WILEY FINANCE

STRUCTURED PRODUCTS IN WEALTH MANAGEMENT

Steffen Tolle
Boris Hutter
Patrik Rüthemann
Hanspeter Wohlwend

Contents

Copyright page

Preface

Authors

Introduction

- Authors’ note

CHAPTER 1 Derivatives

- Introduction
- Forwards and futures
- Swaps
- Options
- Summary

CHAPTER 2 Structured Products

- Introduction
- What are structured products?
- Certificates
- Maximum return products
- Capital protection products
- The market for structured products
- Summary

CHAPTER 3 The Investment Process

Introduction
Overview of the investment process
Investor analysis
Strategic asset allocation
Tactical asset allocation
Implementation in the portfolio
Performance reporting
Summary

CHAPTER 4 Using Structured Products in Wealth Management

Introduction
The use of structured products in the core portfolio
The use of structured products in the satellite portfolio
Currency management with derivatives
Risk reporting
Summary

Conclusion

Index

Structured Products in Wealth Management

Steffen Tolle

Boris Hutter

Patrik Rüthemann

Hanspeter Wohlwend

WILEY

John Wiley & Sons (Asia) Pte. Ltd.

Published in 2008 by John Wiley & Sons (Asia) Pte. Ltd.

2 Clementi Loop, #02-01, Singapore 129809

Other Wiley Editorial Offices

John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, USA

John Wiley & Sons, Ltd., The Atrium, Southern Gate, Chichester, West Sussex P019 8SQ, UK

John Wiley & Sons (Canada), Ltd., 5353 Dundas Street West, Suite 400, Toronto, Ontario M9B 6H8, Canada

John Wiley & Sons Australia Ltd., 42 McDougall Street, Milton, Queensland 4064, Australia

Wiley-VCH, Boschstrasse 12, D-69469 Weinheim, Germany

Library of Congress Cataloging-in-Publication Data

ISBN: 978-0470-82330-9

Translation from German: CLS Communication AG, Basel, Switzerland

Lead translator: Barbara Maas, Chief Language Officer, CLS Communication AG

Artwork/Illustrations: freicom communications ag, St. Gallen, Switzerland

Typeset in 11/14 point, Garamond by C&M Digitals (P) Ltd.

Preface

Wegelin & Co. Private Bankers have a long history of developing structured products – in fact, they were involved in the very first issues in Switzerland. Since then the market for these products has gone on to become one of the fastest growing in the financial world. Dr. Steffen Tolle was the pioneer, and the leading figure in the first product launches. In addition, Dr. Hanspeter Wohlwend's dissertation, *Der Markt für Strukturierte Produkte in der Schweiz* (The Market for Structured Products in Switzerland), forged an important link between theory and practice. Patrik Rüthemann and Boris Hutter are responsible for the issuance of equity-linked derivatives and related research coverage in the Structured Products department of Wegelin & Co. Their product solutions are tailored to the needs of investors in a given market environment.

Structured products have been largely overlooked in the relevant literature, and books on how to make the best use of these instruments are few and far between. With the aim of making information on these products more accessible to investors, we wrote the German version of this book in 2005. The conceptual foundation for the project was laid in New York, a vibrant metropolis and the centre of the financial world, but the final touches were added at home in a cabin in the Swiss Alps. After the success of the German, French and Italian editions, we decided to publish this edition in English, which has been internationalized and brought up to date.

The book owes much to the support of countless colleagues, and we would like to express our sincere gratitude to all those who helped make it a success. Our thanks also go to Wegelin & Co. for its generous assistance.

Dr. Steffen Tolle

Boris Hutter

Patrik Rüthemann, CFA

Dr. Hanspeter Wohlwend

St. Gallen, Switzerland

June 2008

Authors

Dr. Steffen Tolle • Born in 1964, studied business administration at the University of St. Gallen, majoring in finance and accounting. He completed his PhD in 1993 with a dissertation on “Dynamic Hedging Strategies with SMI Futures.” After joining Wegelin & Co. Private Bankers in 1991, he took over as head of Products and Trading in 1996. He has been a managing partner since 1999. Today he is head of Advisory and Wealth Management at Wegelin & Co.

Boris Hutter • Born in 1974, joined Wegelin & Co. Private Bankers in 2001 after studying economics at the University of St. Gallen with a major in finance and capital markets. He is involved on a daily basis in the launch of new structured products.

Patrik Rüthemann, CFA • Born in 1974, studied business administration with a major in finance and capital markets at the University of St. Gallen. After completing his studies he joined the Structured Products department of Wegelin and Co. Private Bankers in 2000. Today he is head of Products and Trading and became a partner in 2007.

Dr. Hanspeter Wohlwend • Born in 1971, studied business administration at the University of St. Gallen, majoring in banking. In 2001 he completed his PhD in financial market theory at the same university with an empirical study of the Swiss market for structured products. Since 1995 he has held various positions at Wegelin & Co. Private Bankers, including head of Investment Process and Portfolio Management. Today he is responsible for the bank’s Operations as a managing director.

Introduction

Structured products in the form of equity-linked derivatives have enjoyed a rapid rise in popularity. Creative and tailored investment solutions that formerly were available only to the institutional market are now being offered to private investors. As their usage spreads, so does the need to better understand these financial products, while the growing variety of products makes it increasingly difficult to maintain an overview. Additionally, employing such products in the investment process calls for a systematic methodology focused on clear objectives. Selecting and combining innovative new products at random can hardly result in outperformance.

While the list of specialized publications on the subject of derivatives such as options and futures as well as on traditional investment vehicles like stocks and bonds is seemingly endless, structured products have scarcely received any attention. Those wishing to find out how to use such products in a practical and efficient manner have come up empty handed. This book aims to fill this gap. It shows how to take strategic advantage of the specific characteristics of structured products within a methodically planned investment process.

The distinctive feature of structured products is their combination of an underlying asset – typically stocks or bonds – with a derivative component. A solid knowledge of the constituent parts of structured products is crucial to an understanding of how they function. Chapter 1 deals extensively with such derivatives as forwards, futures, swaps and options, with the chief emphasis on equity options. Building on this, Chapter 2 goes on to provide an overview of the various types of structured products,

covering certificates, products with maximum return, and those featuring capital protection.

Simply being aware of the characteristics of structured products, however, is not enough to ensure successful investing. Rather, the products must be embedded in an integrated investment process that makes appropriate use of their respective profiles. This process in turn must systematically incorporate both strategic and tactical investment decisions, as well as comprehensive reporting. Chapter 3 presents just such an integrated investment process, while Chapter 4 builds on the content of the previous chapters to describe the systematic use of structured products in daily portfolio management. It becomes clear that the risk/return profile of a given portfolio can be optimally adapted to an investor's needs and expectations through application of these products.

The focus is on the practical use of equity-linked derivatives, with the primary emphasis on wealth management. The book is targeted at investors, wealth managers, client relationship managers and students, as well as anyone with an interest in the financial markets. This book should prove especially useful to anyone wishing to maintain and grow wealth through the systematic use of derivative products.

Authors' note

Throughout this book, we have, in the interests of readability, used pronouns in the masculine gender only, in order to avoid the cumbersome and awkward use of both genders concurrently, such as "he/she," "he or she," "his/her" or "his and her." No sexist connotations should be inferred or implied from this purely stylistic decision. As a result, wherever the masculine gender is used in this book,

it should implicitly be construed to refer to the feminine gender, or to both.

CHAPTER 1

Derivatives

Introduction

Derivative financial instruments are the building blocks of structured products, and the overall character of structured products is largely a function of their derivative components. Anyone wishing to understand structured products properly must therefore come to grips with derivatives. This chapter provides the necessary basis for such an understanding. It takes a deliberately broad approach, focusing on the way options function and how they are priced while also discussing forwards, futures and swaps.

Derivatives are by nature a zero-sum game. One party's gain is automatically the counterparty's loss. Are derivatives then nothing more than a frivolous gamble, in which someone makes a profit at someone else's expense?

Media reports on the enormous losses and spectacular corporate insolvencies caused by the uncontrolled use of derivative financial instruments are a frequent occurrence: just think of Orange County, Metallgesellschaft AG or Barings Bank. In fall 1998, the widely publicized collapse of the hedge fund Long Term Capital Management (LTCM) shook the global financial system. When Warren Buffett, probably the most famous investor in the world, described derivatives as "financial weapons of mass destruction," he put into words a long-held fear that derivatives might indeed be dangerous.

Before discussing individual instruments, it is important to first begin with a few basic reflections on the economic utility of derivatives.

Definition and overview

Derivative financial instruments (the name comes from the Latin *derivare*, meaning to draw off from a source) are forward contracts priced on the basis of an underlying asset, also known simply as the "underlying." Although most derivatives are based on financial instruments or commodities, other underlyings are also possible.

The universe of instruments available can be subdivided into the following basic categories *(Figure 1.1)*.

Let's have a look at each:

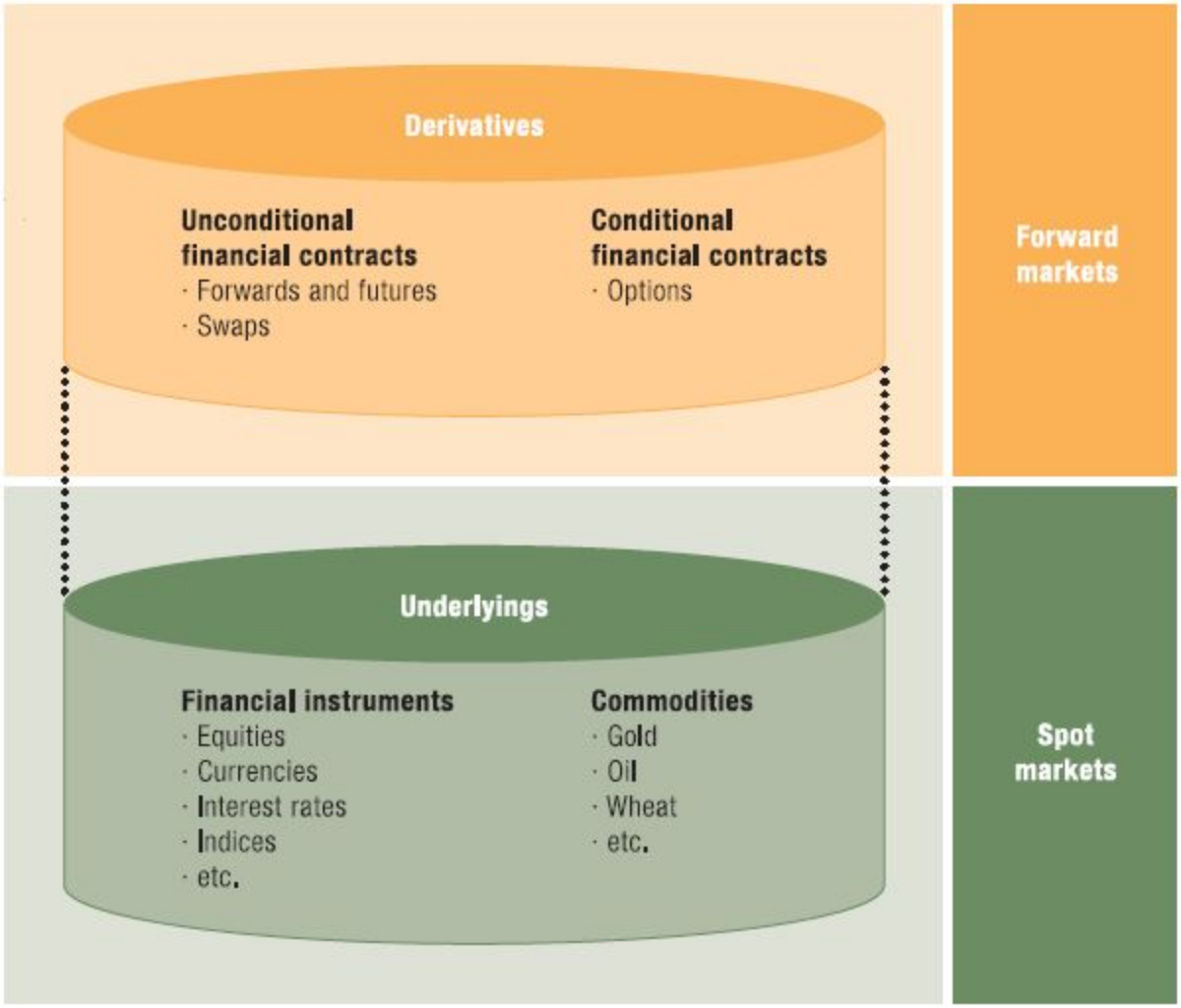
- **Forwards and futures** are unconditional financial contracts. In contrast to a transaction on the spot market, in which deals are concluded directly at the current price, the partners in a forward or future transaction set the price at the time the contract is entered into. Cash and assets only change hands at a future date. Upon expiration of the contract, both partners must fulfill their obligations and trade the underlying at the agreed price.

  Example of a forward contract: forward currency transaction – An American engineering firm is planning a take-over in Europe. In three months, the chief financial officer (CFO) will require 10 million euros (EUR) to pay for the deal.

  The current exchange rate is $1.35 (USD) to the EUR. Since the CFO expects the EUR to appreciate, he enters into a forward currency contract. He buys EUR on a forward basis at a rate of USD 1.3550 to the EUR. There is no payment at the time the contract is entered into. When the contract matures in three months, EUR 10

million is exchanged for USD 13.55 million. The CFO is therefore able to plan his financing without worrying about the future EUR–USD exchange rate.

Figure 1.1 Spot and forward markets



- In the case of a **swap**, the two parties agree to exchange payment streams over a given time period. Since swaps can be seen as bundles of forward contracts, they are also classified as unconditional financial contracts.

Example of a swap: interest rate swap – A small bank has USD 250 million in fixed-rate mortgage assets with an average maturity of five years. On the liabilities side, meanwhile, it has client assets on which it pays variable

interest rates. In a rising interest rate scenario, the bank's financial situation will deteriorate. Higher interest payments will need to be paid on the client assets, while the mortgages will not generate any additional income. For this reason, the bank's management decides to hedge its interest rate risk by means of a five-year payer swap. In other words, the bank pays its counterparty a fixed interest rate, or "swap rate," over the next five years, and receives a floating rate in return. The bank is thus compensated for rising interest rates by higher payments from its swap transaction.

- **Options,** on the other hand, are conditional financial contracts since the buyer of an option contract has a choice of whether to fulfill the terms of the contract. The buyer can either purchase (call option) or sell (put option) an underlying asset on a fixed date in the future. He will exercise this right only if it is advantageous for him to do so. In contrast to an unconditional financial contract, buying an option contract requires an initial cash outlay. The buyer pays the seller the option price, since the right thereby acquired already has a monetary value at the time of the transaction. A further transaction only occurs upon expiration of the contract if the buyer exercises his option.

Example of an option: call option on a stock – An investor looking to speculate is convinced that a technology company's stock is set to post major gains in the month ahead on the back of positive corporate news. The current stock price is USD 75.00. In order to profit from the expected gain in the stock price with the lowest possible investment of capital, the investor decides to buy a call option with a residual time to expiration of six weeks and a strike price of USD 77.50. The right to buy the stock at USD 77.50 is worth USD 0.70.

Background and history

The vast majority of derivative financial instruments are not traded on an exchange but rather over the counter, in the so-called OTC market. Since OTC transactions are negotiated bilaterally between the market participants, there are no reliable figures available on the size and growth of the market. What is clear is that interest in derivatives, along with their usage, has increased sharply since the 1970s. This boom has been driven by a variety of factors:

- The development of the Black-Scholes option-price formula in 1973 constituted a major scientific breakthrough in the history of derivatives, providing all market participants with a common framework for the valuation of options. Overnight, the prospect of a liquid market in these products improved, since it became possible to reliably assess the value of some types of derivatives.
- Progress in information technology provided further momentum: the first pocket calculators came onto the market in 1972. Since then computing power has made enormous strides, while prices of equipment have dropped tremendously.
- The development of derivative financial instruments was institutionalized through the establishment of financial futures and options exchanges. The Chicago Board Options Exchange (CBOE) began trading in 1973, the London International Financial Futures Exchange (LIFFE) opened its doors in 1982, and EUREX, a German–Swiss joint venture, was formed in 1988.
- The 1970s were also a period of profound economic transformation. The abandonment of the gold standard and the collapse of the Bretton Woods system meant that exchange rates were no longer fixed, and henceforth were subject to constant fluctuation. At the same time, the oil shocks drove up inflation, bringing

volatility to the fixedincome markets. As uncertainty increased, so did the demand for efficient hedging instruments.

And yet for all that, derivatives are not a 20th-century invention. Options on tulip bulbs were traded in Holland as early as the 17th century. At the same time, the Japanese began to trade forward contracts on rice. Hence, even then there was a need for instruments that could help to manage risk.

For example, Japanese rice farmers were exposed to price risks since they were unable to predict the value of their harvest at the time they planted their crop. If a rice dealer wanted to be certain about the price he would have to pay for his goods, however, he entered into a forward contract with the farmer, which fixed the ultimate price to be paid.

When the harvest was brought in, and depending on how the market had developed in the interim, it became clear which of the two – farmer or dealer – would have been better off without the hedge. Nevertheless, both parties would have benefited in advance from the elimination of price risk.

The advantages of derivatives

Derivative financial instruments constitute a considerable step forward for the financial markets. Their advantages can be summed up as follows:

- Derivatives make risks tradable, transferring them to those market participants who are willing to bear them. Derivatives play a key role in efficient risk allocation.
- Derivatives can be synthetically replicated with the appropriate combination of an investment in the underlying and a fixed-income instrument. This characteristic can be used to price derivatives. If the derivative’s payoff profile can be replicated exactly by

means of a so-called replication portfolio consisting of its core investments, then their prices will be identical. In contrast to the synthetic replication, however, the desired payoff profile can be purchased in the form of a derivative at considerably lower transaction costs.

- When derivatives are available, the market for a given underlying becomes more complete. If, for instance, there is a liquid market in options on a given stock, the price of such options will provide valuable information about investors' risk perception.
- The prices of underlyings and derivatives are not free to develop randomly. They are linked to one another via a price mechanism. The ease with which they can be traded and their low transaction costs cause many market players to react to newly available information by trading in the forward market. Via the pricing mechanism mentioned above, these transactions feed through to the spot market and thus enhance pricing efficiency.

Derivatives may thus be considered useful products for risk management. Additionally, they produce positive external effects for the financial markets as a whole. And yet, despite their undisputed utility, if used improperly derivatives can prove every bit as fatal as any incorrectly applied medication. The leverage effect combined with the modest capital investment they require calls for a profound grasp of their function and careful monitoring of existing positions.

Transaction motives

The term "market participant" refers to a heterogeneous group comprising both institutions and private individuals. The examples provided in the introductory section give an initial idea of the participants in the derivatives market: producers and consumers of agricultural goods and commodities seeking to eliminate price risks and improve

their financial planning, and internationally active companies interested in managing exchange rate risks. Banks and insurance companies employ derivatives to manage interest rate risk, while private investors use them to adjust the risk profile of their portfolios. In addition, investment banks and futures and options exchanges are pivotal elements in the market, functioning as intermediaries and bringing together the various individual players.

This is by no means an exhaustive list. It makes sense, therefore, to categorize market participants according to their transaction motives. These fall into three groups:

- *Hedging:* Hedging means entering into an additional transaction to protect a given position against price fluctuations. The rice farmer is exposed to fluctuations in the price of his product on the rice market, and can eliminate this risk by means of a forward contract. The hedger is motivated by the need to protect a position against an existing or expected risk.
- *Speculation:* Despite the negative connotations, speculators perform an important function in the forward market. Speculators seek to exploit expected price developments for their own profit. Since future prices cannot be predicted with accuracy, such speculative investments always entail a risk.

In order to protect himself against price risk, the hedger must find someone prepared to serve as a counterpart. In reality, however, there is no guarantee that a rice farmer will always find a rice dealer with a perfectly complementary hedging requirement. The speculator generates additional liquidity by using these instruments to realize his expectations for prices. The rice farmer is also able to transfer his price risk to a market participant speculating on higher rice prices.

- *Arbitrage:* Arbitrageurs seek to exploit price inefficiencies to make risk-free profits. If the price of a derivative is not in equilibrium with that of its synthetic replicate, the situation can be exploited because two identical investments have different valuations. The arbitrageur buys the instrument that is undervalued, financing the investment with the sale of the overvalued position. Each such transaction will continue to provide a risk-free profit until the prices move back into equilibrium. Arbitrageurs thus play a key role in creating efficiency in the financial markets. Arbitrage-free pricing must ensure a balance between the price of an underlying and that of its derivative. The values of these investments are linked via a price mechanism.

Below is a detailed account of the major basic types of derivatives. In addition to unconditional financial contracts (forwards, futures, swaps), the focus is on options, which are especially important to an understanding of structured products.

Forwards and futures

Forwards and futures are unconditional financial contracts, in which two parties agree on the key points of a transaction to be made in the future.

Here is an initial example: a US gold mining company must decide whether to continue investing in one of its gold mines. If production were expanded, this would make new deposits of 25,000 troy ounces available, but the costs of mining them would be relatively high.

According to the business plan, the investment would only pay off if the gold thus extracted could be sold for USD 650 per ounce. The project is being discussed at the moment because the price per ounce has currently reached USD 690

on the spot market. Expanding the mine and extracting the deposits, however, will take six months.

The gold mining company takes a price risk if it makes the investment because it cannot predict the price of gold in six months. The project's profitability is thus directly dependent upon the development of the price. Since the mining company is also considering other capital expenditures, it must be able to plan future cash flows as accurately as possible. The mining company is therefore interested in eliminating the price risk and hedges the return on investment with the help of forward or future contracts.

Forward contracts

A forward contract is an agreement between two parties to buy or sell a given underlying asset at a particular time in the future at a predetermined price. Forward contracts are bilaterally negotiated transactions concluded OTC (over the counter).

The agreed price, also known as the delivery price, does not correspond to the underlying's current market price or "spot price." Since there is no cash flow upon conclusion of the agreement, the delivery price must be chosen to ensure that the forward has no monetary value at the time of the transaction. Further information on forward pricing is found in a subsequent section.

The buyer of the forward thus assumes a so-called "long position" by agreeing to purchase the underlying when the contract expires. The seller of the forward, meanwhile, holds a "short position," and is obliged to deliver the underlying at the predetermined price.

The performance of a forward contract is closely tied to the spot price of the underlying. Although the contract has no monetary value for either party at the time of the transaction, the value will develop subsequently in line with

the price of the underlying. The long position will profit from rising prices on the spot market, while falling prices will benefit the short position.

Example: The gold mining company knows that it will have 25,000 troy ounces of gold at its disposal in six months' time. It can sell this amount now on a forward basis. A potential buyer might be a jewellery manufacturer who needs to be certain what his future costs will be. The transactions of the two parties are as follows: the mining company sells the entire amount of the deposits forward, thereby taking the short position. On the other side of the deal, the jewellery manufacturer agrees to buy the gold in six months' time, thereby taking the long position in the contract. The agreed delivery price is USD 705 per troy ounce.

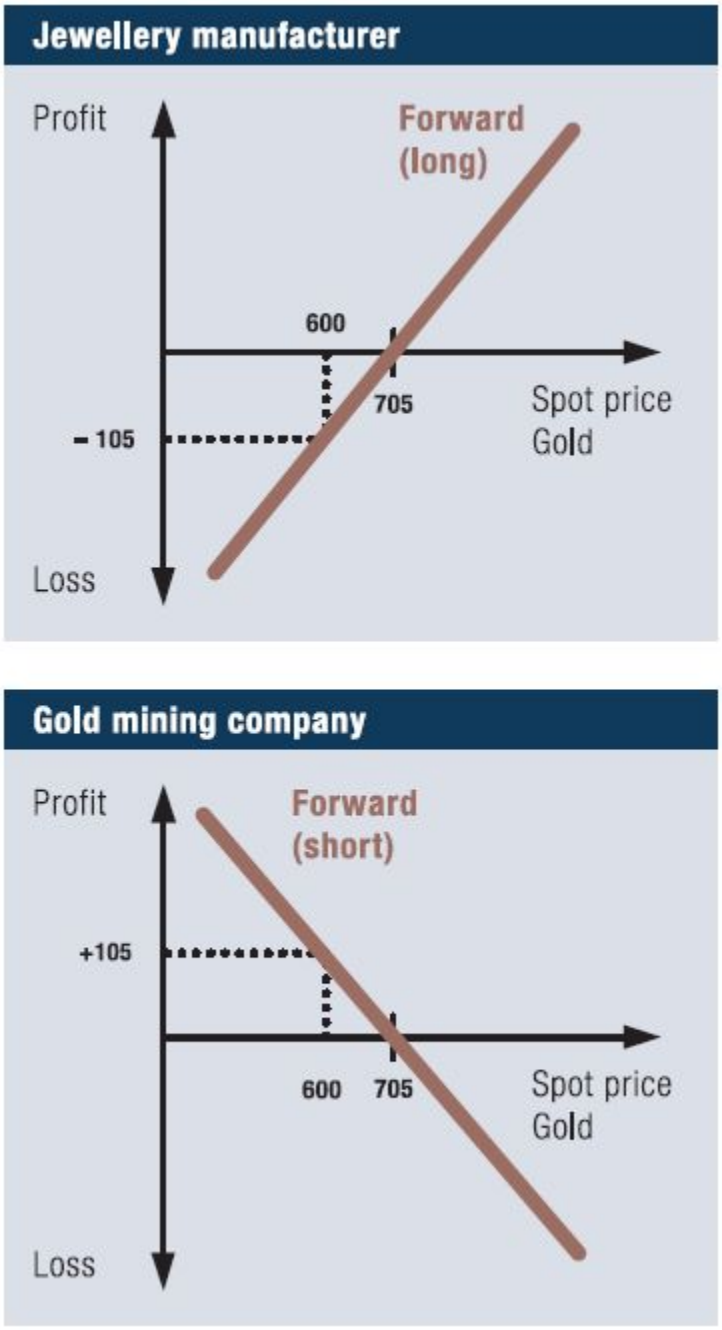
The transaction is executed when the contract matures. Regardless of the actual market price of gold at the time, 25,000 ounces are exchanged for USD 17.625 million. If, for instance, the spot price of gold drops to USD 600 per ounce by the time the contract matures, the mining company has made a profit of USD 105 per ounce. It is now able to deliver the gold at a price of USD 705 even though the market is currently paying only USD 600 per ounce. For the jewellery manufacturer, meanwhile, the situation is precisely the reverse: having agreed to pay USD 705 per ounce for the gold supplied, he must now make good on the contract in spite of the fact that he could currently buy the gold for a significantly lower price on the market.

Figure 1.2 indicates the payoff profile for a forward contract on its maturity. It shows a profit or a loss depending upon the spot price. Forwards exhibit a linear payoff profile: the long position is in loss as soon as the spot price on expiration is below the agreed delivery price, and vice versa. One party's loss thus automatically generates an equivalent profit for the counterparty.

Characteristics of a forward contract

Forward contracts are individual agreements made between two parties. This makes their structure very flexible. The gold mining company can, for example, sell the precious metal forward on the production date. Due to their individuality, forward contracts are not suitable for trading on an exchange. They are traded exclusively in the OTC market. This flexibility has its disadvantages as well, namely in terms of liquidity. For one thing, such agreements require a counterparty that is prepared to assume the counterposition; there is also no secondary market in forward contracts. This means that if, for whatever reason, the gold mining company decides to exit its price hedge, it must either approach the jewellery manufacturer directly or involve a third party.

Figure 1.2 Payoff profile for a forward contract



Forwards are also distinguished by the fact that both parties assume a counterparty risk. They are obligated to perform a transaction in the future, on the agreement's expiration date. Cash and commodities do not change hands until the term of the contract expires. The gold producer will only receive the USD 17.625 million on the delivery date if the jewellery manufacturer is solvent. For