of asset pricing.

1.4 Microstructure

The newest subfield of finance is called market microstructure. Microstructure is the study of how assets are actually traded. It asks questions about the workings of the stock exchange rather than about how investors feel about risks. It relies heavily on information economics, asking how a market maker sets prices when faced with buyers and sellers that may have superior information. Microstructure theory helps to explain why there is such large variation in stock prices from day to day. It has the potential to answer asset pricing questions as well. For example, it may be the case that lots of the difference in average returns between assets is driven by differences in liquidity, or the ease with which different assets can be traded. Whether microstructure can explain expected returns remains to be seen.

While microstructure has been around for a while, it took off as a field with the theoretical models created by Kyle (Econometrica, 1985) and Amihud and Mendelson (1986, JFE) There is now a large empirical and theoretical literature on microstructure. It is covered fairly well by Campbell, Lo and MacKinlay.