Financial decision making in incomplete markets

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Dissertation summary

The studies in the dissertation "Financial decision making in incomplete markets" can be placed in the general framework of incomplete markets. In an incomplete market there is a shortage of traded assets for some states of the world. Consequently, it is impossible to trade one asset for every state of the world to ensure against all future risks. There are several situations in which a market becomes incomplete: if the price of certain assets exhibits features like jumps or stochastic volatility, if we are confronted with transaction costs or portfolio constraints, or if there exist non-traded or infrequently traded assets. I focus on incompleteness which arises due to some of the assets in the market being either non-traded or infrequently traded.

The first instance of market incompleteness that I deal with is that of contingent claims, for instance options written on non-traded or infrequently traded assets. In Chapter 2, I investigate what changes must be made to the traditional pricing mechanism when the underlying asset of the option is either non-traded or infrequently traded. I show in my analysis how to derive analytical formulas for European and perpetual American call options written on non-traded or infrequently traded assets. Given that the market is incomplete, the option price is not unique, but the set of possible prices can be restricted. My approach to narrowing the price interval is to restrict the volatility of the stochastic discount factor. This results in modified Black-Scholes (1973) closed-form solutions for an upper and a lower bound of the price of the call option. I find that, contrary to standard option pricing theory, the prices do not always display an increasing pattern when the volatility of the underlying asset increases. In fact, I show that the lower bound prices can decrease in response to an increase in the volatility of the underlying asset, when the underlying is either infrequently traded or non-traded.

The second case of market incompleteness that I explore in my dissertation is the problem of pricing very long-dated cash flows. In Chapter 3, I investigate how the market implicitly prices very long-dated cash-flows. I look at the prices of UK infinite maturity bonds, which were first issued in the 18th century. Some of them are still traded today. I compute theoretical prices for these bonds and show that they are a cheap investment, because they are generally underpriced. The results show that the mispricing is mainly driven by volatility in financial markets and not by expectations of the economic outlook as one might think.
The last incomplete-market setting that I study is related to the market for political contributions. The activity of companies is affected by the political decisions made in the country they operate in. However, one cannot trade in political decisions hence the market for political risk can be considered incomplete. It is natural though for companies to want to hedge against the risk of political decisions. In Chapter 4, I gather extensive information on all S&P500 companies in a time span of 18 years (i.e., between 1993 and 2010). In particular, I focus on the political contributions they make to US Congressional election campaigns and the government procurements they receive following these contributions. The results show that, in order to maximize the procurement value in the next period, companies should contribute to a large number of candidates taking part in Congressional races and preferably to candidates of the Republican Party. The effect of contributions on the subsequent procurement value is positive and statistically significant not only in the whole sample analysis, but also in sub-sample analysis. There appears to be a reciprocal relationship between contributing S&P500 companies and the government in all election cycles, where an election cycle is defined as the two-year period between US Congressional elections in which an elected candidate exerts his term and contributions can be made for the next election.

Overall, this dissertation brings together three different studies within the framework of incomplete markets and touches upon pricing and hedging issues in this particular framework. Its goal is not to give an exhaustive treatment of incomplete markets, but to show the importance of this concept and the various situations in which it can appear and how it can alter established results based on complete market arguments.