Devexperts

The ABCs of Price Risk Hedging:

How FX Brokers Manage Their Price Risk

devexperts.com

DISCLAIMER & COPYRIGHT NOTICE

This book provides helpful information about forex market and price risk hedging. Statements, figures, calculations, plans, images and representations are indicative only and used for illustrative purposes only, and does not constitute an offer, inducement, or warranty.

Information in this book is presented based on the research and circumstances as of August, 2019. Evgeny Sorokin, who is identified as the author of this work, and Devexperts accept no responsibility for the accuracy of any information contained herein or for any action taken in reliance thereon by any party and shall be hold harmless by such party against any damages, costs and expenses potentially resulting from application of any information contained in this book.

All rights reserved. No part of this book should be reproduced, communicated or transmitted in any form or by any means, including photocopying, recording, other electronic or mechanical methods without the prior written consent of the copyright owner, except when it is permitted by the applicable law. For permission request, please contact us via: pr@devexperts.com, with the title “Copyright Request: The ABCs of Price Risk Hedging”.

© 2019 The ABCs of Price Risk Hedging: How FX Brokers Manage Their Price Risk
Evgeny Sorokin, SVP of Software Engineering at Devexperts

Contents

Introduction

Nature and scope of this book

This book is intended as an introduction to the mechanics of the foreign exchange market. It is aimed at general readers wishing to gain a practical understanding of how brokers manage their risk and make profit, and towards traders and employees of brokerage houses who wish to increase their market knowledge.

In this book, we focus on the broker's part only, and don't cover how traders should manage their risks. This book also does not include information on how to make money through trading, nor does it explain how to choose the right broker or teach fundamental or technical analysis. As these are separate topics, and fall outside the scope of this book.

The FX market and its relation to CFDs

The foreign exchange market (also known as FX, or forex) is a worldwide, decentralized, over-the-counter financial market that facilitates the trading of currencies between banks, speculators, and investors. There is no physical exchange; instead, buyers and sellers make electronic contractual agreements regarding underlying currencies. Because no exchange exists, there is also no clearing, or exchange guarantee. Unlike the futures markets where an exchange guarantees all executed trades, FX traders are fully exposed to counterparty risk.

The most popular way to invest in FX is by using contracts for differences (CFDs). These are essentially over-the-counter (OTC) derivatives that you can trade using a broker as your counterparty. Such brokers might be called FX, CFD, or OTC brokers, and when you hear a broker calls themselves a Forex broker, it usually implies they offer trading forex in a form of CFD, except the USA where CFDs are banned.

CFDs may also be used to trade in other markets, such as stock market indices, bonds, shares in companies and commodities. It is crucial to remember that these are derivative contracts — which means that you are not buying or selling the actual underlying asset, but instead you are seeking to profit from changes in the price of the asset.

01 Brokers, Traders, and Positions

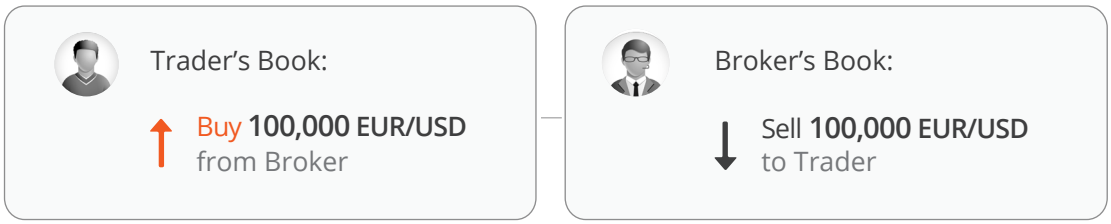
Contrary to their description as “brokers” (an intermediary party which executes the trade on behalf of their clients), FX, CFD brokers act as dealers (a party that trades on their own account) by taking the other side of the executed trades. That’s why you may hear the terms “dealing desk” or “dealing center” in relation to these brokers.

When a client trades with such a broker, both client and broker hold positions against one another.

EXAMPLE 1

A SINGLE TRADER AND A BROKER

For example, a trader buys 100,000 EUR/USD, or holds a “long” position against the broker and bears the risk that the price for EUR/USD will decrease and he will have to sell at a lower price. Conversely, the broker sells, or holds a “short” position against the trader and bears the risk that the price of EUR/USD will rise. This is called price risk.

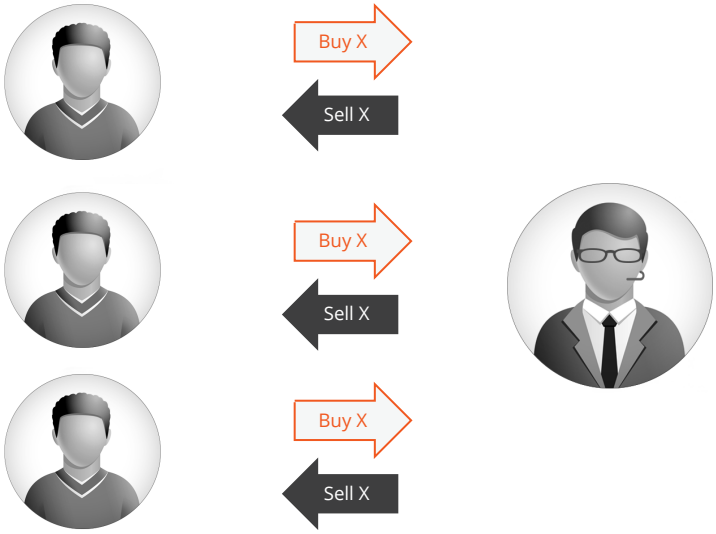


In this situation, both parties are exposed to a price risk.

The OTC broker is the counterparty for all of its traders and holds many positions. In order to understand the price risk for a specific instrument, one needs to sum up all of the broker’s positions against traders in this instrument.

EXAMPLE 2 **MULTIPLE TRADERS AND A SINGLE BROKER**

Here, there are three traders: Trader 1, Trader 2 and Trader 3, all trading in Crude Oil Brent.



1st Trader's Book:

Buy **10,000 Brent** from Broker

2nd Trader's Book:

Sell **6,000 Brent** to Broker

3rd Trader's Book:

Sell **4,000 Brent** to Broker

Broker's Book:

Sell **10,000 Brent** to Trader 1

Buy **6,000 Brent** from Trader 2

Buy **4,000 Brent** from Trader 3

Net Position: **0 Brent** (Flat)

Each individual trader above has taken a position against the broker, but the broker remains market neutral overall as all the clients' positions net one another. This is called being flat for the broker with regard to one financial instrument as they hold no exposure.

Below we will illustrate how the entry prices of those trades do not really affect the broker's price risk. Even if the entry price for each of the trades were different, this difference will not change in case the market fluctuates, as the broker is flat and that risk is locked in due to broker being flat.

For example, if the open prices for the traders' positions were 58.04, 60.15, and 62.73 USD respectively, with 'P' in the formula being the current market price, then P&L (a profit and loss figure) will be calculated as follows:

$$P\&L_1 = 10000\,(P - 58.04)$$

$$P\&L_2 = 6000\,(60.15 - P)$$

$$P\&L_3 = 4000\,(62.73 - P)$$

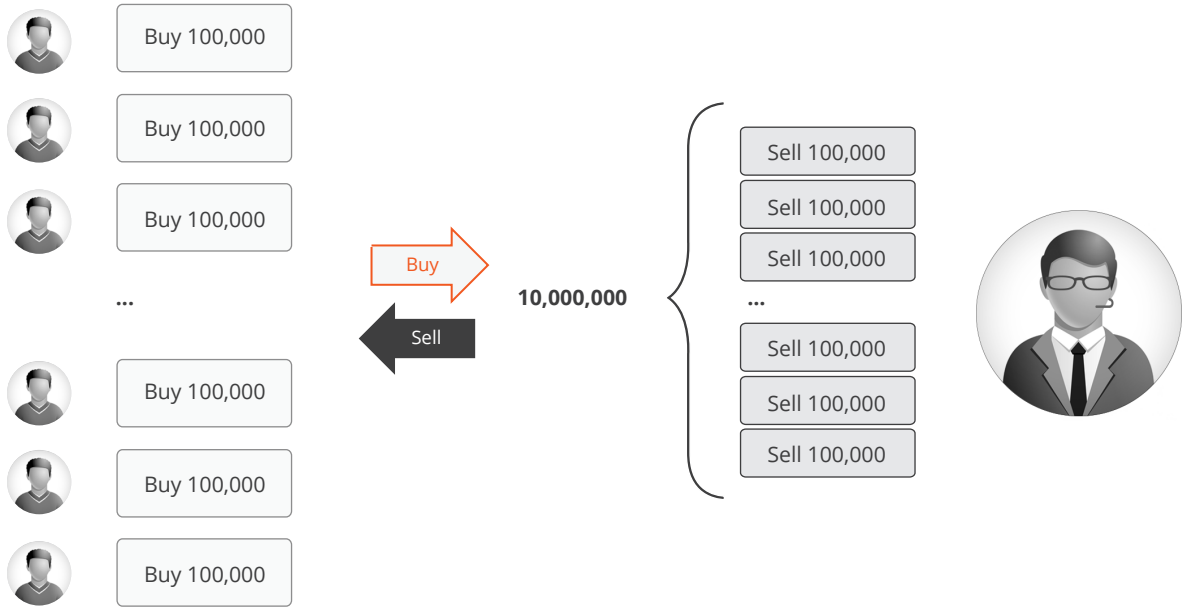
$$P\&L_1 + P\&L_2 + P\&L_3 = 10000\,(P - 58.04) + 6000\,(60.15 - P) + 4000\,(62.73 - P) = 31{,}420 \text{ USD}$$

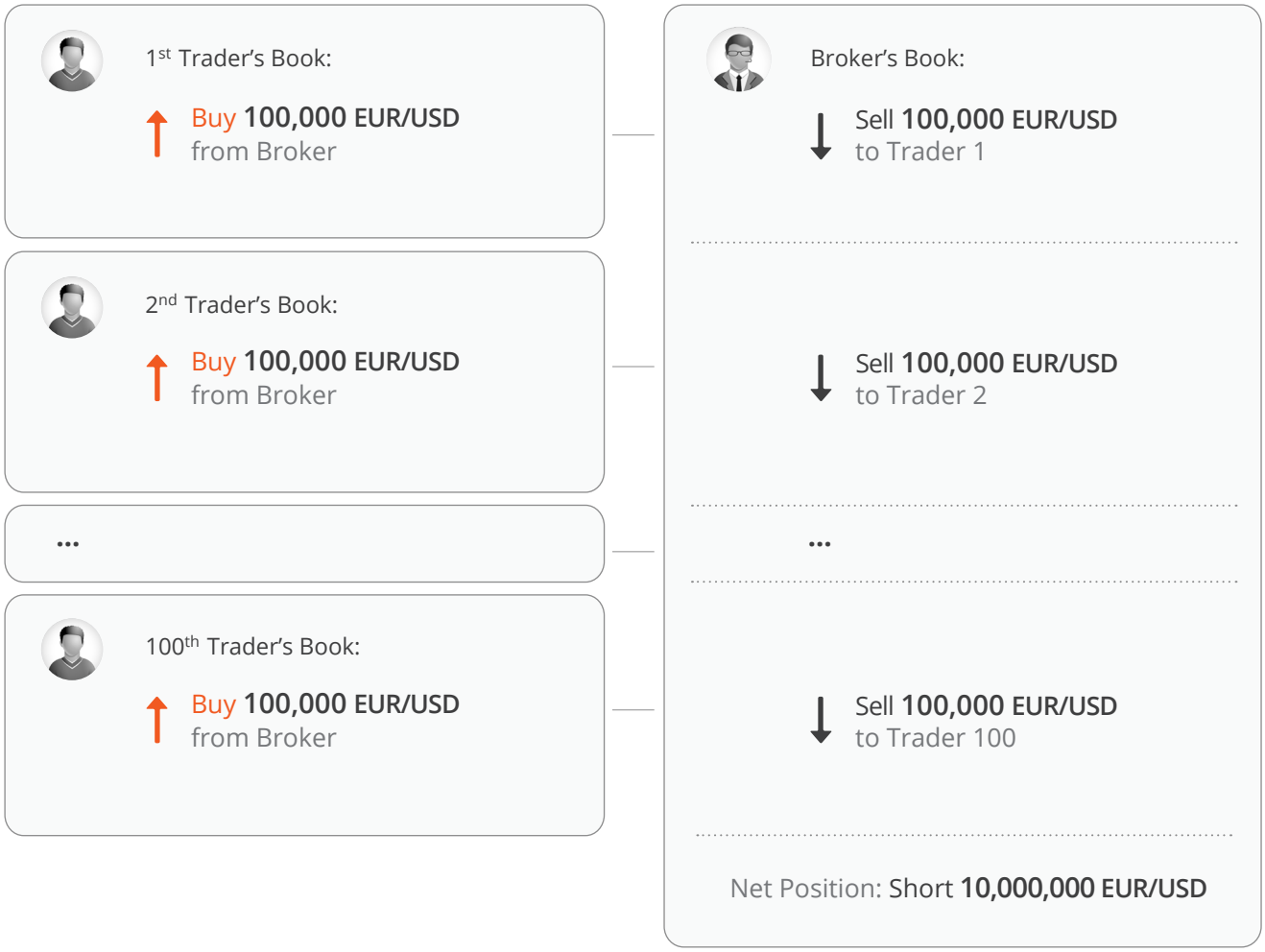
In the example above the net P&L doesn't depend on the current market price.

EXAMPLE 3 MANY TRADERS AND A SINGLE BROKER

Consider a further, more complex example:

There are 100 traders and each bought 100,000 of EUR/USD. The broker now has 100 short positions with an aggregated volume of 10,000,000 EUR/USD.





Here, the broker's price risk is substantially greater than that of its traders. Of course, the broker could stop accepting the trades to take no further risk but that would mean no service for traders.

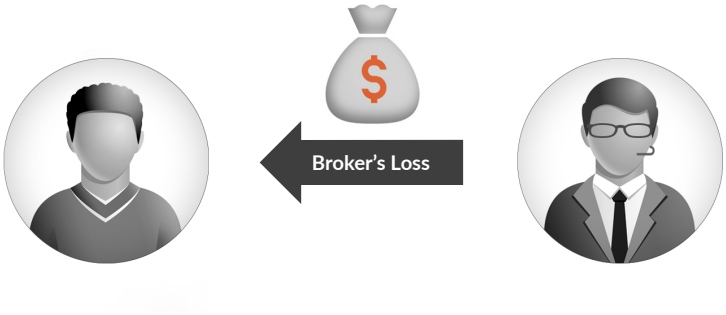
The important point to note is that the impact of a price change could have a significant impact on the broker. Therefore, there is a need to manage this price risk systematically.

02 Risk Acceptance or B-Book Execution

Typically, OTC brokers can choose to accept the price risk from trading against their clients or they can transfer it to another market participant. Price risk acceptance means that the broker does nothing *preventative*. In the event that the market moves against the broker, the broker will run all of the losses, and vice versa.

EXAMPLE 4 **PRICE RISK ACCEPTANCE**

Trader's Book:	Broker's Book:
Buy **1000 Oz of XAU/USD** at 1087.79 from Broker	Sell **1000 Oz of XAU/USD** at 1087.79 to Trader
Assume the market rises to 1173.33...	
Sell **1000 Oz of XAU/USD** at 1173.33 to Broker	Buy **1000 Oz of XAU/USD** at 1173.33 from Trader
Trader's P&L: **85,540 USD**	Broker's P&L: **– 85,540 USD**



When the broker accepts the price risk associated with a client's position, it is called "B-Book execution". In this situation, trades are sometimes described as "B-Booked", "internalized" or "warehoused".

03 Risk Transfer or A-Book Execution

As the name suggests, price risk transfer describes the situation where a broker finds another party to assume the price risk and to run any potential losses. Usually this is another broker, a bank or a non-bank market maker.

When utilizing this strategy, at the moment the broker receives a trade from their trader, the broker will enter into another trade with a counterparty in the same direction as their trader.

EXAMPLE 5

RISK TRANSFER

The broker has a short position of 1,000,000 GBP/USD because a trader went long.

Trader's Book:

↑ Buy **1,000,000 GBP/USD** at 1.44255 from Broker

Broker's Book:

↓ Sell **1,000,000 GBP/USD** at 1.44255 to Trader

In order to transfer the price risk, the broker buys 1,000,000 GBP/USD from the counterparty to compensate its short position against the client.

Trader's Book:

↑ Buy **1,000,000 GBP/USD** at 1.44255 from Broker

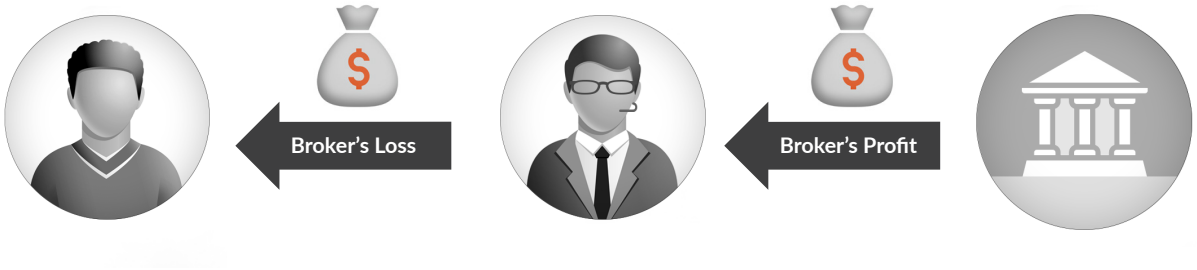
Broker's Book:

↓ Sell **1,000,000 GBP/USD** at 1.44255 to Trader

↑ Buy **1,000,000 GBP/USD** at 1.44255 from Counterparty[1]

[1]The way the Counterparty manages their risk is similar to what we consider in this book.

If the market rises, the traders will win, resulting in the broker suffering a corresponding loss. However, at the same time, the broker will win on his position against the counterparty, who in turn will suffer a loss.



Trader's Book:

Buy **1,000,000 GBP/USD** at 1.44255 from Broker

Sell **1,000,000 GBP/USD** at 1.45123 to Broker

Trader's P&L: **USD 8,680**

Broker's Book:

Sell **1,000,000 GBP/USD** at 1.44255 to Trader

Buy **1,000,000 GBP/USD** at 1.44255 from Counterparty

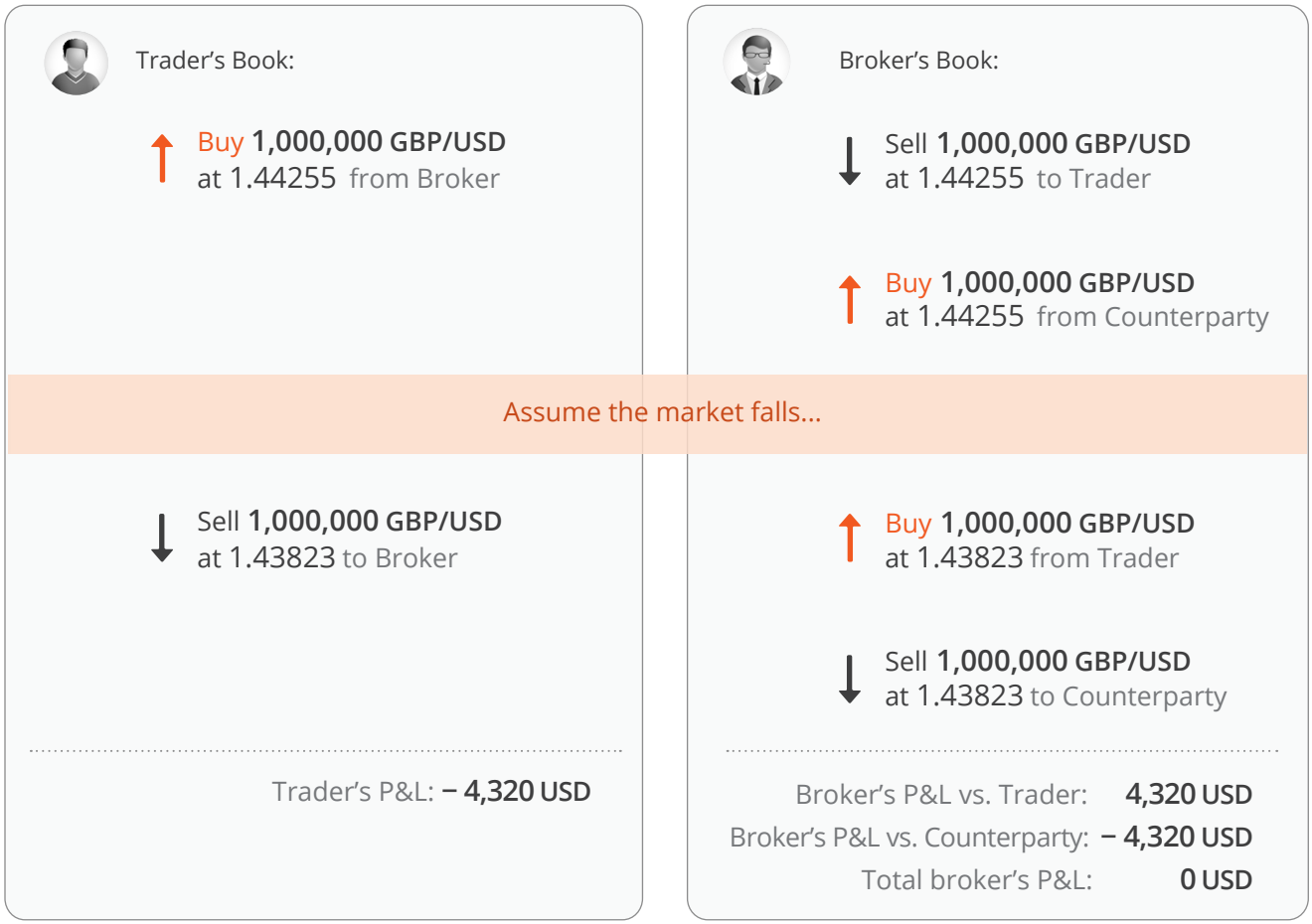
Assume the market rises...

Buy **1,000,000 GBP/USD** at 1.45123 from Trader

Sell **1,000,000 GBP/USD** at 1.45123 to Counterparty

Broker's P&L vs. Trader: **– 8,680 USD**
Broker's P&L vs. Counterparty: **8,680 USD**
Total Broker's P&L: **0 USD**

If the market falls, the traders will lose, resulting in the broker making a profit. However, at the same time, the broker will lose on his position against the counterparty, who in turn will earn a profit.



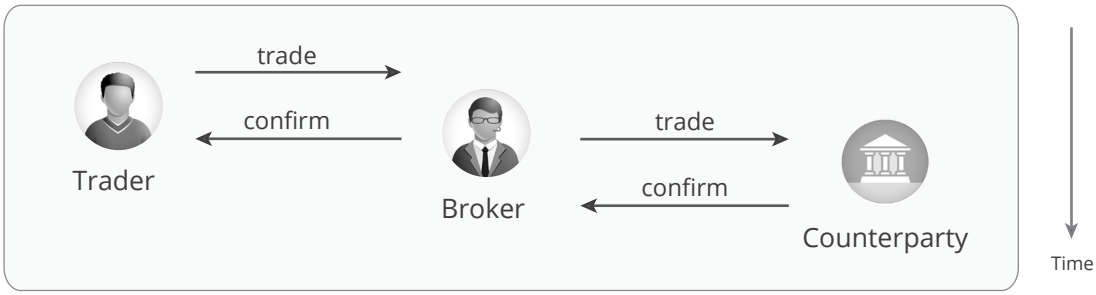
Since the broker doesn't know upfront at what time the trader opens the trade and at what time he needs to hedge with the counterparty, the broker needs to find a counterparty that will maintain continuous quotes and be prepared to trade at these published rates at any given point in time. Such counterparties are called liquidity providers (LPs). We will use the terms 'counterparty' and 'liquidity provider' interchangeably.

In the examples above we only considered how the broker eliminated their risk exposure depending on the price movements. We will add more details in the next paragraph to explain how brokers make money in the A-Book model.

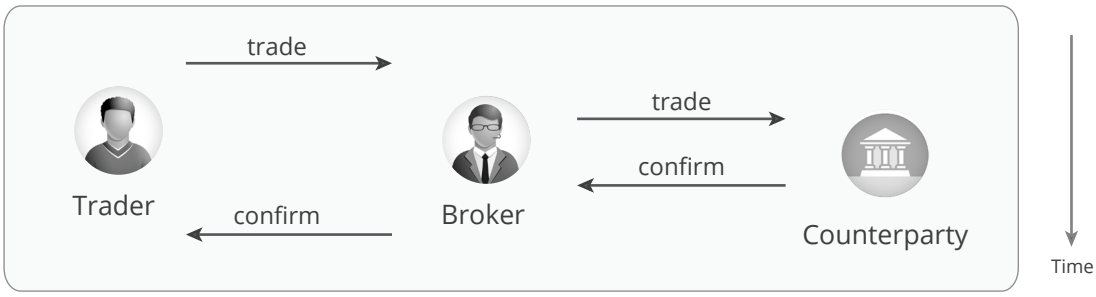
When operating an A-Book model a broker transfers the price risk associated with a client's position to a counterparty, this is called an "A-Book execution" or the trade is described as "A-Booked". Other synonymous terms include "the client's trade has been sent to the market", "covered" or "STP'ed". The client's position may also be described as "hedged" or "offset" and the transfer itself is known as "price risk hedging". The position against the counterparty is called a "hedge" or a "cover position".

A-Book here is compared to STP, although there are still several differences, which can be seen in the picture below. It's important to understand there can be differences, because many brokers in the industry often use them interchangeably, and refer to A-Book and STP as the same concept. Other brokers refer to A-Book as post-trade hedging, and to STP as pre-trade hedging.

A-Book Execution



Straight-through Processing (STP)



From the client's perspective the experience of post- and pre-trade hedging is different.

A-Book: faster execution, no slippage[2] (or slippage is controlled by the broker), less probability of rejection.

STP: slower execution (until the broker receives the confirmation from his counterparty), slippage depends on the received execution price from the counterparty, higher rejection rate for the trader.

04 Making Money in A-Book

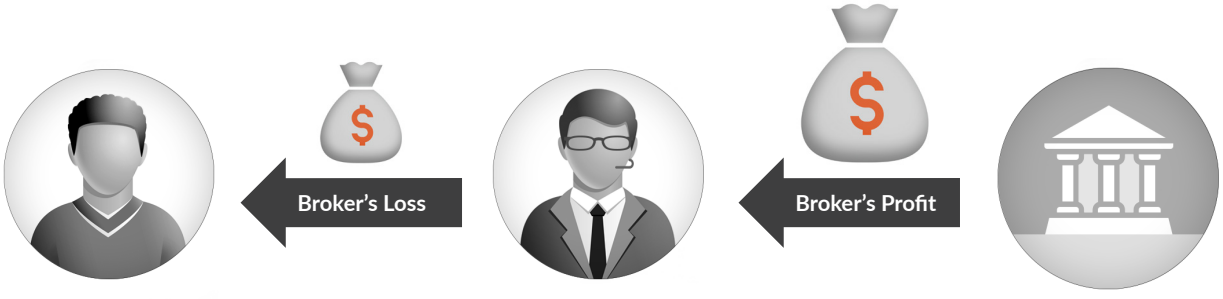
One of the ways for a broker to make money in A-Book is through commissions. Even though the prices of entry and exit were the same for both trader and broker, the trader pays commissions to the broker for the execution. Usually this is calculated as volume-based (e.g. $X per $1M or per lot). This commission constitutes the broker's P&L.

Another way to make money in A-Book is through applying a markup (where a broker adds an additional amount to the pricing for its clients): the broker makes money, because the rates at which it trades with the client are worse than the rates at which broker trades with the counterparty. The markup is the difference between the price provided to the client and the broker's price taken from the counterparty. This difference also constitutes the broker's P&L.

EXAMPLE 6

MAKING MONEY WITH A MARKUP

Here the broker adds a price markup of 0.00004.



[2] Slippage (or price slippage) refers to the difference between the expected price before a transaction is executed and the actual price at which it is executed.

Trader's Book:

Buy **1,000,000 GBP/USD** at 1.44255 from Broker

Sell **1,000,000 GBP/USD** at 1.45123 to Broker

Trader's P&L: **8,680 USD**

Broker's Book:

Sell **1,000,000 GBP/USD** at 1.44255 to Trader

Buy **1,000,000 GBP/USD** at 1.44251 from LP

Assume the market rises...

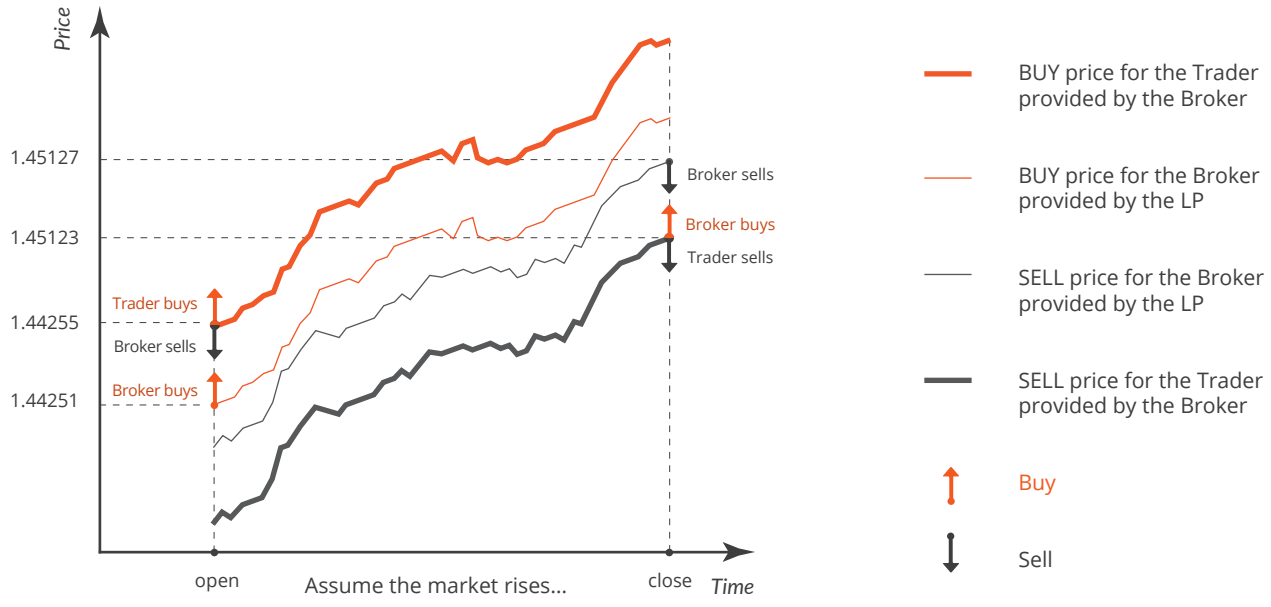
Buy **1,000,000 GBP/USD** at 1.45123 from Trader

Sell **1,000,000 GBP/USD** at 1.45127 to LP

Broker's P&L vs. Trader: **– 8,680 USD**

Broker's P&L vs. LP: **8,760 USD**

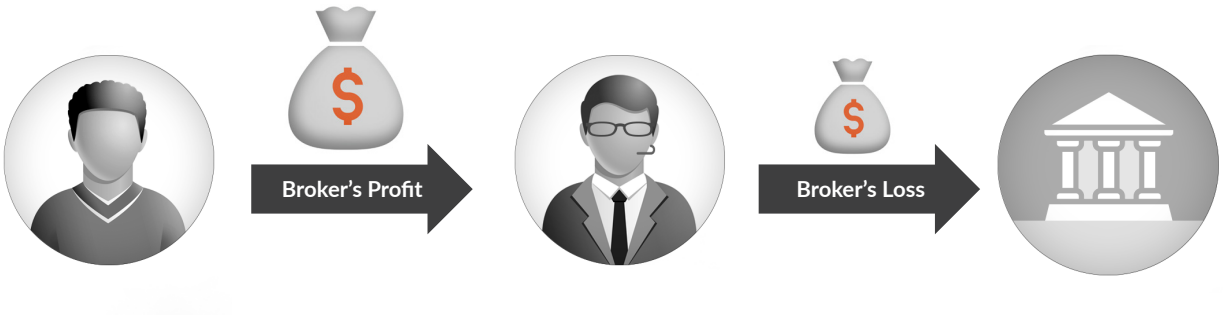
Total broker's P&L: **80 USD**



The thick lines show the prices for the trader, provided by the broker; the thin lines are the prices for the broker provided by the counterparty. Notice how the broker buys lower from the LP than it sells to the trader, and how broker sells higher to the LP than it buys from the trader.

As the broker is operating an A-Book model, if the market falls, the traders lose and the brokers win, however the broker will also lose on the offsetting trade with the counterparty. The difference between this profit and loss is the brokers revenue from each trade.

EXAMPLE 7 **MAKING MONEY WITH A MARKUP**



Trader's Book:

Buy **1,000,000 GBP/USD** at 1.44255 from Broker

Assume the market falls...

Sell **1,000,000 GBP/USD** at 1.43823 to Broker

Trader's P&L: **– 4,320 USD**

Broker's Book:

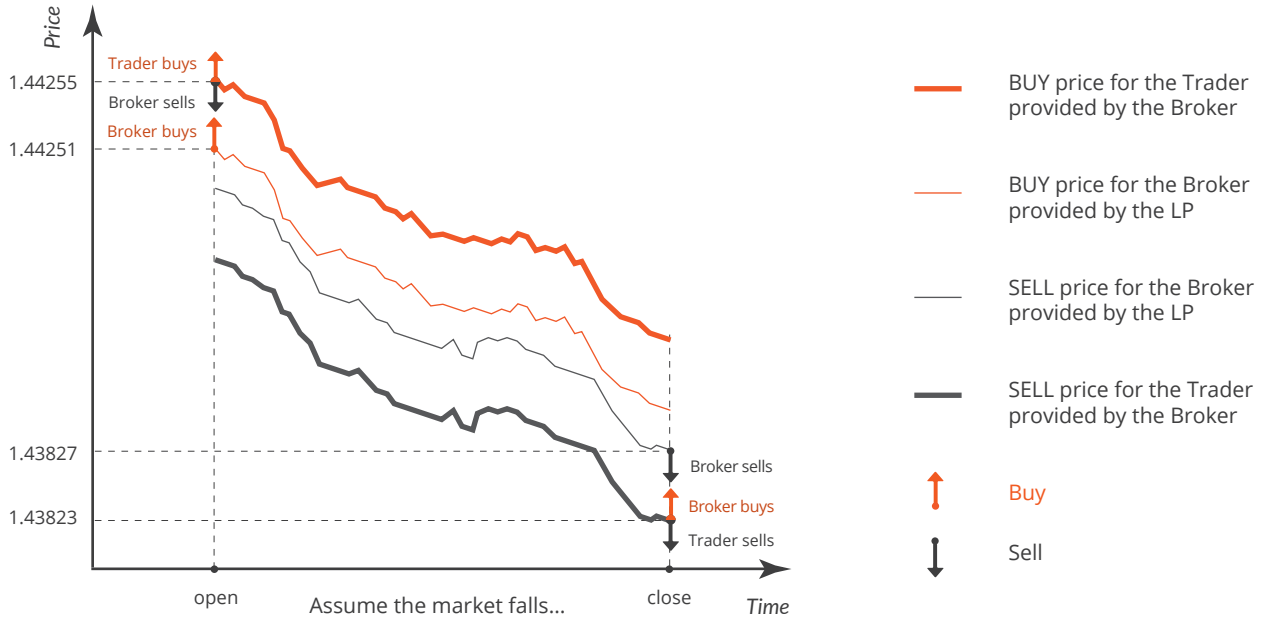
Sell **1,000,000 GBP/USD** at 1.44255 to Trader

Buy **1,000,000 GBP/USD** at 1.44251 from LP

Buy **1,000,000 GBP/USD** at 1.43823 from Trader

Sell **1,000,000 GBP/USD** at 1.43827 to LP

Broker's P&L vs. Trader: **4,320 USD**
Broker's P&L vs. LP: **– 4,240 USD**
Total broker's P&L: **80 USD**



Again, the thick lines show the prices for the trader, provided by the broker; the thin lines are the prices for the broker, provided by the counterparty. As shown in the previous example, the broker buys lower than it sells to the trader, and broker sells higher than it buys from the trader.

In both examples (6 and 7), the broker is no longer exposed to the risk of losses due to market movements. Note that under this A-Book strategy, the broker's P&L (it is called "markup P&L") is the same regardless of whether market rises or falls.

It is important to note that both A-Book and B-Book execution can be combined by brokers. For example, brokers can employ different risk management strategies for different clients or different instruments.

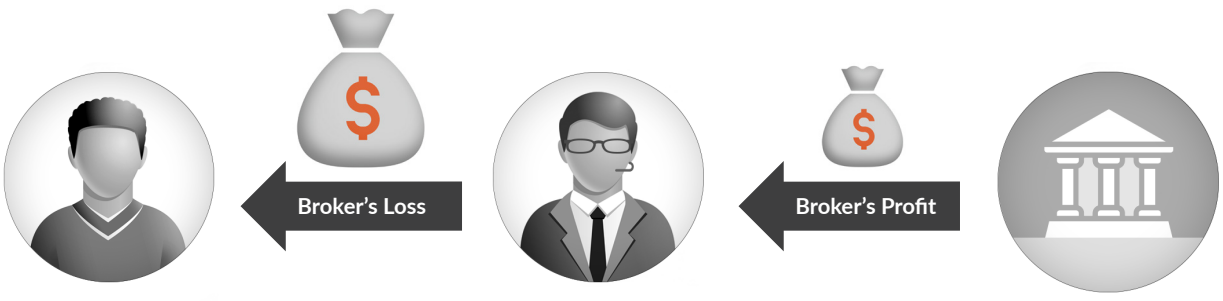
05 Challenges of A-Book Execution

A broker can only earn a markup P&L if the rates at which it trades with the counterparty are better than the rates at which broker trades with its clients.

Otherwise, the broker transfers the price risk but does not make any profit and in some situations, may even make a loss.

The following two examples show where a broker consistently received worse prices from its counterparty compared to those it provided to the trader:

EXAMPLE 8 **NEGATIVE MARKUP P&L DUE TO LP'S PRICING AND THE RISING MARKET**



Trader's Book:

Buy **50,000 USD/JPY**
at 118.985 from Broker

Sell **50,000 USD/JPY**
at 119.541 to Broker

Trader's P&L: **27,800 JPY**

Broker's Book:

Sell **50,000 USD/JPY**
at 118.985 to Trader

Buy **50,000 USD/JPY**
at 118.986 from LP

Assume the market rises...

Buy **50,000 USD/JPY**
at 119.541 from Trader

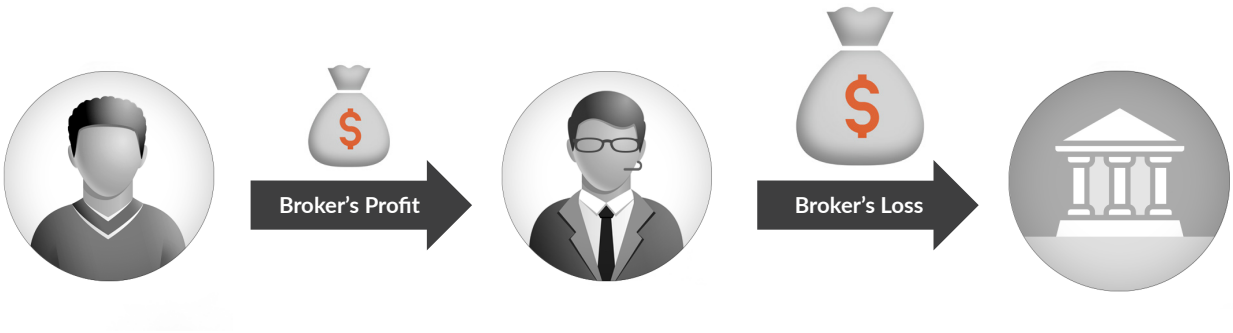
Sell **50,000 USD/JPY**
at 119.535 to LP

Broker's P&L vs. Trader: **– 27,800 JPY**
Broker's P&L vs. LP: **27,450 JPY**
Total broker's P&L: **– 350 JPY**

The projections on the vertical axis of all the lines reflect the price differences. Notice how the distance between the thin lines is bigger than between the thick lines — under this scenario the trader makes more money than the broker, resulting in the broker having an overall loss.

Let's consider an alternative scenario:

EXAMPLE 9 **NEGATIVE MARKUP P&L DUE TO LP'S PRICING AND THE FALLING MARKET**



Trader's Book:

↑ Buy **50,000 USD/JPY**
at 118.985 from Broker

↓ Sell **50,000 USD/JPY**
at 118.403 to Broker

Trader's P&L: **– 29,100 JPY**

Broker's Book:

↓ Sell **50,000 USD/JPY**
at 118.985 to Trader

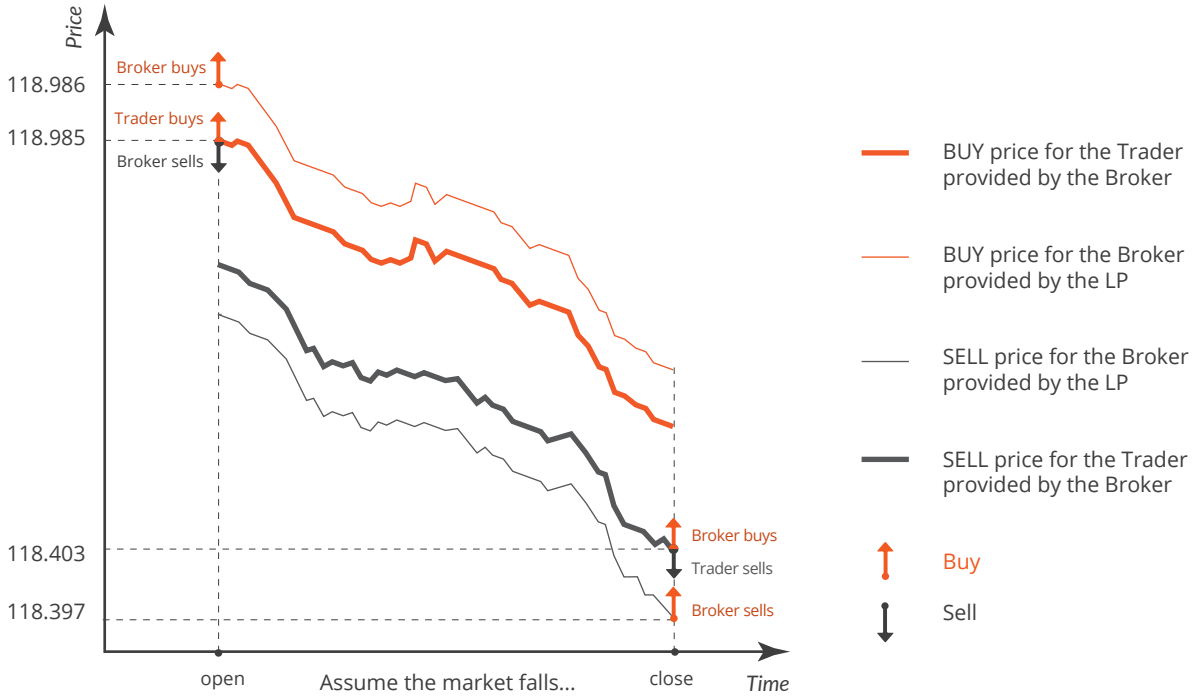
↑ Buy **50,000 USD/JPY**
at 118.986 from Counterparty

Assume the market falls...

↑ Buy **50,000 USD/JPY**
at 118.403 from Trader

↓ Sell **50,000 USD/JPY**
at 118.397 to Counterparty

Broker's P&L vs. Trader: **29,100 JPY**
Broker's P&L vs. Counterparty: **– 29,450 JPY**
Total broker's P&L: **– 350 JPY**



Again, in the example above, the vertical axis projection of all the lines reflects the differences in prices. Notice how the distance between the thin lines (prices for the broker) is bigger. This results in a negative markup P&L, as the broker had to buy at a higher price, and sell it at a lower price, thus bearing losses.

To make money on a markup, it is crucial that the price difference is in favour of the broker. To achieve this, a broker usually:

1. Uses the rates of the counterparty as a source for quoting traders.

2. Enters the trades with a liquidity provider (the “cover trades”, “offsetting trades” or “hedge trades”) at the same time as with the clients. If the cover trade is executed with a delay, the broker may incur losses due to moves in the market.

06 Netting/Position Based and Realized/Unrealized P&L

In retail trading, brokers generally offer two types of accounts: with or without netting. The latter is known as “position-based forex”.

With a netting arrangement, any trades in the same instrument will contribute into a single position. With netting disabled, any orders used to enter the market will open a new position — even if there is already an open position in the same instrument in the same or opposing direction. The accounts without netting are often referred to as “hedging” accounts, which can be confusing — as it has nothing to do with the broker’s risk management, it simply implies that traders have the ability to manage positions individually.

EXAMPLE 10

TRADING WITH AND WITHOUT NETTING

In the following example there will be two traders placing the same trades. Trader 1 has an account with netting, Trader 2 has a position-based account.

Trading Actions	Positions: Trader 1 (account with netting)	Positions: Trader 2 (account without netting)
↑ Buy **500,000 EUR/NZD** at 1.63926	Position 1: ↑ Buy **500,000 EUR/NZD** at 1.63926	Position 1: ↑ Buy **500,000 EUR/NZD** at 1.63926
↑ Buy **500,000 EUR/NZD** at 1.63918	Position 1: ↑ Buy **1,000,000 EUR/NZD** at 1.63922 (the average price of the two trades)	Position 1: ↑ Buy **500,000 EUR/NZD** at 1.63926 Position 2: ↑ Buy **500,000 EUR/NZD** at 1.63918
↓ Sell **1,000,000 EUR/NZD** at 1.63953	No positions (flat)	Position 1: ↑ Buy **500,000 EUR/NZD** at 1.63926 Position 2: ↑ Buy **500,000 EUR/NZD** at 1.63918 Position 3: ↓ Sell **1,000,000 EUR/NZD** at 1.63953

Assuming the current market price is 1.63953...

	1st Trader's P&L (account with netting)	2nd Trader's P&L (account without netting)
Realized P&L	1,000,000 (1.63953 − 1.63922) = **310 NZD**	**0 NZD** (No closed positions yet)
Unrealized P&L	**0** NZD (No open positions left)	Position 1: 500,000 (1.63953 − 1.63926) = **135 NZD** Position 2: 500,000 (1.63953 − 1.63918) = **175 NZD** Position 3: 1,000,000 (1.63953 − 1.63953) = **0 NZD** Total P&L: **310 NZD**

There is no material difference between these two types of account if one takes into consideration both realized and unrealized P&L.

Regardless of whether the market rises or falls, the trader with netting does not have any exposure to the market as he is now flat; and the trader without netting has hedged his positions so the profits and losses will neutralize one another, locking in his P&L.

So, in retail trading there tends to be two account types offered to traders. In some countries, such as the US, the offering is usually just netting based accounts because a netting account provides broker with the easiest way to meet their regulatory requirements (FIFO rule). In other regions, where there are no such demands from regulatory bodies, it's the broker who decides on the account type(s) to be offered to their traders.

Netting accounts are more common in institutional trading, where both parties are financial institutions, for example FX brokers and their LPs.

A common setup is where a retail European broker offers "position-based" accounts to clients and hedges the price risk, using their own netting account. It follows that unrealized and realized P&L can differ when one compares the client vs. broker trading and broker vs. LP.

EXAMPLE 11

TRADING ON POSITION-BASED ACCOUNTS AND HEDGING WITH A NETTING ACCOUNT

Here, two traders with position-based accounts (no netting), are both set to A-Book execution with a EUR/NZD markup of 0.0002, while broker has a netting account with their LP:

1st Trader's Book:

↑ Buy **500,000 EUR/NZD** at 1.63926

↑ Buy **500,000 EUR/NZD** at 1.63918

2nd Trader's Book:

↓ Sell **800,000 EUR/NZD** at 1.63953

Broker's Book:

↓ Sell **500,000 EUR/NZD** at 1.63926 to Trader 1

↑ Buy **500,000 EUR/NZD** at 1.63906 from LP

↓ Sell **500,000 EUR/NZD** at 1.63918 to Trader 1

↑ Buy **500,000 EUR/NZD** at 1.63898 from LP

↑ Buy **800,000 EUR/NZD** at 1.63953 from Trader 2

↓ Sell **800,000 EUR/NZD** at 1.63973 to LP

Broker's Realized P&L vs. Traders is 0 as no positions have been closed yet.

Broker's Net Position vs. LP is:

Buy 1,000,000 EUR/USD at the average price of (1.63906 + 1.63898)/2 = 1.63902

Broker's Realized P&L vs. LP is:

800,000 (1.63973 − 1.63902) = 568 NZD

If we assume that the market rises and the current market prices from LP are: 1.64112 / 1.64151, the broker publishes 1.64092 / 1.64171, the broker's positions and P&L are:

Positions

↓ Sell **500,000 EUR/NZD** at 1.63926 to Trader 1

↓ Sell **500,000 EUR/NZD** at 1.63918 to Trader 1

↑ Buy **800,000 EUR/NZD** at 1.63953 from Trader 2

↑ Buy **200,000 EUR/NZD** at 1.63898 from LP

Broker's unrealized P&L

500,000 (1.63926 − 1.64092) = **− 830 NZD**

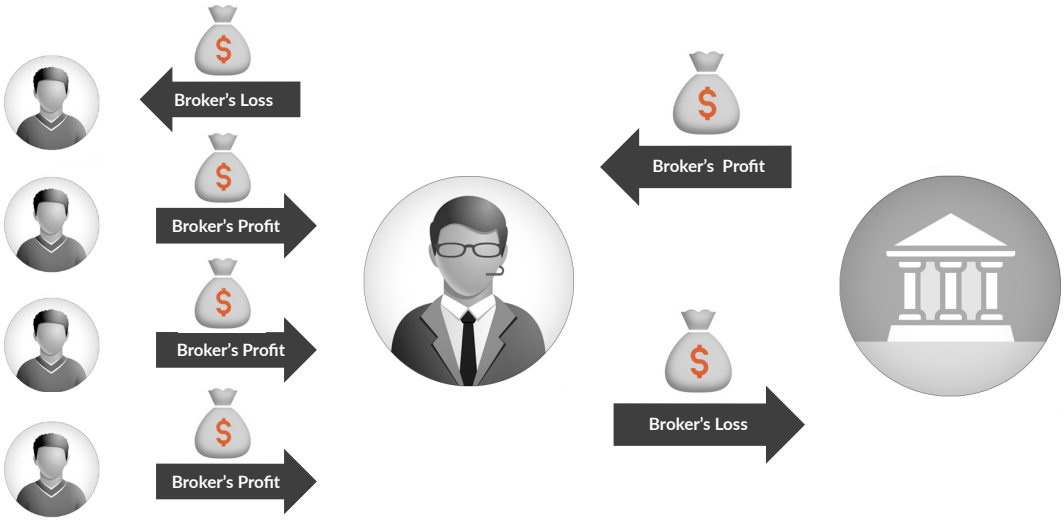
500,000 (1.63918 − 1.64092) = **− 870 NZD**

800,000 (1.64171 − 1.63953) = **1,744 NZD**

200,000 (1.64112 − 1.63898) = **428 NZD**

****

To summarize, until this moment we have learned that brokers may employ a model of A-Book execution, pure B-Book execution or they may use a hybrid model, where some of the trades are A-Booked and others are B-Booked.



The important point to note is in case of B-Book the broker should work with a reliable market data vendor, as the quality of rates is crucial; otherwise the clients could potentially take advantage of any off-market or stale pricing, allowing them the opportunity to make risk-free trades.

In the case of A-Book, a broker is not as sensitive to the quality of the rates, as long as their LP is willing to trade at those rates. To make the statement valid of course the broker should source prices from a liquidity provider, use this LP's pricing for their clients, and trade with this LP to transfer the price risk.

07 Advanced Price Risk Management Strategies

The risk management strategies utilized by brokers in order to best manage their price risk can be highly technical and are often quite advanced. Depending on their risk management strategy and overall risk appetite, brokers may segregate A-Book and B-Book trades by client, instrument, trading session, or overall company's exposure. Brokers will often operate dedicated risk management teams who are responsible for ensuring a broker's risk is managed in line with the risk policies of the company.

7.1 Internalization

One of the advanced techniques for price risk management is to aggregate client trades, whereby trades of the same instrument are matched off with the residual either being hedged or actively risk managed, depending on the broker. This is often referred as Internalization.

When a broker matches Trader 1's trade with another one from Trader 2, he essentially removes the price risk in a similar manner to hedging the trade with his LP. Because the broker does not send any trades to the LP, they will not lose money by paying the spread[3] of their LP.

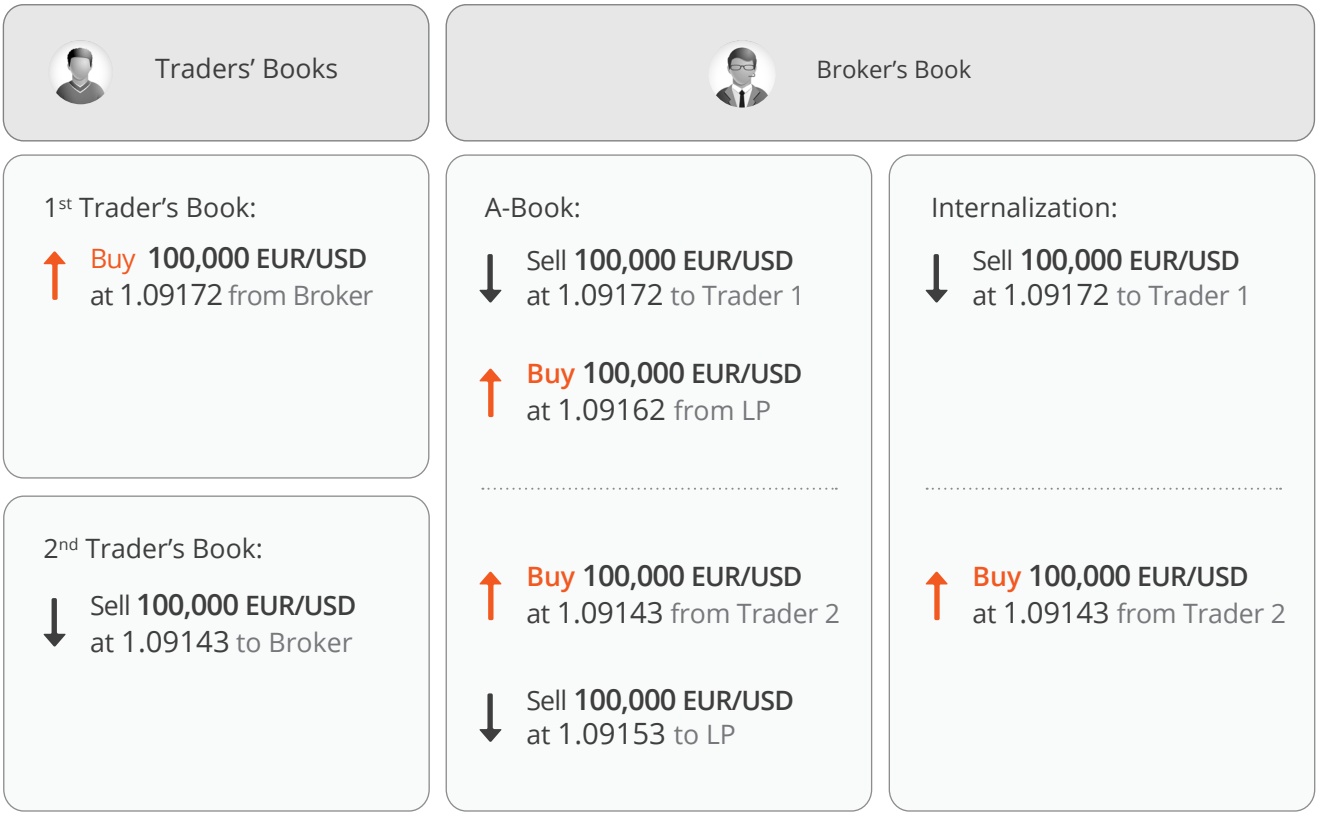
[3] Participants buy an amount of currency for the ask price, and sell it for the bid price. The difference between these two prices is the spread.

EXAMPLE 12

A-BOOK EXECUTION VS. INTERNALIZATION — FULL OFFSET

Trader 1 buys and Trader 2 sells the same amount of the same instrument at the same time. Under this scenario, the broker prefers to transfer price risk to its LP. The LP's prices are marked up by 0.0001 EUR/USD:

Consider the difference between A-Book execution and Internalization



If the broker exercised A-Book execution, he "paid the spread of LP" and the broker's P&L vs. LP would equal:

$$100{,}000\ (1.09153 - 1.09162) = -9\ \text{USD}$$

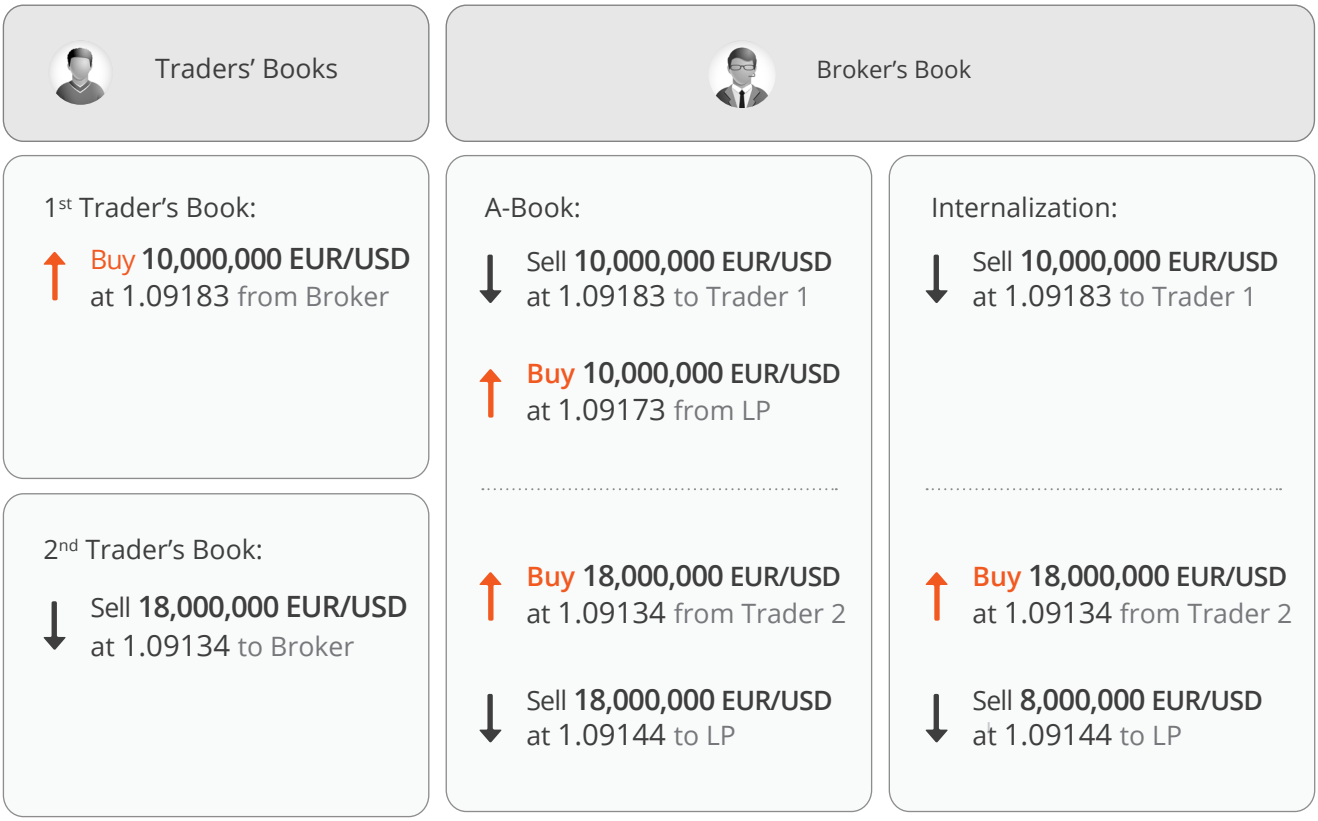
If the broker took advantage of the fact that the trades happened at the same time and didn't send anything to the LP then they wouldn't have paid that cost.

EXAMPLE 13

A-BOOK EXECUTION VS. INTERNALIZATION — PARTIAL OFFSET

If the traders offset one another partially then the broker has a residual net position that leaves the broker exposed to a price risk.

The broker may then transfer this risk to the LP by sending a hedge trade, or they may manage the residual exposure. Consider the difference between A-Book execution and Internalization followed by a hedge trade:



If the broker exercised A-Book execution then the broker's realized P&L vs. LP would equal

$$10{,}000{,}000\ (1.09144 - 1.09173) = -2900\ \text{USD}$$

If the broker had internalized the flow, then they wouldn't have had to pay that cost.

In addition, because the order sent to the LP is significantly smaller, as it covers only the residual amount, the execution price could potentially be better, than that received by the client. In the example above, the client's orders are quite substantial. If they are executed at a volume weighted average price (VWAP), the slippage could be significant. If the broker internalizes the flow, the client's trade can still be executed at a fair VWAP for the full volume, and the hedge trade of a smaller size therefore may receive less slippage.

This technique can significantly reduce the trading costs for a broker without adding too much additional risk under normal market conditions. The primary risk for brokers operating the internalization model occurs when positions are not completely offset, leaving brokers with an exposure to market movements which could result in a positive or negative P&L.

EXAMPLE 14

INTERNALIZATION OF TRADES DURING SHARP MARKET MOVES

Before illustrating how a sharp market move might negatively affect the broker's P&L, let's consider the performance of an A-Book broker as a benchmark.

In this example the prices are sourced from the LP and then marked up by 0.01. Assume the LP quotes EUR/JPY 121.94 / 121.98, and the traders see 121.93 / 121.99.

1st Trader's Book:

Buy **300,000 EUR/JPY** at 121.99

2nd Trader's Book:

Sell **250,000 EUR/JPY** at 121.93

A-Book model. Broker's Book:

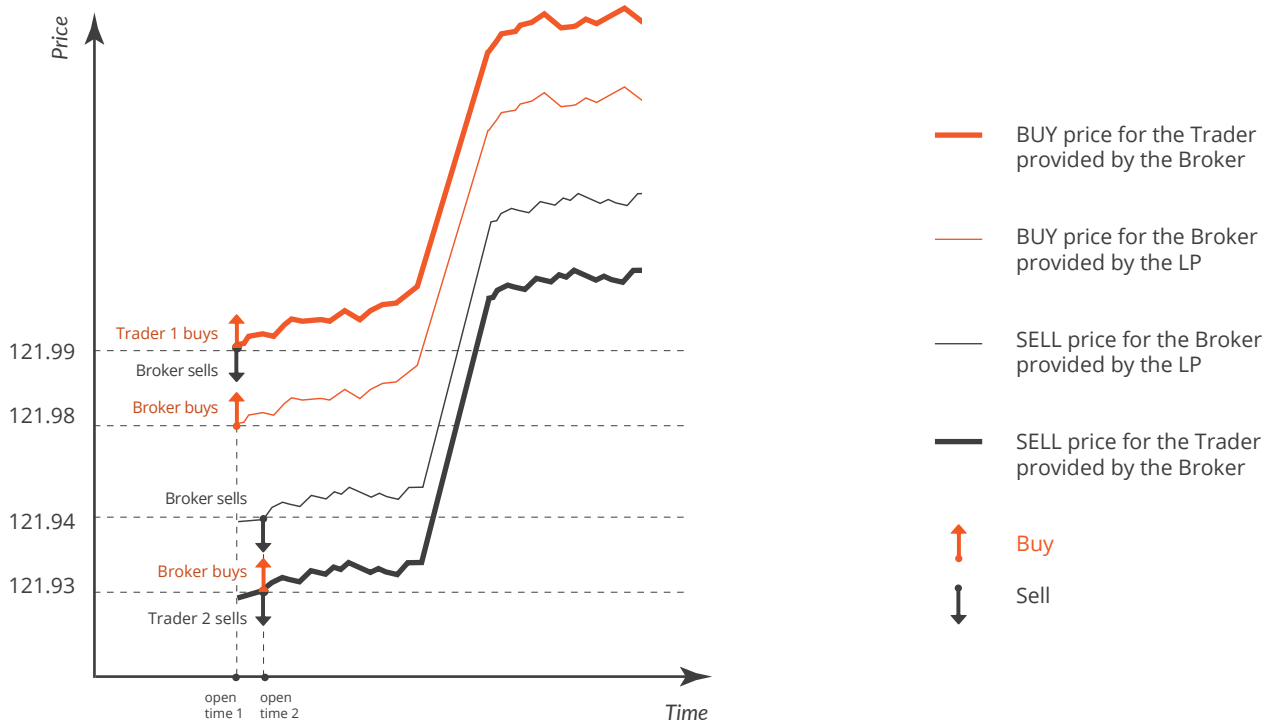
Sell **300,000 EUR/JPY** at 121.99 to Trader 1

Buy **300,000 EUR/JPY** at 121.98 from LP

Buy **250,000 EUR/NZD** at 121.93 from Trader 2

Sell **250,000 EUR/NZD** at 121.94 to LP

A-BOOK:



Shortly after the market moves sharply and the LP quotes 123.02 / 123.05, but as the broker has already transferred the price risk to the LP, they were not negatively affected by this market movement. The traders therefore start to see 123.01 / 123.06.

Now let's move to the broker who employs the Internalization model. In this example the Internalization interval set by the broker elapses after that sharp market move:

1st Trader's Book:

Buy **300,000 EUR/JPY** at 121.99

2nd Trader's Book:

Sell **250,000 EUR/JPY** at 121.93

Internalization model. Broker's Book:

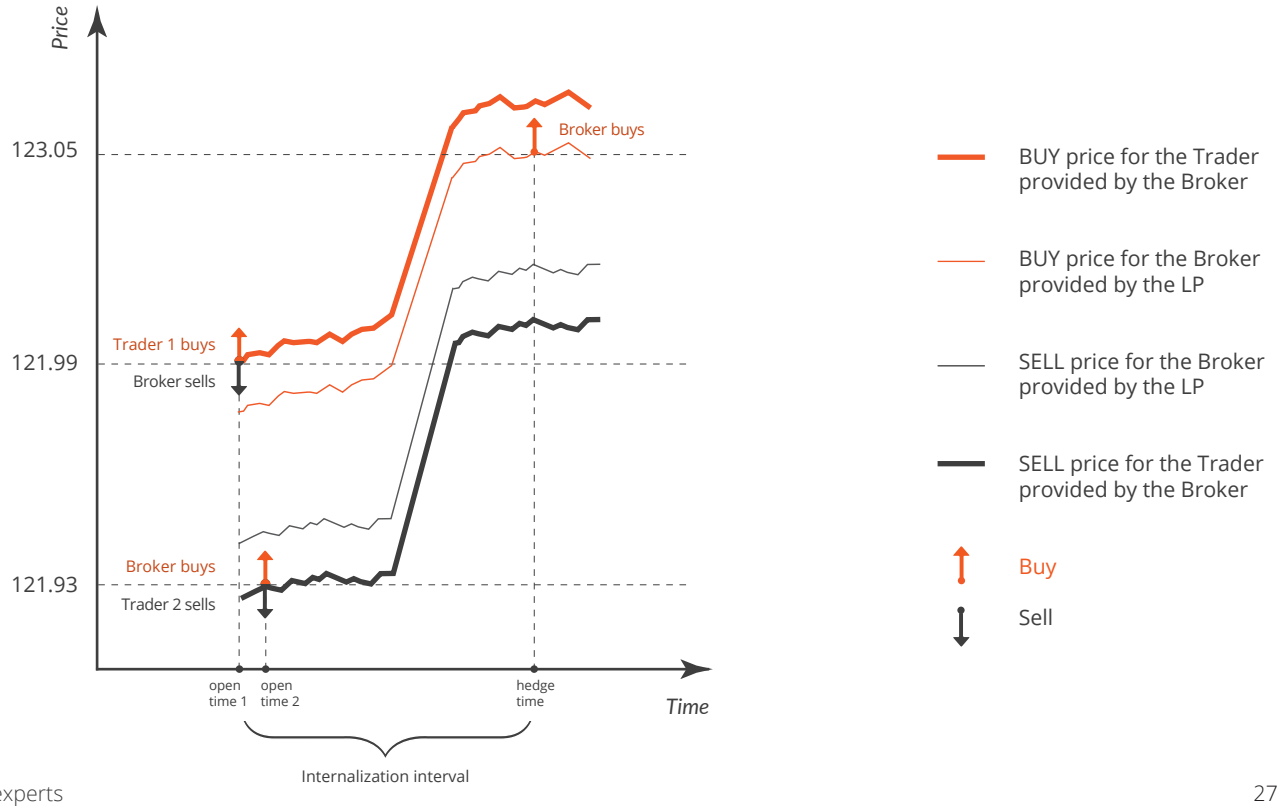
Sell **300,000 EUR/JPY** at 121.99 to Trader 1

Buy **300,000 EUR/JPY** at 121.99 from Trader 2

No hedge trade happening yet as the internalization is in progress. Here market rises and the LP starts to quote to 123.02 / 123.05. According to the internalization strategy, the broker hedges the residual exposure, which results in:

Buy **50,000 EUR/JPY** at 123.05 from LP

INTERNALIZATION:



Note that both models result in exactly the same characteristics when it comes to trades and positions with the clients, however the trading with LP is different:

	A-Book Broker's P&L	Internalization Broker's P&L
P&L vs. Clients	Unrealized: ↓ Sell **300,000 EUR/JPY** at 121.99 to Trader 1; P&L is 300,000 (121.99 − 123.01) = **− 306,000 JPY** ↑ Buy **250,000 EUR/JPY** at 121.93 from Trader 2; P&L is 250,000 (123.06 − 121.93) = **282,500 JPY** Realized: **0 JPY** (as no close trades happened yet)	
P&L vs. LP:	Unrealized: ↑ Buy **50,000 EUR/JPY** at 121.98 from LP; P&L is 50,000 (123.02 − 121.98) = **52,000 JPY** Realized: 250,000 (121.94 − 121.98) = **− 10,000 JPY** (hedge trade of Trader 1 partially closed by hedge of Trader 2)	Unrealized: ↑ Buy **50,000 EUR/JPY** at 123.05 from LP; P&L is 50,000 (123.02 − 123.05) = **− 1500 JPY** Realized: **0 JPY** (as no close trades happened yet)
Total P&L:	**18,500 JPY**	**− 25,000 JPY**

As you can see, the Internalization can be a profitable strategy if there are enough trades of similar size that offset one another, but the broker still bears the risk of the B-Book model.

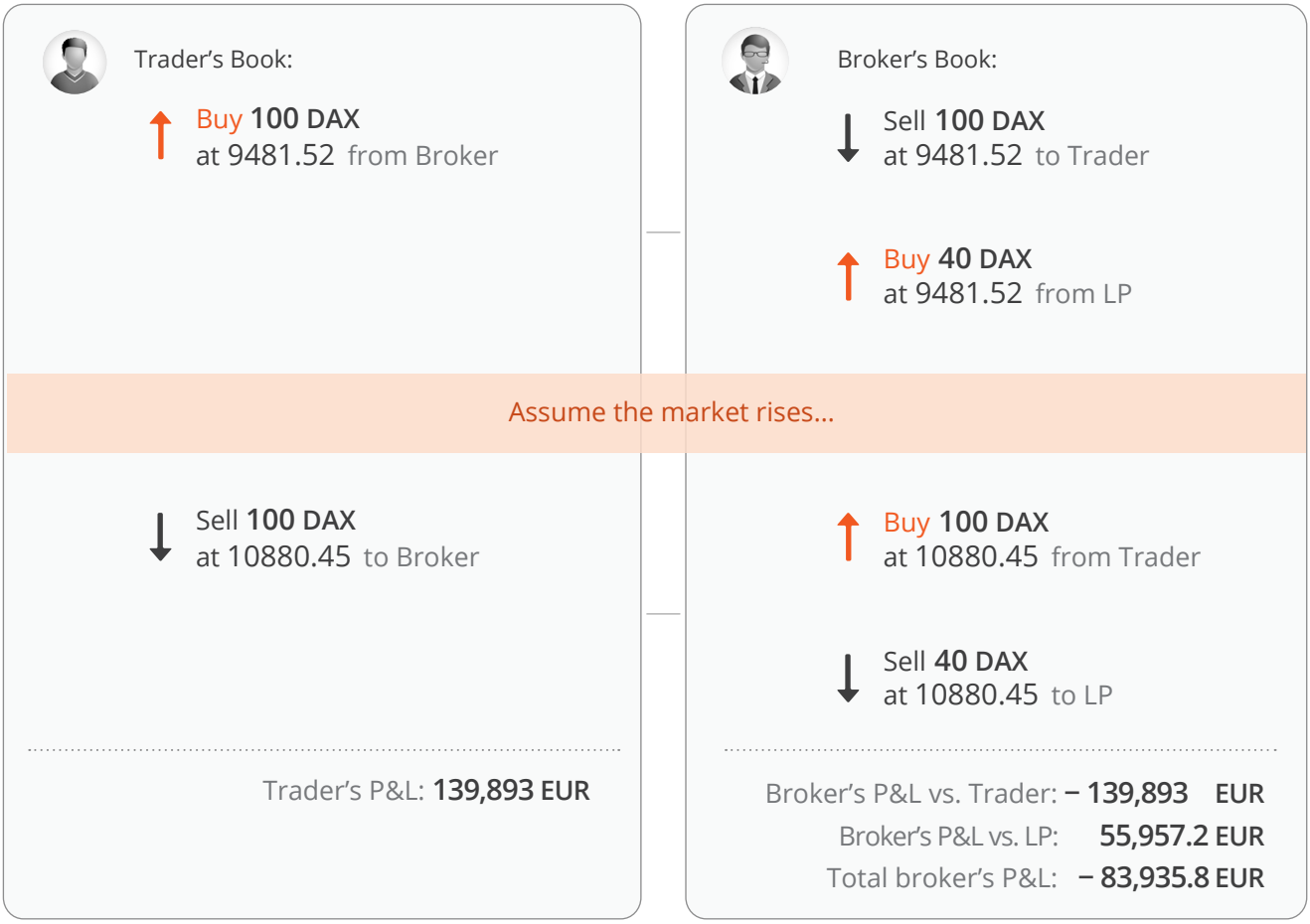
7.2 C-Book

C-Book is a term that is often used to refer to a risk management technique that differs from A or B-Booking. The most common form of C-Book risk management is the partial covering of a client's order. Brokers can hedge the risk partially to mitigate the possible impact, but not eliminate it completely, choosing instead to manage the residual risk in the hope of earning a profit from market movements.

If there is a large client with B-Book characteristics, but the potential P&L implications from sufficient market movements are outside of the brokers risk appetite, by hedging trades partially, the broker can run a portion of the risk and not transfer all of the potential profits to the LP completely. However, such a strategy also opens the possibility of the broker incurring losses that they would have entirely avoided had they hedged the full trade amount.

EXAMPLE 15 **WHEN C-BOOK WORKS AS A SHOCK ABSORBER FOR THE BROKER**

Consider the example where a broker hedges 40% of his trader's position.



In this example, the losses of the broker against the trader were partially compensated by the profit earned with the LP.

Conversely, if the market fell, the profits of the broker against the trader would be reduced by the losses incurred from hedging:

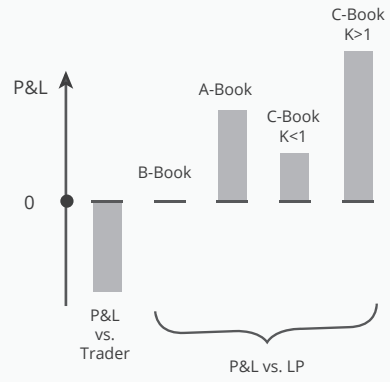
Trader's Book:	Broker's Book:
Buy **100 DAX** at 9481.52 from Broker	Sell **100 DAX** at 9481.52 to Trader
	Buy **40 DAX** at 9481.52 from LP
Assume the market falls...	
Sell **100 DAX** at 8,365.23 to Broker	Buy **100 DAX** at 8,365.23 from Trader
	Sell **40 DAX** at 8,365.23 to LP
Trader's P&L: **– 111,629 EUR**	Broker's P&L vs. Trader: **111,629 EUR** Broker's P&L vs. LP: **– 44,651.6 EUR** Total Broker's P&L: **66,977.4 EUR**

A similar C-Book execution strategy would be to cover a client with a coefficient greater than 1.

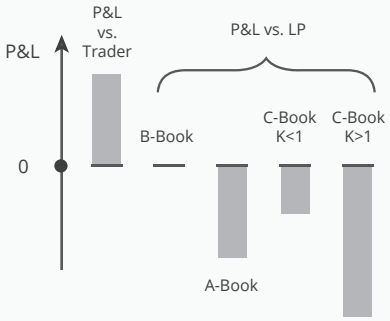
This C-Booking acts as an amplifier for the risk and reward being taken by the broker. It makes sense to apply such an amplification in case if broker believes that the trader will make a profit, however should the market go against the broker, then they will be exposed to a greater loss.

Broker's P&L

When trader wins



When trader loses



Another example of C-Book practices is the reversal of clients' trades partially or completely. This strategy is based on the assumption that trader will place so unprofitable orders that the reverse strategy vs. LP on the rates without markups would make money.

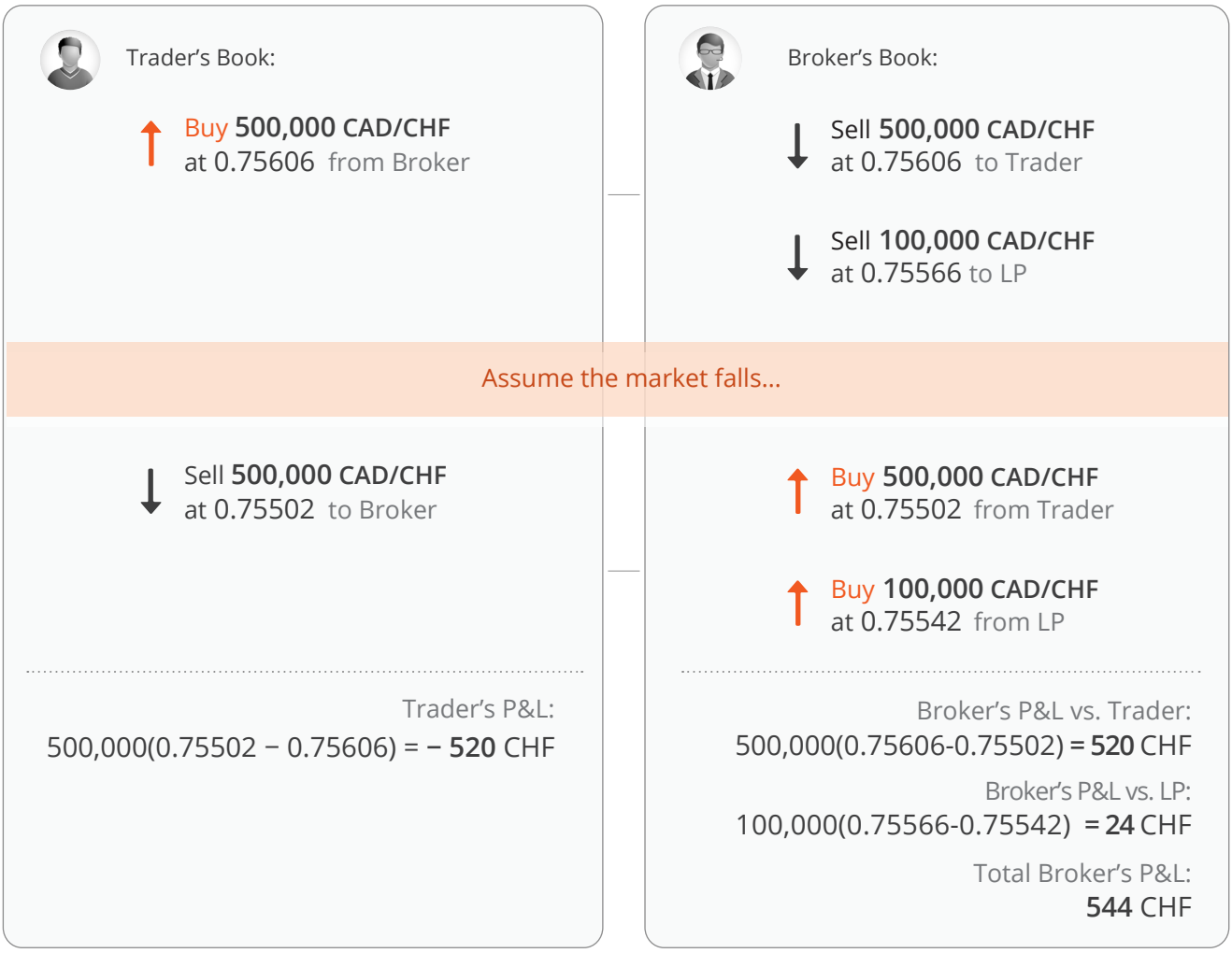
EXAMPLE 16

A PARTIAL REVERSAL OF CLIENTS' TRADES

Consider an example for CAD/CHF pair with a broker's markup of 0.0001.
Trader is willing to buy 500,000 CAD/CHF. Based on the risk profile, the broker decides to C-book this exact trader and reverse 20% of his trade.

At the moment of an opening trade, the LP quotes 0.75566 / 0.75596, and the trader sees marked up prices 0.75556 / 0.75606.

Let's assume that the market then moved against the trader and the LP's new rates are 0.75512 / 0.75542, the trader sees 0.75502 / 0.75552.



As you can see, if the broker's decision to reverse the client's trades was correct, it can be a source of some extra revenue from trading with LP.

If the market, however, moved in favour of the trader, then the reverse strategy would act as an amplifier of that loss.

Conclusion

In this short guide, we have explored and looked to explain the basic mechanics of price risk hedging through practical examples which detail how brokers manage their price risk. We have introduced a number of risk management and execution concepts which are typical for brokers in the FX market but which may not be so commonplace amongst retail traders. Furthermore, due to the high levels of ambiguity at which brokers tend to operate, we have strived to shed some light on their behind the scenes operations related to price risk management.

While this book does cover a wide range of methods used by brokers to manage their price risk, it is essential to realize that every broker is different and that many may adopt unique practices which suit their type of risk management and more importantly, their risk appetite.

It is also important to note that similar to the forex market, risk management techniques will continue to evolve and there is no fixed formula for how a broker will manage their price risk as all brokers will look for the optimal risk management performance to maximise revenue while reducing their risks.

Through gaining a greater understand of the concepts of A/B/C-Booking, risk acceptance or transference and the challenges related to these execution types, our hope is that you have gained a greater understanding of these important dealing operations. We hope you have found this book interesting and that you are inspired to find out more.

ABOUT DEVEXPERTS

Devexperts is a global fintech company. We specialize in software development of trading systems for investing in stocks, futures, options, warrants, FX and cryptocurrencies, and in market data distribution.

As technical partners of some of the world's top brokerage houses, Devexperts is committed to delivering financial technology solutions that are tailored to clients' fast-evolving needs. Our core trading and risk management solutions help clients gain competitive advantage by having the right data and the tools to analyze it easily and quickly.

© 2019 Evgeny Sorokin, Devexperts