Market risk is among the most important sources of risk for companies in the financial and commodity markets. Proper estimation of market risk has become very important in the electricity market, where volatility is very high and trading volumes continue to increase. Value at Risk (VaR) is the most widely used approach to quantify market risk. The aim of this thesis is to study how well analytical VaR methods can be applied to trading portfolios of electricity derivatives. The objectives of the thesis are:

1. To study how the financial electricity market differs from the financial markets and other commodity markets, and what are the implications of these differences to the estimation of market risk
2. To study which analytical VaR methods provide the best results in the financial and commodity markets
3. To study how well these analytical VaR methods perform in estimating the daily market risk for portfolios of electricity derivatives and conclude the implications of this performance to the Nordic electricity market
4. To give recommendations on how the market risk of portfolios of electricity derivatives should be measured in the financial electricity market.

Several studies show that due to the non-storability of electricity, the dynamics of the forward curve in financial electricity market differ from other commodity markets. Both the literature study and statistical analysis done in this thesis reveal that the return distributions of Nord Pool traded electricity forwards exhibit fat tails and are skewed. The non-normality of risk factor returns causes some challenges for VaR estimation. In this thesis, the most prominent analytical VaR methods are identified based on the literature study and assessed with a thorough backtesting procedure.

The statistical analysis and backtesting conducted in this thesis are unique in terms of focus and scope. The results show that using the studied VaR methods in the Nordic electricity market underestimates market risk. Practical recommendations on using VaR methods are given to market participants. The MATLAB implementation done in connection to this thesis is of considerable extent and could be used by a small or medium size company to estimate its market risk.

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electricity markets
electricity markets -- Nordic countries
value at tisk
backtesting

Säilytyspaikka-Förvaringsställe-Where deposited

Muita tietoja-Övriga uppgifter-Additional information