Using Price Gaps for Hedging Prices and Making Financial Decisions

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Abstract. Price gaps in assets pricing are relatively rare. Gaps arise at the moment when the open price of a new period opens significantly lower or higher than the close price of the previous period. The aim of this paper is to find out how often gaps are created in the prices of a selected underlying asset and how they can be used for improving the corporate financial situation. The object of our examination was a soybeans oil commodity traded on the e-CBOT futures market while the subject of the research were the price gaps themselves, the frequency of their occurrence and the likelihood of their closing. Data were analyzed over a period of 30 years. The fact that it is more likely than unlikely that the price will return and close the gap has been confirmed. The larger the price gap was, the longer it was necessary to wait for it to close. However, as for trading, it was also possible to take advantage of the low probability that the price gap would be closed - to set up a suitable stop loss order.

1 Introduction

Gaps are relatively rare phenomena in the financial assets valuation in financial markets. The more rarely they occur, the more reliable signals they can generate (for example, they are one of the ways how choose trades with a profit probability of more than 70 %). That is the reason why price gaps could also be used by enterprises to improve their financial situation and stability. This applies in particular to companies that have access to financial markets and actively trade in them (e.g. agricultural companies that use futures markets).

Gaps arise when the opening price of a new period opens significantly lower or higher than the closing price of the previous period. There is a kind of free space between these prices, which is not filled. This "vacuum" is an illustration of the range of prices that were skipped and for which no trades were concluded. More precisely - it should be noted that this is the blank space between the highest and lowest price of two consecutive periods. As stated by C. M. Corcoran: "Discontinuities in price behavior or “gaps” are one of the most intimidating characteristics of financial markets. Gaps or discontinuities arise because price does not follow a trajectory in the same way that physical objects move continuously through spatial dimensions. Although price can be mapped into two or even three dimensional

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graphical surfaces to depict the movement of price "through" time, there will be discontinuities in the path of movement." [1]

2 The aim of the paper and methodology

The aim of this paper is to find out how often gaps are being created in the prices of a selected underlying asset and how they can be used for hedging prices or financial decisions of enterprises. Especially companies dealing with agricultural products can actively trade e.g. futures contracts and take advantage of the price gaps once created.

We are using MS Excel and its functions, in which the underlying prices of the asset are being analyzed. Soybean oil commodity traded on the e-CBOT futures market (a member of the CME group) has been chosen as the object of our examination. The subject of the examination were price gaps themselves, the frequency of their occurrence and the likelihood of their closing. Data were analyzed over a period of thirty years.

3 Price gaps theory

The reason for creating price gaps is that new information has entered the market, usually at a time when it was closed for trading. The surprising information subsequently had an impact on extreme price moves after the market opening (it could be e.g. bigger than expected changes in interest rates, natural disasters, unexpected news, etc.). Author T. Knight states: "Many things can cause a price gap, such as surprisingly good earnings, surprisingly bad earnings, FDA approval or disapproval of an important drug at a pharmaceutical company, a takeover of a company, and so on. Gaps are the market's way of signaling a big change, but knowing what to do with that change separates profitable trades from losing ones." [2] D. H. Weis & A. Elder concluded: "The market we are watching can gap sharply higher or lower because of unexpected news events. These are the extremes of the probability curve but they must be accepted by anyone who ventures into speculation as part of the territory." [3] More information on the topic of unexpected news can be found in the paper by K. P. Evans: "Intraday jumps and US macroeconomic news announcements". [4] Alike, J. Bernstein on the topic of price gaps: "Gap days are very important because they often provide very reliable day trading and short-term trading opportunities." [5] Author C. A. Kase confirms: "The placement of gaps before or after key patterns, or during trends, can give clues as to the market's future action." [6]

Gaps are usually created on market openings. Due to the information received during a break or a market close, an enormous amount of market orders (buy or sell) has been accumulated, which means that traders are willing to sell or buy significantly cheaper or more expensive than they were at the closing price of the previous period. The pressure to move in one direction is so huge that the market will open up at a significantly higher or lower price level.

T. N. Bulkowski states in his book: "Traders define an opening gap as one in which the opening price gaps away from the prior day's close, leaving a hole on the chart - at least temporarily. Some day traders fade the opening gap and others trade with the trend. Fade means to go against the prevailing trend, like trying to spit into the wind." [7] Alike, E. Ponsi states: "Gaps commonly occur when a market opens. Illiquid trading vehicles have a higher tendency to gap than liquid trading vehicles. Some investments will gap in the middle of the trading session. These intraday gaps are particularly prone to occur during lunch hours, when many participants are away from their desks." [8]

However, there are many authors dealing with the price gaps and the basic groups they can be put into, e.g. T. N. Bulkovski in his other books about technical analysis and the price

gaps [9, 10], A. Plastun et al. [11], J. Stubinger & L. Schneider, [12], M. C. Thomsett [13], G. M. Caporale & A. Plastun [14], GF. Gu et al. [15]. Most authors agree that price gaps can be divided into four basic groups:

1. Common gaps (also Trading gaps) – are the most common gaps and do not necessarily increase the volume of trades of the underlying asset. They arise coincidentally, when multiple market orders accumulate in one direction. These orders are supported by most market players after the market opens. However, such gaps are closed within the next few days.

2. Breakaway gaps – are the ones that follow the breakthrough of a strong technical formation (usually triangles or levels of support and resistance). Above and below this range, in which the market had moved for days, traders have meanwhile set up a number of buy and sell orders. But once strong fundamental changes and reports reach the market, a price gap is created immediately after the opening. This price jump is later supported by a number of additional sell bellow / buy above orders which were activated. Such price gaps are also often the beginning of new strong trends, especially if these gaps have not been closed. Breakaway gaps are accompanied by a sharp increase in trading volume.

3. Runaway gaps – are created during strong trends, when the price gap is caused by a further increase in interest in the given asset, supporting the current price trend even more. In other words, in the current constant price move in one direction, such price gap just creates a kind of sudden price jump, in the same direction. This kind of price gap is not usually closed.

4. Exhaustion gaps – are usually created during strong trends, but unlike Runaway gaps, the price use to return and the gap is filled. The fact that the price has reversed and filled the gap signifies that the price jump was not strong enough and is no longer supported by most subjects. Exhaustion gaps signalize the end of trend and its change to the opposite one.

Despite the fact that the price gap theory speaks clearly, the practical side of their trading is partly different. In fact, at the time of formation of a new price gap, the company and the financial manager could hardly clearly determine whether it is really e.g. the Runaway gap, or the price reverses later and forms the Exhaustion gap. All price gaps are also usually accompanied by a sharp increase in trading volume (with the exception of the Common gaps), which also does not make the situation easier. In addition to the abovementioned facts, the gaps could also be closed later just partially, which can be confusing even more. The most reliable ones are probably the Breakaway gaps, where movement in one direction is supported by a number of pre-placed orders from other entities. An example of a perfect closing of the price gap within six days is shown in Figure 1.

Figure 1. Price gap closed.

An example of a price gap that keeps being open is shown in Figure 2. Not even the next 10 trading days were enough to close the gap.

Figure 2. Price gap was not closed.

A common way of trading price gaps is to rely on reverse price movements and thereby on closing the gap. This is especially true for Common gaps as well as Exhaustion gaps. On the other hand, if traders would rely solely on the reverse movement at Runaway or Breakaway gaps, they could pay significant financial costs later. The theoretical dividing into four basic groups is more of an informative nature on the nature of price gaps rather than of practical commercial importance. It is not always possible to tell what kind of price gap we see and how it can be used for a profitable trade right after the gap has been formed (we do not know whether it will be closed or remain open for many days). Anyway, what the financial managers can do is to use the long-term test results, which can tell them what the probability of closing a gap for their selected asset will be.

4 Research results and discussion

Table 1 shows the results of the tests we have performed. The tests were conducted on a soybean oil commodity (e-CBOT prices) for a 30-year period (1979-2009).

Table 1. Price gaps long-term trading tests (soybean oil)

GAP	Incidence	Period	Gap filled
$60	5,19%	5 days	42,49%
		10 days	55,47%
		15 days	62,09%
		20 days	66,41%
		25 days	68,45%
		30 days	70,74%
$90	3,93%	5 days	38,38%
		10 days	51,85%
		15 days	58,92%
		20 days	63,97%
		25 days	65,99%
		30 days	68,69%

GAP	Incidence	Period	Gap filled
$210	1,63%	5 days	30,08%
		10 days	43,09%
		15 days	49,59%
		20 days	54,47%
		25 days	56,91%
		30 days	58,54%
$240	1,48%	5 days	29,46%
		10 days	39,29%
		15 days	46,43%
		20 days	51,79%
		25 days	54,46%
		30 days	56,25%

GAP	Incidence	Period	Gap filled
$120	3,07%	5 days	36,64%
		10 days	48,28%
		15 days	54,74%
		20 days	59,91%
		25 days	62,07%
		30 days	65,09%
$150	2,45%	5 days	33,51%
		10 days	47,03%
		15 days	52,97%
		20 days	58,38%
		25 days	60,54%
		30 days	63,24%
$180	1,97%	5 days	31,54%
		10 days	44,97%
		15 days	51,68%
		20 days	57,05%
		25 days	59,73%
		30 days	61,07%

GAP	Incidence	Period	Gap filled
$270	1,20%	5 days	23,08%
		10 days	34,07%
		15 days	42,86%
		20 days	48,35%
		25 days	51,65%
		30 days	53,85%
$300	1,00%	5 days	22,37%
		10 days	32,89%
		15 days	39,47%
		20 days	44,74%
		25 days	48,68%
		30 days	51,32%
$330	0,93%	5 days	22,86%
		10 days	32,86%
		15 days	40,00%
		20 days	45,71%
		25 days	50,00%
		30 days	52,86%

Note: own calculations

The first column shows the minimum level of the price gap that had to be created to be included in the calculations. The second column shows the percentage of all days that saw an opening at or above this price gap. The third column shows the number of days that were included in the tests to see whether the price gap has been closed. The last, fourth column shows the percentage of price gaps that have returned to the initial price over a given time and caused closing a gap.

As can be seen in the Table 1, with a price gap of $ 60, the incidence was more than 55 % that the gap was closed within next 10 days. With an incidence rate of more than 70 % the gap was closed no later than 30 days from its arising. However, if $ 330 price gaps were traded, it would be necessary to wait at least 25 days or more so that financial managers could rely on a more than 50% probability of closing the gap.

In general, the smaller the price gap which was created, the more likely it was that it will close quickly. Vice versa, the larger the price gap which was created, the longer it was necessary to wait until it was closed. All tested price gaps and time periods confirmed that it was more likely that the price would return and close the gap. We can also state that the larger the price gap was, the longer it was necessary to wait for it to close. Of all the price gaps included in the tests, more than 50 % of them were closed within next 30 days.

If a financial manager is interested in using price gaps to hedge prices or even improve the financial situation of his company and wants to reach high probability of profit, he should focus on small price gaps. Small gaps were closed with the incidence of more than 70 % of all cases and were also closed very quickly. The opposite applies to big price gaps.

In addition, our tests have shown that it is not only possible to take advantage of the high probability of closing the gap, but also vice versa - the very low probability that the price gap will be closed. How? This finding can be used for the correct setting of a stop loss order. This can be illustrated by Table 1 - when the market created a price gap of $ 300, there was only a 22 % probability that such a gap would be closed within 5 days, or 33 % that it would be closed within 10 days. Stop loss can therefore be set at the initial price of this price gap - of

course, this only applies if the financial manager wants to enter the market in the direction of the prevailing trend. Such a time period was sufficient to allow the market to begin moving in the expected direction.

5 Conclusion

The size of the gaps and their incidence depends on the market liquidity. In general, the more liquid the market, the less often price gaps are being created. If they are created, they are not too big. Market where price gaps do occur rarely is e.g. the foreign exchange market (forex). Not only is the forex liquidity the highest of all financial markets, but it does non-stop trading, so any information that reaches the market is immediately taken into account, leaving no room for excessive panic and accumulation of one-way orders before market opening.

If some enterprises or financial managers are interested in using the price gaps to hedge prices or improve the financial situation and stability, they should first make the long-term tests of gaps incidence in asset prices. They could find out the best moments to enter the financial market or where exactly to place the stop loss order. On the contrary, the main risk of price gaps, especially for enterprises that remain in the market overnight and do not trade the price gaps at all, is that the price could skip their set stop loss - thus, their loss could be much higher than originally intended.

Acknowledgement

The presented paper is the output of the scientific grant: VEGA No. 1/0007/19 "Asset allocation in a low interest rate environment in the financial and non-financial companies in the Slovak republic" (100 %).

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