

Wiley Finance Series

The Trade Lifecycle

*Behind the Scenes of
the Trading Process*

Second Edition

ROBERT BAKER

WILEY

The Trade Lifecycle

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To the memory of my dear mother

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Foreword from the First Edition

Trading has evolved from a humble apple grower wanting a stable price for his produce come harvest time, to a complex and exciting industry comprising a significant share of the global economy.

Trading is the fundamental activity of investment banks, hedge funds, pension funds and many other financial companies. There is no better way to understand the workings of a financial entity than to follow the progress of a trade through its lifecycle and all the activities performed upon it.

This book will dissect a trade into its components, track it from conception to maturity and describe the *raison d'être* of the business functions of a financial entity all arising from the processing of a trade. Having seen the full path of a trade, the reader will gain a more complete view of the world of finance which will answer some fundamental questions such as why, what and how people trade.

Derivatives are complex variations of standard trades. By contrast and comparison with the lifecycle of standard trades the reader will glean a better understanding of these often misunderstood financial instruments.

Together with the trade itself, the book will explore essential activities such as booking, confirmation, settlement, risk management, legal obligations, finance and control functions such as credit, market risk and auditing. Almost every person working in an investment bank or hedge fund has a large part of their work connected to the lifecycle of a trade. It is the glue by which all the departments are bound and the aggregated success or failure of each trade determines the survival and growth of the entire organisation.

The book also draws on real life experience of the trading floor. The sights and sounds of the action are brought to life to allow the reader to see how abstract concepts are actually practised. Detailed case studies illustrate how financial business problems were solved with varying degrees of success. There is also a unique description of the world of the quantitative analyst – a function that few people understand.

WHY THIS BOOK?

Many volumes have been written on the business side of trading and related activities such as market risk management. Although particular areas of the processes behind

trading have been explained, I have not found the complete lifecycle of a trade fully described in one book. I feel a thorough end-to-end guide would be of interest to:

- anyone seeking work in the financial services industry
- people already in the industry who want to see how their work fits into the organisation as a whole
- those with an interest in the activities of a financial entity. They could include clients, academics, pension holders and people making investments of all sizes
- people selling products and services to the financial sector such as software vendors.

The importance of the financial sector to the world economy has been brought into focus by many recent events: the credit crunch, the collapse of companies such as Lehman Brothers and a recession affecting most countries across the world. The result has been a demand for better inspection and regulation of trading activities. No longer is it sufficient for firms to return profits, they have to convince investors, shareholders and regulators that they are employing due diligence and managing risks.

In writing about the trading process, my aim is to reveal all areas subject to potential risk. Once a risk is known, it can be monitored and managed even if the eventual decision is not to take action – forewarned is forearmed.

Although any financial entity engaged in trading activities will have already arrived at a set of processes spanning the trade lifecycle, these are not always performed in an optimal fashion; they may have evolved more by historical accident than by design. A careful reappraisal of the *entire* trading processes can lead to:

- a reduction in risks
- exposure of weaknesses
- lower operating costs
- elimination of wastage
- better overall awareness leading to more confidence in the trading process.

I hope that this book might encourage all participants in the trade lifecycle to look again at their activities and those of their colleagues and see where improvements can be made to reduce risk and enhance the reputation of a battered industry.

Gaining employment in the financial sector is becoming increasingly competitive. It is no longer sufficient to have the skills and experience in one business function. Applicants must demonstrate an understanding of where they fit into the organisation and have the ability to communicate with other business functions – every activity in the trade lifecycle being connected to others. This book is written with a view to helping this understanding.

I have tried to make the book a readable progression through all the important activities and components of the trade lifecycle. Detailed explanations are given where necessary, but the book is intended as a comprehensive overview and therefore I have avoided too much detail where it might hinder the reader's ability to see the full picture.

Any mistakes are mine. All views expressed are entirely my own.

Foreword to the Second Edition

Since the book was first published in 2010, many changes have been occurring to trading. The most significant is in the field of regulation. Investment banks and other financial institutions are now subject to more regulations which cut deep into the way they are allowed to operate. This is both on a macro level affecting the way they are structured and on a micro level in how individual trades are executed and processed. Thus a section of the second edition is devoted to regulation.

Feedback from the first edition included a desire of the readership to know more about asset classes – this chapter has been expanded.

A common confusion is the difference between asset classes and financial products. A chapter of the book seeks to remove this confusion and further the understanding of how products behave by ‘following the money’, that is examining the cashflows of several commonly traded products.

Quantitative analysts play a vital role in finance but are little known and understood. A chapter is therefore devoted to shedding some light on this business function.

In training courses based on the book, I have frequently been asked what working in capital markets and on trading floors is really like. This edition tries to give the reader a flavour of these experiences including real life case studies.

Finally, I have in the course of my career come to the realisation that one of the greatest impediments to delivering successful IT projects is a phenomenon I refer to as ‘The IT divide’. This second edition describes the problem and some possible solutions.

Preface

This book is divided into five parts.

Part I is entitled '**Products and the background to trading**'. It starts with a chapter on trading giving an overview of trading in general as well as that related to the financial services industry. The next chapter is a background to risk which is another important theme of the book. We then look into specific trades by examining the cashflows associated with each. Chapters follow on asset classes and derivative products. Part I concludes with a look at three important aspects of trading – liquidity, price and leverage.

Part II is '**The trade lifecycle**'. It starts with an anatomy of the trade which is the core element of the lifecycle. Then the lifecycle is analysed in detail followed by a chapter on cashflows and asset holdings which are directly influenced by the lifecycle. We then move on to four methods of direct monitoring of trades throughout their lifetime: risk management, market risk control, counterparty risk control and accounting. There is a discussion of P&L attribution followed by a full description of the business functions in the lifecycle (i.e. the people). Then there is a chapter on regulation including Credit Value Adjustment (CVA) – a subject growing in importance.

Part III '**What really happens**' lifts the lid on the trading floor with chapters on insights into the real world of capital markets – here be dragons, case studies of real projects, the 'IT divide' and quants in capital markets.

Part IV '**Behind the scenes**' looks into processes, new products, testing, data, reports and calculations.

Finally, in Part V, the **Appendix** summarises the risks arising from the trade lifecycle.

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I would like to thank my colleague Geoff Chaplin (of Reoch Credit Partners LLP) for his inspiration and guidance that allowed this book to come into existence.

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This book would not have been possible without the help of Thomas Hyrkiel, Jenny Kitchin and many more at the publishers John Wiley & Sons.

Finally I thank my wife Nechama for her constant love and support, my children and grandchildren for reminding me what is important in life and my father for all his advice and guidance.

About the Author

Robert Baker (London, UK) works as a consultant in the development of financial software and in training. Robert has over 20 years of commercial programming experience of which the last 13 have been in the financial sector, primarily as a quantitative developer sitting between traders, quants and programmers. He has been involved in credit derivatives for 10 years, and has held positions at ABN Amro, Barclays Capital, UBS Warburg, Rabobank, Royal Bank of Scotland and at the hedge fund Solent Capital. Robert also has experience of project management across a wide range of asset classes and financial instruments from plain vanilla to complex exotics. He holds a degree in mathematics from the University of Oxford.

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PART

One

Products and the Background to Trading

In this chapter we introduce the concept of trading which underpins the whole book and go on to look at factors influencing trading, market participants, how trading occurs and related topics.

1.1 HOW AND WHY DO PEOPLE TRADE?

People engage in trade primarily for one or more of the following reasons:

- Require more or less of a product
We go shopping because we need things. The same is true of financial products. One person buys something that another person has in surplus and is prepared to sell.
- To make profit
If someone anticipates that he can buy for less than he can sell and has the ability to hold a product long enough to take advantage of the price differential, he trades.
- To remove risk
Sometimes we need protection. We are worried that future events may cause our position to deteriorate and we therefore buy or sell to reduce our risk. The ship is safe, fully loaded in port today, but how will it fare exposed to the open sea tomorrow?

1.2 FACTORS AFFECTING TRADE

In order to understand trading we will proceed to discuss the motivation behind why trading occurs.

TABLE 1.1 How a trade affects currency exposure

Item	Exposure for buyer (Company A)	Exposure for seller (Company B)
EUR	Increased	Decreased
JPY	Decreased	Increased

Product appetite

Everybody wants to buy as cheaply as possible, but some people have a greater need for a product and will be willing to pay more for it. Our appetite for a product will determine the price at which we buy. Conversely, our desire to divest ourselves of a product will affect the price at which we are prepared to sell.

Risk appetite

Risk is not necessarily an undesirable concept. Different people and organisations have a different attitude to risk. Some people make money by owning and managing risk. They are prepared to service other people's desire to reduce risk. Many trades arise because some people will pay money to reduce risk and others will accept money for taking on risk.

Exposure

Whenever a trade occurs, both counterparts have each increased and reduced their exposure to something. For example, if Company A buys yen and sells euros to Company B, then A has increased its exposure to yen and decreased its exposure to euros and B has done the opposite (see Table 1.1).

The EUR-JPY foreign exchange transaction has resulted in the trading of one exposure for another.

Even when something is bought for money, the seller has increased his exposure to the currency of the money he receives. Someone living in New York and trading in dollars does not consider receiving more dollars as a risk because he is not exposed to changes in exchange rates. But in international commerce most market participants do worry about exposure to all currencies including their domestic currency which may attract less deposit interest than an alternative, making holding money in that currency less attractive.

1.3 MARKET PARTICIPANTS

We use the example of a forward trade to illustrate various market participants. Other trades such as spot trades (immediate buy and sell) and options (rights to buy and sell in the future) have similar participation.

Producer

Imagine an apple grower owning a number of orchards. His product sells once a year and his entire income is dependent upon the size and price of his harvest. He can take steps to maximise his crop but he can do little to predict or control the price. He would rather have a fixed and known price for his produce than be subject to the vagaries of the market price at harvest time. How does he achieve a fixed price? He enters into a forward trade with a speculator obliging him to supply a fixed quantity of apples in return for a guaranteed price. He has now removed price uncertainty (or risk) and can concentrate on producing enough apples to meet his obligation.

Consumer

A cider manufacturer requires a certain supply of apples in six months' time. He is willing to pay more than the current market value to guarantee fresh stock is available when it is useful to him. His desire is to reduce his exposure to fluctuation of supply.

Speculator

A speculator takes a view on the likely direction of price change. If he sees a future shortage of apples, he will buy forward contracts now and hope to take advantage of his ability to supply later. He will take the opposite position and sell forward contracts if he forecasts a future glut. He is a risk taker, prepared to take advantage of other market participants' desire to reduce their level of risk.

Market maker

The market maker brings together buyers and sellers. He creates a market where it might be difficult for them to trade directly. He doesn't require the produce himself, nor does he have a view on the direction of price change; he is the middleman. He makes the market more efficient and helps to ensure prices reflect supply and demand.

1.4 MEANS BY WHICH TRADES ARE TRANSACTED

This section explains how trading actually takes place.

Brokers

Individuals and small financial entities cannot always get direct access to market makers. This may be due to their unknown credit worthiness, their small volume of trading or their specialised nature. They must rely on brokers to transact their trades.

A broker, in return for a commission, will act on their behalf to execute a transaction at a given price or at the best possible price.

Sales departments of investment banks also have a broking function. Customers of the bank may request orders for financial instruments which the sales force transacts on their behalf either at their own bank or using their contacts with other banks.

Exchanges

An organised trading exchange is a safe and reliable place to trade. Prices are published, there is a plentiful supply of all products covered by the exchange and counterparty risk is virtually eliminated. There is a set of products traded, each one is well-defined, eliminating legal risk and liquidity is maintained by the guarantee of a market in each of the products.

Market participants buy or sell a product with the exchange taking the other side of the trade. Members of the exchange ensure that the exchange has sufficient funds to cover any transaction and the members themselves are vetted to ensure they behave according to the rules of the exchange. Examples of exchanges are:

- London Metal Exchange
- Chicago Mercantile Exchange
- New York Stock Exchange.

It is increasingly common for trading to be conducted electronically. Most exchanges have moved beyond open outcry, where participants shout out or visually indicate their requirements and prices. Electronic exchanges work by having participants sending in orders and setting prices across a network of computers connected to the main exchange which publishes all the information simultaneously to all subscribers. This creates a virtual market place: the traders can operate from their own locations without ever meeting their counterparts.

Breaches of security are a greater risk to electronic exchanges – it is essential that the participants are bona fide members of the exchange and that their details, prices and orders are kept secure. There is also communication risk where a computer or network fails in the central exchange or in one location, preventing some or all members from access to the market data.

Over-the-counter

Exchange trades are limited to:

- members of the exchange
- certain sets of defined products
- times when the exchange is open.

If trading is required without these restrictions, it has to be done directly between the counterparties. This is known as over-the-counter (OTC) trading. There is increased flexibility because the counterparties can agree to any trade at any time but the absence of an exchange carries greater risks. Nowadays, much OTC trading is covered by regulation to ensure, inter alia, that both counterparties are competent and knowledgeable enough to trade, and understand the risks entailed.

1.5 WHEN IS A TRADE LIVE?

A trade is live between the time of execution and the time of maturity. Final delivery may sometimes occur after the maturity date, in which case although the trade has no value at maturity, it does still bear the risk of non-delivery. Even when a trade has matured it may still feature in trade processes, such as for compilation of trading statistics, lookback analysis, auditing or due to outstanding litigation.

1.6 CONSEQUENCES OF TRADING

Once a trade has been executed, there will be at least one exchange of cash or assets at some future time ranging from within a few hours or days for spot trades, to many years for trades such as swaps, to unlimited periods for perpetual bonds. (Assets here include cash.)

Apart from exchanging cash or assets, the trade itself has value while it is still live. So all processes and risk analysis must work with both the cash or asset exchanges and the intrinsic trade.

The buyer and seller are holding different sides of the same trade. Although at execution the price they agreed was the same for both, the value of each side of the trade may vary over time.

Here is an example that shows how a trade has two independent sides that result in intrinsic value and exchange of cash.

On 11th January X buys a future contract from Y in EUR/JPY where he will in six months pay one million EUR and receive 137.88 million JPY (that is a 6m future at 137.88).

On 11th April, the three-month future price is 140. X holds but Y buys a three-month future from Z.

On 11th July, both futures settle.

X pays EUR 1m and receives JPY 137.88m

Y receives EUR 1m from X, pays JPY 137.88m to X

Y pays EUR 1m to Z and receives JPY 140m from Z

Z receives EUR 1m and pays JPY 140m

So instead of Y buying a new trade (the three-month future), he could simply have sold his side of the original (six-month future) trade with X to Z. The fair price of

the sale would be the amount of yen that would result in a value of JPY 2.12 million (140 – 137.88) on 11th July.

We see that through the life of a trade it has past, current and future cash or asset exchanges and it has intrinsic value. Concomitant with these exchanges come their associated risks and processes.

In financial terms, a trade converts potential to actual profit and loss with every exchange of cash or assets.

1.7 TRADING IN THE FINANCIAL SERVICES INDUSTRY

So far we have discussed some of the general issues of trading. Now we will focus on trading within the financial services industry. This includes investment banks, hedge funds, pension funds, brokers, exchanges and any other professional organisations engaged in financial trading. We exclude from this list retail banking services and private investments.

Market makers in a financial institution are sometimes referred to as ‘front book’ traders and typically their ‘open’ positions are held for a maximum of three months – often very much less. In contrast, the risk takers or speculators are often called ‘back book’ traders or the ‘prop desk’ and they may hold positions to maturity of the transaction (though they can also be very short-term traders).

Two types of trading policy

Where a trade is completed very soon after execution with a single exchange of cash or assets (a spot trade), there is no policy required for how to treat it. The only course of action is to accept the change in cash or assets caused by the trade. However, where the trade remains in existence for a period of time, there are two policies that can be adopted.

One is to buy with a view *to holding a trade to its maturity*; the other to buy with the expectation of *resale before maturity*. Sometimes it is unknown at the time of purchase which policy will be adopted. At other times, changes in market conditions may force the purchaser to alter his course of action. Most trading participants in the financial services industry engage in buy and resell before maturity, whereas private individuals apply both policies. To a large extent the decision is dependent upon:

- the reason for entering into the trade
- the view on direction of market conditions which affect the value of the trade
- the possibility of resale – is there a potential buyer willing to buy it before maturity?

Why does a financial entity trade?

We divide our discussion into the principal types of financial entities.

Investment banks These institutions have a large customer base. Some of these customers are drawn from the retail banking arm usually connected to major banks. Due to their size they can offer a range of financial services and draw on expert advice in many different fields. They benefit from economies of scale and because they trade in large volumes, enjoy lower bid/offer spreads making their trading cheaper. They are sometimes referred to as the ‘sell side’ of the industry because they are supplying products for the market place. Investment banks are active in trading activities in order to:

1. Service their clients

The clients come to the bank with requirements that are satisfied by trading. The bank can either act as the middleman or broker to execute trades on behalf of the client who has no access to counterparties or it can trade directly with the client and either absorb the trade or deal an equal and opposite trade (known as back-to-back) in the market place, making a profit by enjoying lower trade costs.

2. Proprietary trading

Most investment banks have proprietary (or ‘prop’) desks with the aim of using the bank’s resources to make profit. The financial knowledge and skills base within the bank should enable it to understand the complexities of trades and take a realistic view on the future direction of the market in order to generate revenue for the bank.

3. Offset risks

By engaging in a range of financial activities, the bank may have substantial holdings in various assets. These could expose the bank to risk if the market price moves against them. Therefore much of the trading of investment banks is to offset these risks.

Examples:

- too much holding in a risky foreign currency – trade into less risky or domicile currency
- too much exposure to a particular corporate debt such as holding a large number of bonds – buy credit protection by way of credit default swaps.

4. Broaden their client base

Just as a shop selling sports equipment might decide to appeal to more customers or better service its existing customers by expanding into sports clothing, so an investment bank might trade in new areas or products to provide a better service to its clients. The bank will constantly review its current service in the light of:

- what the competition is providing
- what clients are requesting
- what are likely profit-making ventures in the future.

Some trades done by the bank do not make money or might even lose money, but are justified to attract new business or to service important clients.

The image of a bank is very important. The product of banking is money, from which it cannot distinguish itself (it can't provide better banknotes than its competitor!) so the diversity and quality of its services are the means by which it seeks competitive advantage.

Hedge funds Hedge funds are established to make profits for their investors. In return, the fund managers usually get paid an annual fee plus a percentage of any profits made. The funds are generally constructed to adopt a particular trading strategy. All other risks and exposures that occur as a by-product of following that strategy are offset or hedged. Hedge funds are like the consumers in the financial industry and therefore known as being on the 'buy side'. They engage in trading in order to pursue their strategy and manage their risks.

Pension funds and other asset managers Asset management is a generic group of financial companies of which pension funds are the most well known. They trade for very similar reasons to hedge funds. They want to maximise the return on the assets they hold for their clients or employees. They usually take a long-term view and are more risk-averse.

Brokers Brokers facilitate trades by bringing together buyers and sellers. They do not take upon themselves positions or trade risks. They do, however, require many of the trading processes described in the trade lifecycle section of this book with the additional complication of having two counterparties on every trade (one purchaser, one vendor).

1.8 WHAT DO WE MEAN BY A TRADE?

A trade can be a single transaction or a collection of transactions that are associated together for some reason. In this book, we use the former definition.

A trade is an agreement between two counterparts to exchange something for something else. This book will concentrate on financial trades, which means those involving financial instruments.

Examples of financial trades are:

- 1000 barrels of West Texas intermediate crude oil for USD 6015
- 1000 Royal Bank of Scotland ordinary shares for GBP 33.50