

Ankara Üniversitesi, Sosyal Bilimler Enstitüsü  
Risk Analizi

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Tavsiye edilen kaynaklar:

- Bankalarda Risk ve Basel 2, Hasan Candan, İş bankası yayınları
- Understanding Market, Credit, And Operational Risk The Value At Risk Approach Linda Allen, Jacob Boudoukh, And Anthony Saunders, 2004
- Piyasa Riski Ölçüm Modelleri, Hasan Şahin.

**Dersin Amacı :**

Bu ders temel olarak finansal riskin bileşenlerini ve bu bileşenlerin nasıl ölçülmesi gerektiğine ilişkin yöntemleri ele almaktadır. Ele alınacak finansal riskler temel başlık altında piyasa riski, kredi riski ve operasyonel risktir. Bu riskler hem finansal kuruluşlar (temel de bankalar) hem de düzenleyici kuruluşlar açısından önemlidir. Düzenleyici kuruluşlar finansal kuruluşların ne kadar sermaye tutacağına temel olarak bu riskler üzerinden karar verir. Bu nedenle finansal riskleri **doğru** biçimde hesaplanması önem kazanır. Bu anlamda hesaplama yöntemlerinin iyi analiz edilmesi ve değerlendirilmesi gerekir. Dersimizde yöntemler ve yöntemlerin karşılaştırmalı analizi yapılacaktır. Ele alacağımız risklere ilişkin kullanılan modellerin bir kısmı bireysel yatırımcılar perspektifinden pratik hayatta kullanılabilir niteliktedir.

İşlenecek konular ana başlıklar itibariyle aşağıdaki gibidir (Gerekli ekleme ve çıkarmalar yapıldığında duyurulacaktır):

**0. Matematik ve İstatistik**

- 0.1 Matris işlemleri
- 0.2 Temel istatistik kavramları
- 0.3 Kesikli ve sürekli değişkenler için dağılımlar ve uygulamaları

**Okuma Bölümleri Linda Allen vd'lerinden**

**Riske Maruz Değer**

**Introduction to Value at Risk (VaR)**

- 1.1 Economics underlying VaR measurement
  - 1.1.1 What is VaR?
  - 1.1.2 Calculating VaR
  - 1.1.3 The assumptions behind VaR calculations
  - 1.1.4 Inputs into VaR calculations
- 1.2 Diversification and VaR
  - 1.2.1 Factors affecting portfolio diversification
  - 1.2.2 Decomposing volatility into systematic and idiosyncratic risk

**RMD modellerinde volatilitenin sayılaştırılması**

**2 Quantifying Volatility in VaR Models**

- 2.1 The Stochastic Behavior of Returns
  - 2.1.1 Revisiting the assumptions
  - 2.1.2 The distribution of interest rate changes
  - 2.1.3 Fat tails

- 2.1.4 Explaining fat tails
- 2.1.5 Effects of volatility changes
- 2.1.6 Can (conditional) normality be salvaged?
- 2.1.7 Normality cannot be salvaged
- 2.2 VaR Estimation Approaches
  - 2.2.1 Cyclical volatility
  - 2.2.2 Historical standard deviation
  - 2.2.3 Implementation considerations
  - 2.2.4 Exponential smoothing – RiskMetrics™ volatility
    - 2.2.4.1 The optimal smoother lambda
    - 2.2.4.2 Adaptive volatility estimation
    - 2.2.4.3 The empirical performance of RiskMetrics™
    - 2.2.4.4 GARCH
  - 2.2.5 Nonparametric volatility forecasting
    - 2.2.5.1 Historical simulation
    - 2.2.5.2 Multivariate density estimation
- 2.2.6 A comparison of methods
- 2.2.7 The hybrid approach
- 2.3 Return Aggregation and VaR
- 2.4 Implied Volatility as a Predictor of Future Volatility
- 2.5 Long Horizon Volatility and VaR
- 2.6 Mean Reversion and Long Horizon Volatility
- 2.7 Correlation Measurement

## **RMD'nin pratikte uygulanması**

### **3 Putting VaR to Work**

- 3.1 The VaR of Derivatives – Preliminaries
    - 3.1.1 Linear derivatives
    - 3.1.2 Nonlinear derivatives
    - 3.1.3 Approximating the VaR of derivatives
    - 3.1.4 Fixed income securities with embedded optionality
    - 3.1.5 “Delta normal” vs. full-revaluation
  - 3.2 Structured Monte Carlo, Stress Testing, and Scenario Analysis
    - 3.2.1 Motivation
    - 3.2.2 Structured Monte Carlo
    - 3.2.3 Scenario analysis
      - 3.2.3.1 Correlation breakdown
      - 3.2.3.2 Generating reasonable stress
      - 3.2.3.3 Stress testing in practice
      - 3.2.3.4 Stress testing and historical simulation
      - 3.2.3.5 Asset concentration
  - 3.3 Worst Case Scenario (WCS)
    - 3.3.1 WCS vs. VaR
    - 3.3.2 A comparison of VaR to WCS
- Appendix 3.1 Duration

### **RMD yaklasiminin ticarete konu olmayan kredilere uygulanması**

- 4 Extending the VaR Approach to Non-tradable Loans
  - 4.1 Traditional Approaches to Credit Risk Measurement
    - 4.1.1 Expert systems
    - 4.1.2 Rating systems
    - 4.1.3 Credit scoring models
  - 4.2 Theoretical Underpinnings: Two Approaches
    - 4.2.1 Options-theoretic structural models of credit risk measurement
    - 4.2.2 Reduced form or intensity-based models of credit risk measurement
    - 4.2.3 Proprietary VaR models of credit risk measurement
  - 4.3 CreditMetrics
    - 4.3.1 The distribution of an individual loan's value
    - 4.3.2 The value distribution for a portfolio of loans
      - 4.3.2.1 Calculating the correlation between equity returns and industry indices for each borrower in the loan portfolio
      - 4.3.2.2 Calculating the correlation between borrower equity returns
      - 4.3.2.3 Solving for joint migration probabilities

- 4.3.2.4 Valuing each loan across the entire credit migration spectrum
- 4.3.2.5 Calculating the mean and standard deviation of the normal portfolio value distribution
- 4.4 Algorithmics' Mark-to-Future

#### Appendix 4.1 CreditMetrics: Calculating Credit VaR Using the Actual Distribution

### **RMD yaklasiminin Operasyonel Riske Uygulanmasi**

- 5 Extending the VaR Approach to Operational Risks
  - 5.1 Top-Down Approaches to Operational Risk Measurement
    - 5.1.1 Top-down vs. bottom-up models
    - 5.1.2 Data requirements
    - 5.1.3 Top-down models
      - 5.1.3.1 Multi-factor models
      - 5.1.3.2 Income-based models
      - 5.1.3.3 Expense-based models
      - 5.1.3.4 Operating leverage models
      - 5.1.3.5 Scenario analysis
      - 5.1.3.6 Risk profiling models
  - 5.2 Bottom-Up Approaches to Operational Risk Measurement
    - 5.2.1 Process approaches
      - 5.2.1.1 Causal networks or scorecards
      - 5.2.1.2 Connectivity models
      - 5.2.1.3 Reliability models
    - 5.2.2 Actuarial approaches
      - 5.2.2.1 Empirical loss distributions
      - 5.2.2.2 Parametric loss distributions
      - 5.2.2.3 Extreme value theory
    - 5.2.3 Proprietary operational risk models
  - 5.3 Hedging Operational Risk
    - 5.3.1 Insurance
    - 5.3.2 Self-insurance
    - 5.3.3 Hedging using derivatives
      - 5.3.3.1 Catastrophe options
      - 5.3.3.2 Cat bonds
    - 5.3.4 Limitations to operational risk hedging

### **RMD'nin Düzenleyici Kurum Modellerine Uygulanması**

- 6 Applying VaR to Regulatory Models
  - 6.1 Applying VaR to Regulatory Models
    - 6.1 BIS Regulatory Models of Market Risk
      - 6.1.1 The standardized framework for market risk
        - 6.1.1.1 Measuring interest rate risk
        - 6.1.1.2 Measuring foreign exchange rate risk
        - 6.1.1.3 Measuring equity price risk
      - 6.1.2 Internal models of market risk
    - 6.2 BIS Regulatory Models of Credit Risk
      - 6.2.1 The Standardized Model for credit risk
      - 6.2.2 The Internal Ratings-Based Models for credit risk
        - 6.2.2.1 The Foundation IRB Approach
        - 6.2.2.2 The Advanced IRB Approach
      - 6.2.3 BIS regulatory models of off-balance sheet credit risk
      - 6.2.4 Assessment of the BIS regulatory models of credit risk
    - 6.3 BIS Regulatory Models of Operational Risk
      - 6.3.1 The Basic Indicator Approach
      - 6.3.2 The Standardized Approach
      - 6.3.3 The Advanced Measurement Approach
        - 6.3.3.1 The internal measurement approach
        - 6.3.3.2 The loss distribution approach
        - 6.3.3.3 The scorecard approach