Chapter 8
Big Data Analytics and Models

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ABSTRACT

When uncertainty is regarded as a surprise and an event in the minds, it can be said that individuals can change the future view. Market, financial, operational, social, environmental, institutional and humanitarian risks and uncertainties are the inherent realities of the modern world. Life is suffused with randomness and volatility; everything momentous that occurs in the illustrious sweep of history, or in our individual lives, is an outcome of uncertainty. An important implication of such uncertainty is the financial instability engendered to the victims of different sorts of perils. This chapter is intended to explore big data analytics as a comprehensive technique for processing large amounts of data to uncover insights. Several techniques before big data analytics like financial econometrics and optimization models have been used. Therefore, initially these techniques are mentioned. Then, how big data analytics has altered the methods of analysis is mentioned. Lastly, cases promoting big data analytics are mentioned.

INTRODUCTION

Uncertainty is expressed as a situation in which many different outcomes of an option can take place in the decision-making process, but the probabilities of these different outcomes are unknown. When uncertainty is regarded as a surprise and an event in the minds, it can be said that individuals can change the future view. Market, financial, operational, social, environmental, institutional and humanitarian risks and uncertainties are the inherent realities of the modern world. Life is suffused with randomness and volatility; everything momentous that occurs in the illustrious sweep of history, or in our individual

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lives, is an outcome of uncertainty. An important implication of such uncertainty is the financial instability engendered to the victims of different sorts of perils. This chapter is intended to explore big data analytics as a comprehensive technique for processing large amounts of data to uncover insights. Several techniques before big data analytics like financial econometrics and optimization models have been used. Therefore, initially these techniques are mentioned. Then, how big data analytics has altered the methods of analysis is mentioned. Lastly, cases promoting big data analytics are mentioned.

Financial Econometric Models

This sub-section involves a comprehensive series of techniques using financial econometrics and practical applications of these techniques. This sub-section opens up the experimental subjects and techniques meet the finance, forecasting and sampling requirements including continuous-time-period sampling and an introduction to inference. The main topics of financial econometric models are Market Efficiency, Return Predictability, ARCH, GARCH, value at risk, volatility clustering, asset returns, Single and Variable linear Models, Cointegration, Conditional Heteroskedasticity, Market Microstructure, Event Analysis, Case Study Analysis Predictability, Capital Asset Pricing Models, Multi-Factor Pricing Models, Present-Price Relations, Intertemporal Equilibrium Models, and Maturity Structure Models.

Studies that examine conditional return predictability dependent on the magnitude of the information signal can be divided into two groups (Ulusavas, 2010). The first group is the ones that examine price patterns following large one-day price changes and the second group are the ones that deals with the investment strategies designed to exploit large one-day price changes. The first group, which examined price patterns following large one-day price changes, found mixed evidence. Although most of the studies found evidence of overreaction following large positive and negative one-day price change events, only a few of them found evidence of under reaction to negative price change events. However, it was noted that in the face of transaction costs, these predictable patterns do not have economic significance. The studies in the second group dealt with whether contrarian strategies or momentum strategies make abnormal profits. A contrarian investment strategy sells past winners and buys past losers relying on price reversals but a momentum strategy sells past losers and buys winners that rely on price continuations for profitability. Most of these studies documented price continuations and price reversals for different return intervals. However, these transaction intensive strategies might not be profitable if transaction costs are taken into account. Also, the contrarian investment strategies, which rely on short-term price movements, may be a manifestation of the bid-ask bounce effect.

The concept of Market Efficiency (ME) was first introduced by Fama (1965) and has been continuously studied ever since then. ME is one of the basic concepts of financial economics. It argues that in active markets, securities are invested in the best possible way by market participants. According to the Efficient Market Hypothesis, it is stated that in the active markets it is very difficult to obtain a return on market returns only with the help of past price information, (Fama, 1970). In this context; financial econometric models and machine learning techniques have also emerged as experiments where ME is experimentally tested. It refers to the instantaneous and full incorporation of all available information and expectations by market participants into financial asset prices at any given time. Therefore, in an efficient market, investors should not be able to develop investment strategies that will consistently generate abnormal profits. Bachelier (2011) described this by saying "past, present and even discounted future events are reflected in market price, but often show no apparent relation to price changes". The