



金融学经典影印系列
[“目录和索引”英汉对照]

目录和索引翻译：叶永刚

金融工程原理

Principles of
Financial Engineering

[美] Salih N. Neftci



WUHAN UNIVERSITY PRESS

武汉大学出版社

金融学经典影印系列
[“目录和索引”英汉对照]

目录和索引翻译：叶永刚
武汉大学经济与管理学院□

金融工程原理

Salih N. Neftci 著

美国纽约城市大学研究生院
瑞士日内瓦 F A M E



WUHAN UNIVERSITY PRESS
武汉大学出版社

Principles of **Financial Engineering**

Salih N. Neftci

Graduate School, CUNY
New York, New York
and
FAME
Geneva, Switzerland

Wuhan University Press

图书在版编目(CIP)数据

金融工程原理=Principles of Financial Engineering:英文/(美)内福斯(Neftci, S. N.)著. —影印本. —武汉:武汉大学出版社, 2007. 6

金融学经典影印系列

目录和索引翻译:叶永刚

ISBN 978-7-307-05483-7

I. 金… II. 内… III. 金融学—英文 IV. F830

中国版本图书馆 CIP 数据核字(2007)第 034487 号

著作权合同登记号:图字 17-2007-033 号

责任编辑:范绪泉

出版发行:武汉大学出版社 (430072 武昌 珞珈山)

(电子邮件:wdp4@whu.edu.cn 网址:www.wdp.whu.edu.cn)

印刷:武汉中远印务有限公司

开本:787×1092 1/16 印张:36.625 字数:890千字 插页:3

版次:2007年6月第1版 2007年6月第1次印刷

ISBN 978-7-307-05483-7/F·1039 定价:50.00元

版权所有,不得翻印;凡购买我社的图书,如有缺页、倒页、脱页等质量问题,请与当地图书销售部门联系调换。

Principles of Financial Engineering, 1/E

Salih N. Neftci

ISBN: 0125153945

Copyright ©2004 by Elsevier. All rights reserved.

Authorized English language reprint edition published by the Proprietor.

ISBN: 981-259-720-4

Copyright ©2007 by Elsevier (Singapore) Pte Ltd. All rights reserved.

Elsevier (Singapore) Pte Ltd.

3 Killiney Road

#08-01 Winsland House I

Singapore 239519

Tel: (65) 6349-0200

Fax: (65) 6733-1817

First Published 2007

2007 年初版

Printed in China by Wuhan University Press under special arrangement with Elsevier (Singapore) Pte Ltd.

This edition is authorized for sale in China only, excluding Hong Kong SAR and Taiwan.

Unauthorized export of this edition is a violation of the Copyright Act. Violation of this Law is subject to Civil and Criminal Penalties.

本书英文影印版由 Elsevier (Singapore) Pte Ltd. 授权武汉大学出版社在中国大陆境内独家发行。

本版仅限在中国境内(不包括香港特别行政区及台湾)出版及标价销售。未经许可之出口,视为违反著作权法,将受法律之制裁。

Preface

This book is an introduction. It deals with a broad array of topics that fit together through certain logic that we generally call *Financial Engineering*. The book is intended for beginning graduate students and practitioners in financial markets. The approach uses a combination of simple graphs, elementary mathematics and real world examples. The discussion concerning details of instruments, markets and financial market practices is somewhat limited. The pricing issue is treated in an informal way, using simple examples. In contrast, engineering dimension of the topics under consideration is emphasized.

The book uses several real-life episodes as examples from market practices. I would like to thank International Financing Review (IFR) and Derivatives Week for their kind permission to use the material. I learned a great deal from technically oriented market practitioners who, over the years, have taken my courses. The deep knowledge, and the professionalism of these brilliant market professionals contributed significantly to putting together this text. I also benefited greatly from my conversations with Marek Musiela on various topics included in the book. Several colleagues and students read the original manuscript. I especially thank Jiang Yi, Lu Yinqi, Andrea Lange, Lucas Bernard, Inas Reshad, and several anonymous referees who read the manuscript and provided comments.

All the remaining errors are, of course, mine. The errata for the book and other related material will be posted on the Web site www.neftci.com and will be updated periodically. A great deal of effort went into producing this book. Several more advanced issues that I could have treated had to be omitted, and I intend to include these in the future editions. The future editions will also update the real-life episodes used throughout the text.

Salih N. Neftci
February, 2004
New York

Contents

目录

Preface 1

前言

CHAPTER 1 Introduction 1

第一章 导论

1. A money market problem 1
货币市场难题
2. A taxation example 4
税收例子
3. Some Caveats for What Is to Follow 8
阅读本书应遵循的原则
4. Conclusions 8
结论
- References 9
参考文献
- Case Study
案例研究

CHAPTER 2 A Review of Markets, Players, and Conventions 13

第二章 市场,参与者与惯例概述

1. Introduction 13
导论
2. Markets 13
市场
3. Players 17

2 Contents

| | |
|----------------------------|----|
| 参与者 | |
| 4. The Mechanics of Deals | 17 |
| 交易机制 | |
| 5. Market Conventions | 20 |
| 市场惯例 | |
| 6. Instruments | 27 |
| 工具 | |
| 7. Positions | 27 |
| 头寸 | |
| 8. The Syndication Process | 31 |
| 辛迪加过程 | |
| 9. Conclusions | 32 |
| 结论 | |
| References | 32 |
| 参考文献 | |
| Exercises | 33 |
| 练习 | |

CHAPTER 3 Cash Flow Engineering and Forward Contracts 35

第三章 现金流量工程与远期合约

| | |
|---------------------------|----|
| 1. Introduction | 35 |
| 导论 | |
| 2. What Is a Synthetic? | 35 |
| 什么是合成 | |
| 3. Forward Contracts | 40 |
| 远期合约 | |
| 4. Currency Forwards | 44 |
| 货币远期 | |
| 5. Synthetics and Pricing | 49 |
| 合成和定价 | |
| 6. A Contractual Equation | 50 |
| 合约方程 | |
| 7. Applications | 51 |
| 应用 | |
| 8. A "Better" Synthetic | 57 |
| “更佳”合成 | |
| 9. Futures | 61 |

| | |
|------------------------------|----|
| 期货 | |
| 10. Conventions for Forwards | 66 |
| 远期惯例 | |
| 11. Conclusions | 68 |
| 结论 | |
| References | 68 |
| 参考文献 | |
| Exercises | 69 |
| 练习 | |
| Case Study | 71 |
| 案例研究 | |

CHAPTER 4 Engineering Simple Interest Rate Derivatives 73

第四章 简单利率衍生工具工程

| | |
|-------------------------------------|----|
| 1. Introduction | 73 |
| 导论 | |
| 2. Libor and Other Benchmarks | 74 |
| Libor 和其他基准 | |
| 3. Forward Loans | 75 |
| 远期贷款 | |
| 4. Forward Rate Agreements | 84 |
| 远期利率协定 | |
| 5. Futures: Eurocurrency Contracts | 88 |
| 期货:欧洲货币合约 | |
| 6. Real-World Complications | 93 |
| 现实世界复杂性 | |
| 7. Forward Rates and Term Structure | 94 |
| 远期利率和期限结构 | |
| 8. Conventions | 96 |
| 惯例 | |
| 9. A Digression: Strips | 97 |
| 无违约纯贴现债券的例子:剥离债券 | |
| 10. Conclusions | 97 |
| 结论 | |
| References | 98 |
| 参考文献 | |
| Exercises | 99 |
| 练习 | |

CHAPTER 5 Introduction to Swap Engineering 103

第五章 互换工程导论

1. Introduction 103
导论
2. The Instrument: Swaps 105
工具:互换
3. Types of Swaps 107
互换类别
4. Engineering Interest Rate Swaps 117
利率互换工程
5. Uses of Swaps: Introduction 125
互换用途:导论
6. Mechanics of Swapping New Issues 130
新发行证券的互换机制
7. Some Conventions 135
某些惯例
8. Currency Swaps Versus FX Swaps 136
货币互换与外汇互换
9. Additional Terminology 138
新增术语
10. Conclusions 139
结论
- References 139
参考文献
- Exercises 140
练习

CHAPTER 6 Repo Market Strategies in Financial Engineering 145

第六章 金融工程的回购市场策略

1. Introduction 145
导论
2. What Is Repo? 146
什么是回购?
3. Types of Repo 148
回购类别
4. Equity Repos 153
权益回购

| | |
|---------------------------|-----|
| 5. Repo Market Strategies | 153 |
| 回购市场策略 | |
| 6. Synthetics Using Repos | 159 |
| 运用回购的合成 | |
| 7. Conclusions | 161 |
| 结论 | |
| References | 161 |
| 参考文献 | |
| Exercises | 162 |
| 练习 | |
| Case Study | 163 |
| 案例研究 | |

CHAPTER 7 Dynamic Replication Methods and Synthetics 165

第七章 动态复制方法与合成

| | |
|--------------------------------------|-----|
| 1. Introduction | 165 |
| 导论 | |
| 2. An Example | 166 |
| 一个例子 | |
| 3. A Review of Static Replication | 167 |
| 静态复制概述 | |
| 4. “Ad-hoc” Synthetics | 172 |
| “特定”合成 | |
| 5. Principles of Dynamic Replication | 175 |
| 动态复制原理 | |
| 6. Some Important Conditions | 187 |
| 某些重要条件 | |
| 7. Real-Life Complications | 188 |
| 现实生活复杂性 | |
| 8. Conclusions | 189 |
| 结论 | |
| References | 190 |
| 参考文献 | |
| Exercises | 191 |
| 练习 | |

CHAPTER 8 Mechanics of Options 193

第八章 期权机制

1. Introduction 193
导论
2. What Is an Option? 194
什么是期权?
3. Options: Definition and Notation 196
期权:定义和符号
4. Options as Volatility Instruments 201
作为波动率工具的期权
5. Tools for Options 212
有关期权的各种工具
6. The Greeks and Their Uses 219
各种希腊字母及其用途
7. Real-Life Complications 232
现实生活复杂性
8. Conclusion: What Is an Option? 233
结论:什么是期权?
- References 233
参考文献
- Appendix 8-1 234
附录
- Appendix 8-2 235
附录
- Exercises 238
练习

CHAPTER 9 Engineering Convexity Positions 241

第九章 凸度头寸工程

1. Introduction 241
导论
2. A Puzzle 242
一个谜
3. Bond Convexity Trades 243
债券凸度交易
4. Sources of Convexity 254
凸度来源
5. A Special Instrument: Quantos 261
一种特别工具:双货币期权
6. Conclusions 266

| | |
|------------|-----|
| 结论 | |
| References | 266 |
| 参考文献 | |
| Exercises | 267 |
| 练习 | |
| Case Study | 269 |
| 案例研究 | |

CHAPTER 10 Options Engineering with Applications 271

第十章 期权工程应用

| | |
|--------------------------------|-----|
| 1. Introduction | 271 |
| 导论 | |
| 2. Option Strategies | 274 |
| 期权策略 | |
| 3. Volatility-Based Strategies | 285 |
| 基于波动率的策略 | |
| 4. Exotics | 290 |
| 奇异期权 | |
| 5. Quoting Conventions | 302 |
| 报价惯例 | |
| 6. Real-World Complications | 305 |
| 现实世界复杂性 | |
| 7. Conclusions | 306 |
| 结论 | |
| References | 306 |
| 参考文献 | |
| Exercises | 307 |
| 练习 | |

CHAPTER 11 Pricing Tools in Financial Engineering 311

第十一章 金融工程中的定价工具

| | |
|----------------------------------|-----|
| 1. Introduction | 311 |
| 导论 | |
| 2. Summary of Pricing Approaches | 312 |
| 定价方法小结 | |
| 3. The Framework | 313 |
| 框架 | |
| 4. An Application | 318 |

| | |
|--|----------|
| 应用实例 | |
| 5. Implications of the Fundamental Theorem | 324 |
| 基本定理的意义 | |
| 6. Arbitrage-Free Dynamics | 331 |
| 无套利动态过程 | |
| 7. Which Pricing Method to Choose? | 335 |
| 选择何种定价方法? | |
| 8. Conclusions | 336 |
| 结论 | |
| References | 336 |
| 参考文献 | |
| Appendix | 11-1 337 |
| 附录 | |
| Exercises | 339 |
| 练习 | |

CHAPTER 12 Some Applications of the Fundamental Theorem 341

第十二章 基本定理的某些应用

| | |
|--|-----|
| 1. Introduction | 341 |
| 导论 | |
| 2. Application 1: The Monte Carlo Approach | 342 |
| 应用 1: 蒙特卡罗方法 | |
| 3. Application 2: Calibration | 351 |
| 应用 2: 校准方法 | |
| 4. Application 3: Quantos | 360 |
| 应用 3: 双货币期权 | |
| 5. Conclusions | 367 |
| 结论 | |
| References | 367 |
| 参考文献 | |
| Exercises | 368 |
| 练习 | |

CHAPTER 13 A Framework for Fixed-Income Engineering 371

第十三章 固定收入工程框架

| | |
|-----------------|-----|
| 1. Introduction | 371 |
|-----------------|-----|

| | |
|------------------------------|-----|
| 导论 | |
| 2. A Framework for Swaps | 372 |
| 互换框架 | |
| 3. Term Structure Modeling | 382 |
| 期限结构建模 | |
| 4. Term Structure Dynamics | 384 |
| 期限结构动态过程 | |
| 5. Measure Change Technology | 394 |
| 测度变化的技术 | |
| 6. An Application: CMS Swaps | 399 |
| 一种应用: CMS 互换 | |
| 7. Conclusions | 405 |
| 结论 | |
| References | 405 |
| 参考文献 | |
| Appendix 13-1 | 406 |
| 附录 | |
| Exercises | 409 |
| 练习 | |

CHAPTER 14 Tools for Volatility Engineering, Volatility Swaps, and Volatility Trading 411

第十四章 波动率工程、波动率互换和波动率交易的各种工具

| | |
|-------------------------------------|-----|
| 1. Introduction | 411 |
| 导论 | |
| 2. Volatility Positions | 412 |
| 波动率头寸 | |
| 3. Invariance of Volatility Payoffs | 413 |
| 波动率支付的不变性 | |
| 4. Pure Volatility Positions | 420 |
| 纯波动率头寸 | |
| 5. Volatility Swaps | 424 |
| 波动率互换 | |
| 6. Some Uses of the Contract | 429 |
| 合约的某些用途 | |
| 7. Which Volatility? | 430 |
| 哪一种波动性? | |
| 8. Conclusions | 432 |

| | |
|------------|-----|
| 结论 | |
| References | 432 |
| 参考文献 | |
| Exercises | 433 |
| 练习 | |

CHAPTER 15 Smile Effects in Financial Engineering 435

第十五章 金融工程的微笑效应

| | |
|----------------------------------|-----|
| 1. Introduction | 435 |
| 导论 | |
| 2. Preliminaries | 435 |
| 初步 | |
| 3. A First Look at the Smile | 437 |
| 微笑一瞥 | |
| 4. What Is the Volatility Smile? | 438 |
| 什么是波动率微笑? | |
| 5. Smile Dynamics | 446 |
| 微笑动态过程 | |
| 6. How to Explain the Smile | 446 |
| 如何解释微笑性 | |
| 7. The Relevance of the Smile | 454 |
| 微笑的相关内容 | |
| 8. Trading the Smile | 454 |
| 微笑交易 | |
| 9. Pricing with a Smile | 455 |
| 微笑定价 | |
| 10. Exotic Options and the Smile | 460 |
| 奇异期权和微笑 | |
| 11. Conclusions | 464 |
| 结论 | |
| References | 464 |
| 参考文献 | |
| Exercises | 465 |
| 练习 | |

CHAPTER 16 How Do Credit Derivatives Change Financial Engineering? 467

第十六章 信用衍生工具如何改变金融工程?

| | |
|--|-----|
| 1. Introduction | 467 |
| 导论 | |
| 2. Terminology and Definitions | 468 |
| 术语和定义 | |
| 3. Credit Default Swaps | 470 |
| 信用违约互换 | |
| 4. Total Return Swaps | 479 |
| 总回报互换 | |
| 5. Uses of Credit Derivatives | 482 |
| 信用衍生工具用途 | |
| 6. Balance Sheets and Credit Derivatives | 486 |
| 资产负债表和信用衍生工具 | |
| 7. Conclusions | 487 |
| 结论 | |
| References | 487 |
| 参考文献 | |
| Exercises | 488 |
| 练习 | |
| Case Study | 490 |
| 案例研究 | |

CHAPTER 17 Engineering of Equity Instruments: Pricing and Replication 493

第十七章 权益工具工程:定价和复制

| | |
|--|-----|
| 1. Introduction | 493 |
| 导论 | |
| 2. What Is Equity? | 494 |
| 什么是权益? | |
| 3. Engineering Equity Products | 500 |
| 权益产品工程 | |
| 4. Financial Engineering of Securitization | 510 |
| 证券化中的金融工程 | |
| 5. Conclusions | 514 |
| 结论 | |
| References | 514 |
| 参考文献 | |
| Exercises | 515 |
| 练习 | |