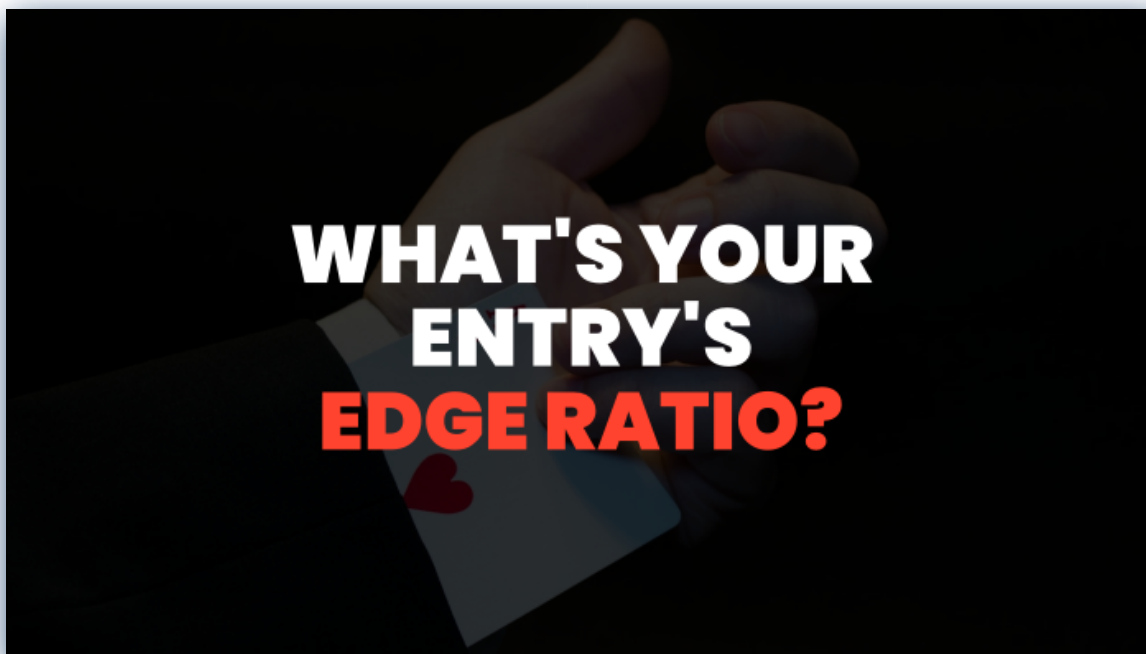


to Quantify Entry Profitability

Oct 4, 2021



The Edge Ratio helps you compare entry signals by measuring the open profits and losses they generate.

This post will cover:

- Maximum favourable excursion and maximum adverse excursion
- Edge Ratio calculations
- Quantifying entry profitability with the Edge Ratio
- Benefits & drawbacks of the Edge Ratio

With today's backtesting software, we can quickly quantify an entry's profitability over years of historical data.

The Edge ratio, first proposed by Curtis Faith in [Way of the Turtle](#), is a unique metric that can help with entry selection.

The ratio is derived from each trade's maximum favourable excursion (MFE) and maximum adverse excursion (MAE). Let's briefly discuss these concepts.

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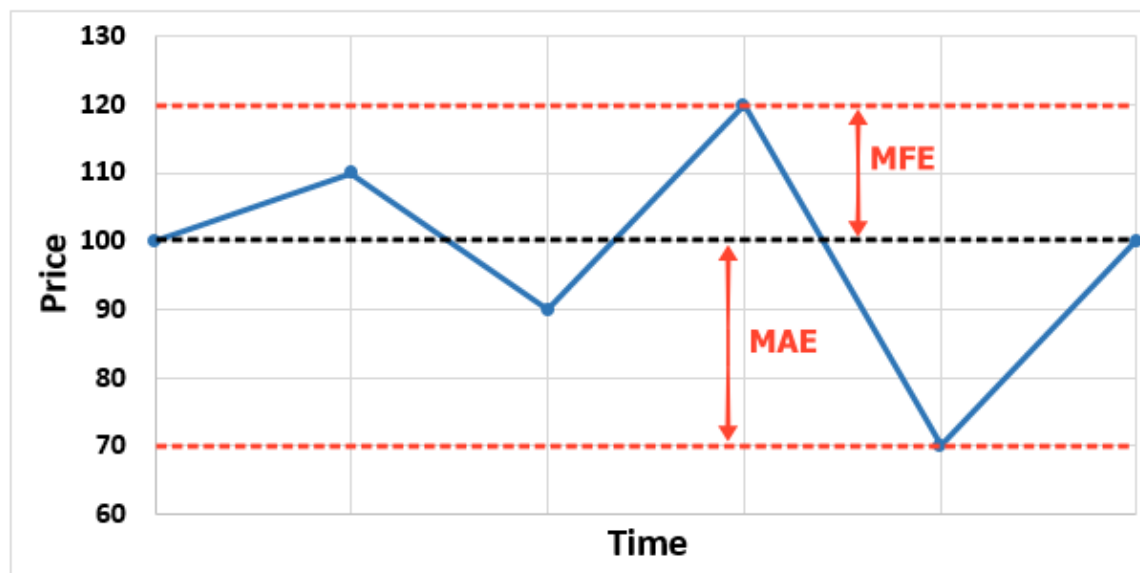
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Maximum Favourable Excursion & Maximum Adverse Excursion

MFE is the largest open gain during a trade. It measures the furthest that prices moved in your favour.

MAE is the largest open *loss* during a trade. It measures the furthest that prices moved *against* you.

MAE and MFE are calculated relative to your entry price. Suppose you have a trade that progresses as shown:





[stop loss placement.](#)

MT4's backtester does not calculate MFE/MAE by default, so I recommend backtesting your strategy using [StrategyQuant](#).

Data

Main: GBPJPY_M1_...

Direction

L+S

Lng

Shr

Sample

Full

IS

OOS

Symbol	Type	Size	Open price	Close price	Profit/Loss ...	MFE (pips)	MAE (pips)
GBPJPY_M1	Buy	0.01	194.115	193.261	-85.4 pips	28.2	85.4
GBPJPY_M1	Sell	0.01	193.743	190.915	282.8 pips	290.3	46.3
GBPJPY_M1	Buy	0.01	189.736	190.122	38.6 pips	272.7	36.4
GBPJPY_M1	Buy	0.01	190.136	189.359	-77.7 pips	38.2	77.7
GBPJPY_M1	Buy	0.01	189.446	188.661	-78.5 pips	41.1	78.5

I prefer to display MFE/MAE in pips since this removes the effects of fluctuating currency values.

Edge Ratio Calculation

The Edge Ratio is the MFE/MAE ratio normalized by the prevailing market volatility when the trade is opened. It essentially measures the entry's ability to accrue profits.

This normalization is necessary because volatile markets tend to produce higher MFE and MAE values. The prevailing 14-period ATR at the trade open will be used for normalization.

StrategyQuant automatically calculates the Edge Ratio for you. Here I'll use a hypothetical five-trade backtest to demonstrate the calculation.

For each trade, you'll need the MFE, MAE and the 14-period ATR at the trade open.

Type	Size	Open price	Close price	Profit/Loss Pips	MFE (pips)	MAE (pips)	ATR(14) On Open
Buy	0.01	191.731	191.242	-48.9 pips	73.2	48.9	0.187
Sell	0.01	188.646	185.296	335 pips	431.1	31.2	0.15427
Buy	0.01	186.508	185.987	-52.1 pips	52.9	52.1	0.18011
Buy	0.01	187.734	188.123	38.9 pips	75.6	0	0.18021
Buy	0.01	185.947	185.362	-58.5 pips	6.2	58.5	0.2076

2. Obtain the average normalized MFE and MAE values.
3. Obtain the Edge Ratio by dividing the average MFE by the average MAE.

MFE (pips)	MAE (pips)	ATR(14) On Open	MFE Norm	MAE Norm
73.2	48.9	0.187	391.44	261.50
431.1	31.2	0.1543	2793.91	202.20
52.9	52.1	0.1801	293.73	289.28
75.6	0	0.1802	419.53	0.00
6.2	58.5	0.2076	29.87	281.79

Step 1

Step 2

Avg MFE Norm	785.70
Avg MAE Norm	206.96

Step 3

Edge Ratio	3.80
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An Edge Ratio of 1.00 indicates equal amounts of favourable and adverse price movement.

The 3.80 ratio above indicates the strategy is far more likely to produce open profits. This correlates with the 200-pip gain after the five trades.

You can use the ratio to evaluate complete strategies, or any strategy element of interest. Since MFE and MAE are often used to track trade progression without any exits, I think the Edge Ratio is best suited to evaluate entry profitability.

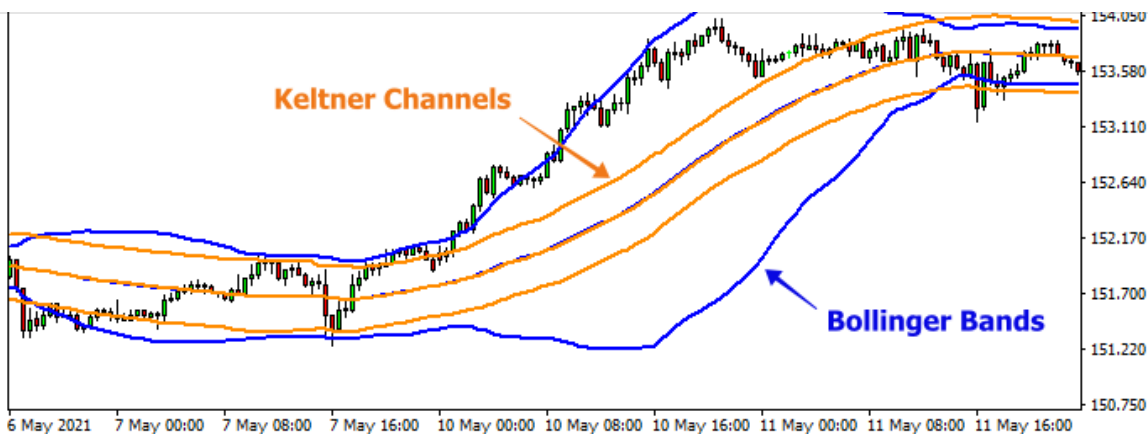
That's what we'll do now.

Quantifying Entry Profitability With the Edge Ratio

I'll evaluate the performance of two popular indicators: Bollinger Bands and Keltner Channels.

These indicators are visually similar. Each consists of a middle moving





The Bollinger Band width is ± 2 standard deviations, whereas the Keltner Channels use ± 2 ATR. [Standard deviation](#) accounts for directional volatility, unlike the ATR. This makes the Bollinger Bands expand more during market trends.

Each indicator will be used to generate trend following entries for the 30-minute GBPJPY. Trading logic is as follows:

- Buy when price closes above the upper Bollinger Band/Keltner Channel
- Sell when price closes below the lower Bollinger Band/Keltner Channel
- Exit each position after 50 bars have elapsed

The 50-bar time stop, which equals about one day on M30, gives each signal equal time to generate profits.

This strategy was quickly programmed in [AlgoWizard](#):

Long
Short
+ Add rule

IF CONDITIONS

Market Position(Current, Magic, "") Is Flat

and

Close[1] > BollingerBands(BB_Period, 2).Upper[1]

Add another condition

Optimize from 10-100

THEN ACTION(S)

EnterAtMarket

Order identification

Magic Number

Magic

Exit methods

Set to 50

Exit After Bars

TimeStop

I'll optimize each indicator's lookback period from 10-100, in steps of 1. Plotting the Edge Ratio across a large range of lookback periods allows a more comprehensive assessment of entry profitability.

The strategy was then loaded into StrategyQuant's Optimizer and setup as shown:

Parameters (manual settings)

Parameter settings: **Manual** Automatic

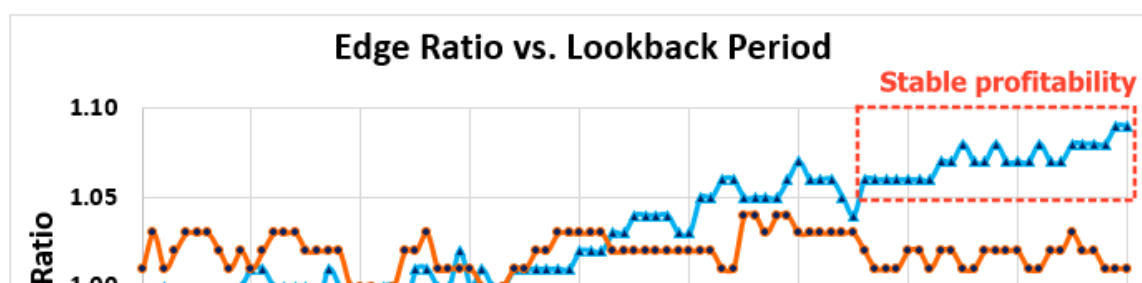
Max optimizations: 20000 Recommended number of tests is 5000 - 20000

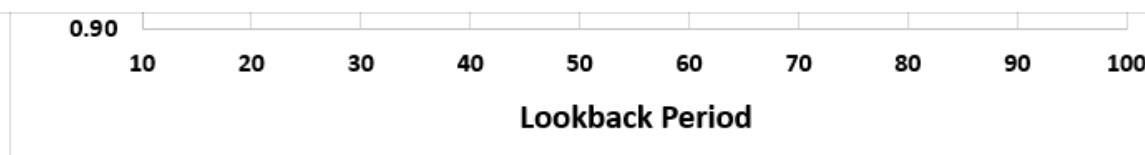
Total combinations: 91 Auto preset selected parameters

<input type="checkbox"/>	Name	Type	Value	Start	Stop	Step
<input type="checkbox"/>	Default					
<input checked="" type="checkbox"/>	BB_Period	int	50	10	100	1
<input type="checkbox"/>	Magic	int	1000	700	1300	150
<input type="checkbox"/>	Lots	double	0.01	0.01	0.01	0
<input type="checkbox"/>	TimeStop	int	50	35	65	7

Optimization Results

Here's the Edge Ratios from 2003-2021.





Even with these basic entry signals, it's reassuring that both indicators produce an average Edge Ratio exceeding 1.0.

f**in****...**

The Bollinger Bands start to outperform the Keltner Channels for lookback periods above 50. I would pick a period in the 80-100 range for further development. Periods above 100 are feasible as long as you don't mind the lower trading frequency.

I previously did another [Bollinger Bands vs. Keltner Channels comparison](#), where I plotted each indicator's optimization profile across a wide range of lookback periods and band multiples. The Bollinger Bands produced higher profits despite having less market exposure.

I suspect the Bollinger Bands' faster and larger expansion during market trends is the reason behind this performance improvement. Their widespread popularity is certainly justified.

Edge Ratio Benefits

Considers Open-Trade Performance

Unlike most performance metrics, the Edge Ratio takes both open profits and losses into account. This can help you determine optimal trade exits.

For example, if your entry has mediocre closed-trade metrics but a high Edge Ratio, it's likely that you're giving back a chunk of open profits. A profit target would be handy in such cases.

Likewise, if your Edge Ratio is surprisingly low, you may choose to implement

Since the Edge Ratio is volatility-normalized using the ATR, you can use it to compare performance across different markets, or across different regimes for the same market.

Edge Ratio Drawbacks

Doesn't Consider Trading Frequency



Since we use the *average* normalized MFE and MAE values, the Edge Ratio is not affected by trading frequency. Higher trading frequencies are usually preferred because they generate profits faster.

To alleviate this, you can plot [profits vs. lookback period](#) instead. A simple reversal strategy, which is always in the market, will suffice for such cases.

You can use both methods concurrently to get a more comprehensive overview of your entry performance.

Affected By Backtest Precision

MFE and MAE values continually evolve as your trade progresses. Your backtest thus needs to be precise enough to capture the open profits/losses within each bar.

If your backtest engine evaluates performance at the open of each 30-minute bar, your MFE/MAE values will only be updated every 30 minutes.

For best results, you should [backtest with tick precision](#) or at least with 1-minute OHLC prices.

Wrapping Up

The Edge Ratio is a unique metric that considers the open profits/losses generated by your entries, possibly giving it an edge (pun intended) over more conventional metrics.

Plotting the Edge Ratio against your indicator lookback period is a good way to rank different entry signals and select an optimal lookback.

On a related note, you can also plot the [Edge Ratio against the number of bars in trade](#). This illustrates how your entry's edge evolves as the trade progresses.

If you need help with this, check out my post on how to plot [expectancy vs. number of bars in trade](#).

Ultimately, every method has its benefits and drawbacks; there is no universal or best way. What matters is that you attempt to quantify your strategy's performance using a method you're confident in.

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