

The Impact of Golden Cross and Death Cross Frequency on Stock Returns in Pre- and Post-financial Crisis

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Abstract. Technical analysis in stock market seems to be helpful for investors to survive the financial crisis. To verify this point, we try to explore whether the moving average (MA) strategy is related to the investment performance. Here we apply the Golden Cross (Death Cross), a technical indicator signalling the time to buy (sell) when the short term moving average crosses above (below) the long term moving average, to 400 listed firms in the Taiwan stock market based on the approach of [8]. We find that Golden Cross (Death Cross) is positively (negatively) related to stock returns. However, the occurrences of Golden Cross and Death Cross before and after financial crisis are not significantly related to stock returns.

Keywords: Death cross · Financial crisis · Golden cross · Moving average · Technical analysis

1 Introduction

Moving average is a very popular technical analytical tool for market traders. The Golden Cross (GC) is a buy signal when the short term moving average of stock price crosses and rises above long term moving average of stock prices. The Death Cross (DC) is a sell signal when short term moving average of stock prices crosses and drops below long term moving average of stock prices. [2] adopts GC and DC to generate portfolios which outperform buy-and-hold portfolios. As Taiwan had experienced a sharp drop in its stock index, TAIEX, from 9,259 on 2008/5/19 to 4,089 on 2008/11/20, we therefore define one year period before 2008/5/20 as the pre-financial crisis period, and one year period starting 2008/5/20 as the post-financial crisis period. We aim to examine whether the number of occurrences of GC and DC during these two periods is related to the stock returns.

2 Literature Review

[9] studies the effects of expected depreciation on stock returns during financial crisis and finds that as the stock volatility increases, investors tend to decrease their holdings and thus lower their stock returns especially when depreciation is expected by investors. [15] find that from 1992 to 2013 there were six financial crises which all substantially affect the volatility and returns of the Taiwan stock market.

[1, 3, 13] find that the technical analysis tools such as cumulative trading volume, relative momentum and moving average, can provide investors with abnormal returns on stocks. [5, 10] propose that 50- and 200-day moving average are the most countable and easily applied tools by investors. By using the emerging market data of 4 Latin American and 6 Asian countries, [14] find that only Taiwan, Thailand and New Mexico have significant profits using moving average strategy. [11] also find moving average strategy profitable in Bengal, India, Pakistan and Sri Lanka. [16] also show significant results using moving average in markets of China, Hong Kong and Taiwan in comparison with markets of French, German, UK and USA.

There are some studies against the profitability of technical tools. [12] find that by accounting transaction costs, technical tools are not profitable although they are able to predict future stock prices. [17] adopts moving average, stop-loss, profit-taking and bias and random indicators by using intra day trading data. He concludes that those tools are not profitable at all.

3 Methodology

[6, 7] propose that stock returns are related to firm size and book-to-market ratio. [4] also find that **capital asset pricing model** (CAPM) provides better explanation for the stock returns in the Taiwan stock market. Therefore, we adopt the approach of [8] to examine the cross-sectional stock returns in the following:

$$Y_i = a + b_1 GC + b_2 DC + b_3 SIZE_i + b_4 BM_i + b_5 \beta_i + \varepsilon_i, \quad (1)$$

where Y_i is the quarterly returns on firm i ; GC and DC are the number of occurrences of Golden Cross and Death Cross, respectively. $SIZE_i$ is the total assets for firm i . BM_i is firm's book-to-market ratio. β_i is firm's market beta. Here we just define 5- and 20-day moving average as the short-term and long-term moving average to verify the following three hypotheses:

- H1: The number of occurrences of GC is positively related with the stock returns.
- H2: The number of occurrences of DC is negatively related with the stock returns.
- H3: The relationship of the number of GC (DC) occurrences with stock returns is different in pre- and post-financial crisis period.

4 Empirical Results

The data are downloaded from Taiwan Economic Journal (TEJ) ranging from 2007/05/20 to 2009/05/20 with 856 listed firms excluding TDR (Taiwan Depository Receipts). To see whether firm size will affect the results, we rank firms by their market capitalization and sampled only 400 firms of which 200 firms belong to the highest market capitalization and 200 firms belong to the lowest market capitalization.

4.1 All Sample

Here we consider all 400-firm observations and present the results of Eq. (1) as follows: Table 1 shows that GC is significantly positively related to the stock returns in three periods: whole period, pre-crisis and post-crisis. The DC is significantly negatively related to the stock returns in three periods. However, as the absolute value of the coefficients of DC are all larger than those of GC, DC has stronger effects on stock returns than does GC. Therefore, H1 and H2 are valid but H3 is invalid as there is no significant evidence to support a different relationship in pre- and post-financial crisis.

Table 1. $Y_i = a + b_1 GC + b_2 DC + b_3 SIZE_i + b_4 BM_i + b_5 \beta_i$

Coefficient	Whole period ^a	Pre-crisis ^a	Post-crisis ^a
a	-4.9303	-13.4068	10.9590
p -value ^b	0.1643	0.0064***	0.0137**
GC	1.9960	1.5979	1.7346
p -value	0.0309**	0.0160**	0.0106**
DC	-2.1758	-2.3399	-1.6976
p -value	0.0181**	0.0006***	0.0096***
$SIZE$	0.3094	1.4690	-1.0389
p -value	0.1246	0.0000***	0.0003***
BM	-2.2595	-3.0030	-2.0019
p -value	0.0018***	0.0172***	0.0030***
β	1.7391	-7.8335	10.0413
p -value	0.2071	0.0000***	0.0000***
adj- R^b	0.0481	0.1057	0.1027

^aWhole period: 2007/05/20–2009/05/20; pre-crisis period: 2007/05/20–2008/05/19; post-crisis period: 2008/05/20–2009/05/20. We use 400-firm observations for the regression.

^b p -value is the probability of t -statistics and ***, ** and * denote its 1%, 5% and 10% significance level, respectively.

4.2 Firms with High and Low Market Capitalizations

We divide 400-firm observations into two groups: one with high market capitalization (*HMKT*) and the other with low market capitalization (*LMKT*) and run the regression Eq. (1) with the results outlined in Table 2.

Table 2. $Y_i = a + b_1 GC + b_2 DC + b_3 SIZE_i + b_4 BM_i + b_5 \beta_i$

Coefficient	Whole period ^a		Pre-crisis ^a		Post-crisis ^a	
	HMKT	LMKT	HMKT	LMKT	HMKT	LMKT
<i>a</i>	16.9553	11.4495	9.7307	9.7076	34.0396	15.5974
<i>p</i> -value ^b	0.0031***	0.4196	0.2685	0.6123	0.0000***	0.4110
<i>GC</i>	0.9496	1.9934	0.2613	2.1008	1.7903	2.2762
<i>p</i> -value	0.4688	0.1151	0.7779	0.0259**	0.0411**	0.0247**
<i>DC</i>	-1.6549	-1.7591	-1.4326	-2.3858	-2.7475	-1.6159
<i>p</i> -value	0.2036	0.1649	0.1416	0.0122**	0.0020***	0.0901*
<i>SIZE</i>	-0.6645	-0.9725	0.3192	-0.3114	-1.6855	-1.7376
<i>p</i> -value	0.0170**	0.3094	0.4650	0.8116	0.0000***	0.1896
<i>BM</i>	-3.2221	-1.7548	-5.3511	-1.3773	-1.9967	-1.6882
<i>p</i> -value	0.0008***	0.0903*	0.0036***	0.4243	0.0345**	0.0779*
β	2.7332	-0.9459	-4.2186	-11.6209	6.0922	10.3341
<i>p</i> -value	0.1596	0.6401	0.1551	0.0000***	0.0101**	0.0001***
adj- <i>R</i> ^b	0.0830	0.0095	0.0512	0.1121	0.1620	0.0982

^aWhole period: 2007/05/20–2009/05/20; pre-crisis period: 2007/05/20–2008/05/19; post-crisis period: 2008/05/20–2009/05/20. We use 400-firm observations for the regression.

^b*p*-value is the probability of *t*-statistics and ***, ** and * denote its 1%, 5% and 10% significance level, respectively.

By Table 2, returns of firms with high market capitalization are positively (negatively) related with *GC* (*DC*) for the post-crisis period, which are statistically significant at 5% and 1% (0.0411 and 0.0020). However, they are not statistically significant for the whole period and pre-crisis period. One possible reason is that after financial crisis, investors are becoming conservative and more sensitive to risks such that they tend to depend more on the technical indicators to support their investment decision. The same results apply also to the returns of firms with low market capitalization for the post-crisis period with significance level at 5% and 10% (0.0247 and 0.0901). The coefficient of β for the post-crisis period is significantly positive which also supports the assumption that returns of stocks tend to move with the market directions.

5 Conclusion

Different from the study in the literature that usually adopts the GC and DC as the signal of buy and sell, the study tries to use the number of occurrences to explain the normal returns of stocks. Three findings of the paper are: (1) the number of occurrences of GC is positively related to stock returns; (2) the number of occurrences of DC is negatively related to stock returns; (3) the relationship of GC (DC) with stock returns for pre-crisis and post-crisis does not change, i.e., positive (negative) with stock returns for both periods. However, the relationship becomes more pronounced for the post-crisis period, suggesting the fact that during post-crisis of one year period, investors are becoming more risk-sensitive and may become more dependent on technical analysis to help their investment decision. This supposition may need further verification in the future studies.

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