

EMPIRICAL ANALYSES OF THE “DOGS OF THE DOW” STRATEGY: JAPANESE EVIDENCE

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ABSTRACT. *In the stock market, one of the aims of investors is to outperform market benchmarks such as NIKKEI 225. However, in the Japanese stock market, even professional fund managers have failed to achieve this. To overcome this difficulty, we propose the application of the “Dogs of the Dow” investment strategy to the Japanese stock market and analyze its performance on the basis of 1981-2010 data. The results show that on an average, this strategy is superior to NIKKEI 225 and is statistically significant at a 95% confidence level. We also examine the performance of this strategy for various aspects. In conclusion, the Dogs of the Dow strategy can be a successful and easy-to-practice investment strategy in the Japanese market.*

Keywords: Dogs of the Dow strategy, Dow 10 strategy, Portfolio selection, Japanese stock market, NIKKEI 225 index, Sharpe Ratio

1. Introduction. In the stock market, one of the aims of investors is to “beat the market”, i.e., to outperform benchmarks such as the Dow Jones Industrial Average or Nikkei Average. This aim, however, is not easily achieved even by professional fund managers. For example, a study on the American funds reported that 75% of them underperformed benchmarks [1], and the situation for the Japanese fund managers is even worse. As for individual investors, most of them lack advanced professional skills or do not have enough time to study the stock market. As a consequence, most of them are losers in the market. Therefore, effective investment strategies, which should be simple and easy-to-practice, are necessary for both professional and individual investors.

As a solution, this study proposes the application of the “Dogs of the Dow” investment strategy to the Japanese market. This strategy, also known as the Dow 10 strategy, is a very popular and successful investment strategy in the United States. It involves investing equal amounts in the 10 highest-yielding stocks of the Dow Jones Industrial Average (DJIA) index (the 10 stocks are commonly referred to as Dogs of the Dow) at the end of the year, and then holding these stocks. After a year, the portfolio is rebalanced and updated with equally weighted investments on the new Dogs of the Dow.

One of the first papers on the Dogs of the Dow investment strategy was written by Slatter [2], who showed that the 10 highest-dividend-yielding stocks of DJIA outperformed DJIA from 1973 to 1988. Since then, many papers have been written on the American stock market. O’Higgins and Downes [3] and Knowles and Petty [4] published books

examining the performance of the Dogs of the Dow strategy over longer time horizons. These studies show the effectiveness of this strategy from 1973 to 1991. While these books increased the popularity of the strategy, they also raised new concerns. Nonetheless, they attracted more investors and scholars to apply the strategy. The first academic study on the Dogs of the Dow strategy was performed by McQueen et al. [5]. They used statistical methods to examine the performance of the portfolio over 50 years (1946-1995), and concluded that this strategy's superiority is statistically significant.

Encouraged by its success in the United States, scholars in many countries have examined the strategy. Visscher and Filbeck [6] showed that the Dogs of the Dow strategy performed well against the Toronto 35 and TSE 300 indices in the Canadian stock market. The strategy was also widely examined in Latin American and Polish stock markets [7,8]. Furthermore, Eemeli and Sami [9] concluded that the Dogs of the Dow strategy can be successfully applied to the Finnish stock market. In Japan, Song and Hagio [10] proposed the application of this strategy to the Tokyo Stock Exchange, and concluded that it performed well when it was applied in NIKKEI 225 for the 2002-2006 data.

This study analyzes the performance of the Dogs of the Dow strategy in the Japanese stock market for a longer term in order to examine its validity. First, we conduct a simulation using the 1981-2010 data and compare the performance of the Dogs of the Dow strategy with that of NIKKEI 225 index. The results show that the strategy outperforms the index remarkably. This provides empirical evidence for the effective application of the strategy in the Japanese market. Second, because of the higher standard deviation of the Dogs of the Dow strategy, we make risk adjustments by using the Sharpe Ratio, drawing the comparison one more time. The results after adjusting for risk and transaction costs make the strategy more convincing and rigorous. Third, this study explores various versions of the Dogs of the Dow strategy, which provide more implications for investors of the Japanese stock market.

The rest of this paper is organized as follows: In the next section, we focus on the simulation process. Section 3 presents the results of the annual return and accumulated performance of both the Dogs of the Dow strategy and NIKKEI 225, and compares them at 10-year subperiods. In Section 4, we adjust the risk for the Dogs of the Dow strategy and make the comparison again. In Section 5, we test the performance of the Dogs of the Dow strategy with various numbers of stocks. In Section 6, we discuss the advantages of the strategy. The concluding remarks are presented in Section 7.

2. The Simulation. NIKKEI 225 (also known as NIKKEI average or NIKKEI) is the most widely used market index for the Tokyo Stock Exchange. It includes 225 stocks, which are equally weighted, and has been calculated on the daily basis since 1950.

We implemented the simulation of the Dogs of the Dow investment strategy in three steps. In step 1, we collected data for all 225 companies of NIKKEI 225 on March 31, and then selected the 10 highest-dividend-yielding stocks. On April 1, we invested equally in the 10 stocks. In step 2, we held these stocks for one year and then sold them at the end of March of the following year. After updating the list of NIKKEI 225, we invested equally in the new top-10 stocks on April 1. In step 3, we repeated the process for each year.

We searched for the stock prices on the Internet and in newspapers and obtained the expected dividend price data for 225 companies of NIKKEI 225 [11]. April 1 was chosen as the investing date because it is the beginning of the fiscal year for most Japanese companies.

In this study, we implemented the simulation using data from the years 1981-2010.

3. Comparison of Dogs of the Dow Strategy and NIKKEI 225.

3.1. Average return. Table 1 presents the average returns and standard deviations of the Dogs of the Dow strategy and NIKKEI 225. The Dogs of the Dow strategy had an average return of 13.61% and a standard deviation of 32.27%. The NIKKEI 225 portfolio had a lower mean return and deviation at 3.97% and 24.17%, respectively. The table also provides data on the difference between the two strategies. The Dogs of the Dow strategy had a 9.64 percentage points higher return on average and the difference of the standard deviation was 8.10 points. The data show that in the last 30 years, the Dogs of the Dow strategy outperformed NIKKEI 225 on average, although the former had a higher risk.

TABLE 1. Annual return summary statistics

| <i>Portfolio</i> | <i>Average annual return</i> | <i>Standard deviation</i> |
|------------------------|------------------------------|---------------------------|
| <i>Dogs of the Dow</i> | <i>13.61%</i> | <i>32.27%</i> |
| <i>NIKKEI 225</i> | <i>3.97%</i> | <i>24.17%</i> |
| <i>difference</i> | <i>9.64%</i> | <i>8.10%</i> |

To check the statistical significance of the result, we conducted a T-test at a 5% significant level. In the test, $p = 0.022705 < 0.05$, and thus the higher performance is statistically significant at a 95% confidence level.

3.2. Annual difference analysis. Figure 1 plots the differences between the Dogs of the Dow strategy and NIKKEI 225 annual portfolio returns for each year. Here, a positive difference indicates that the Dogs of the Dow strategy outperformed the NIKKEI 225 portfolio.

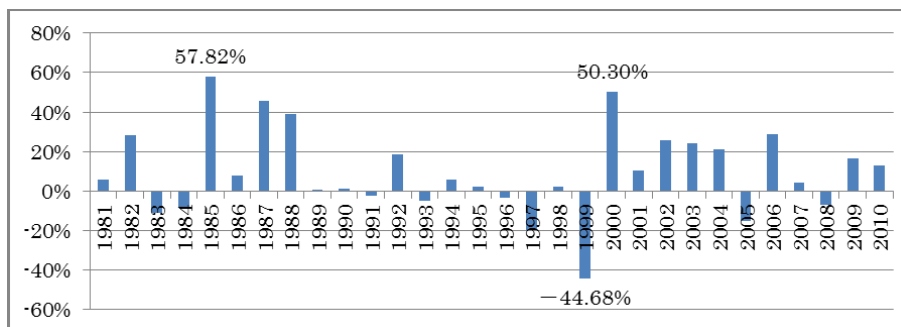


FIGURE 1. Annual difference in returns between the Dogs of the Dow strategy and NIKKEI 225

Figure 1 indicates that the Dogs of the Dow strategy outperformed NIKKEI 225 on 21 occasions. Especially in 1985, the Dogs of the Dow strategy was 57.82 percentage points greater than NIKKEI 225. In 2000, the Dogs of the Dow strategy was 50.30 percentage points more than NIKKEI 225. Since 2000, the Dogs of the Dow strategy has outperformed NIKKEI 225 nine times in 11 years. On the other hand, the worst performance of the Dogs of the Dow strategy was in the year 1999, when the difference between the two strategies was -44.68 percentage points. Therefore, the Dogs of the Dow strategy may occasionally perform quite miserably in the short term. In order to make the most out of this strategy, we suggest implementing it for a long period.

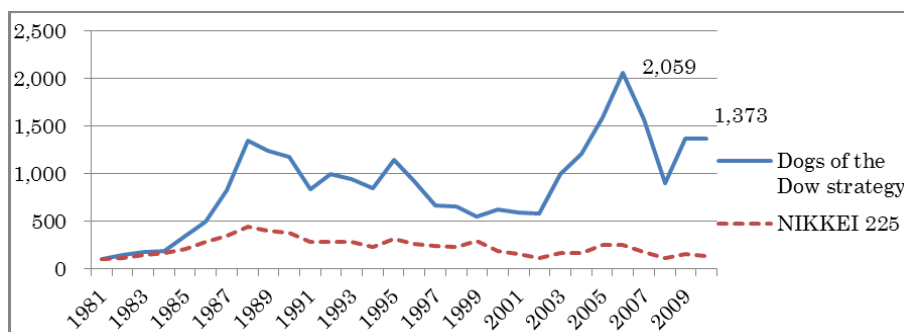


FIGURE 2. Accumulated performance of the Dogs of the Dow strategy and NIKKEI 225

3.3. Accumulated performance. Next, we compared the accumulated performances of the Dogs of the Dow strategy and NIKKEI 225. Figure 2 shows the results. Supposing that the asset value of both portfolios was 100 in 1981, at the end of the 2010 fiscal year, the Dogs of the Dow strategy had an accumulated value of 1,372, which is approximately 14 times the value in 1981. The accumulated performance was especially notable in 2006, when the Dogs of the Dow strategy had the highest accumulated value at 2,059. Moreover, from 1981 to 2010, the Dogs of the Dow strategy always had a higher accumulated performance than that of NIKKEI 225. By contrast, the NIKKEI 225 line in the lower part of the graph shows a steady trend. The accumulated performance of NIKKEI 225 for 2010 was only 139, which implies that the asset value of the portfolio increased merely 39% in the 30 years.

3.4. Subperiod analysis. In this subsection, we provide a 10-year subperiod analysis of the Dogs of the Dow strategy.

In the first subperiod, Japan experienced the so-called “bubble economy” and NIKKEI 225 reached a historical 38,916 points at the end of 1989. The last decade of the 20th century, the second subperiod, is named “the lost decade” of the Japanese economy because of the long-lasting recession. Then, in the first decade of the new century, which is the third subperiod, the Japanese economy recovered from the recession, but seriously suffered again because of the Lehman crisis.

Table 2 reports the mean return and nominal difference between the Dogs of the Dow strategy and NIKKEI 225. We can see that the Dogs of the Dow strategy outperformed NIKKEI 225 in all the three 10-year subperiods. In the 1981-1990 period, the difference between the Dogs of the Dow strategy and NIKKEI 225 was very large, at 16.53 percentage points. In the second subperiod, although the difference was very small (0.32 percentage points), the Dogs of the Dow strategy performed better than NIKKEI 225. In the 2001-2010 period, the Dogs of the Dow strategy showed a good result, with a difference of 12.08 percentage points.

TABLE 2. Subperiod analysis

| Subperiod | Mean return | | Standard deviation | | Nominal difference |
|-----------|-----------------|-----------|--------------------|-----------|--------------------|
| | Dogs of the Dow | NIKKEI225 | Dogs of the Dow | NIKKEI225 | |
| 1981-1990 | 31.69% | 15.17% | 31.51% | 14.87% | 16.53% |
| 1991-2000 | -4.09% | -4.41% | 19.98% | 20.62% | 0.32% |
| 2001-2010 | 13.24% | 1.16% | 33.03% | 30.05% | 12.08% |
| 1981-2010 | 13.61% | 3.97% | 32.27% | 24.17% | 9.64% |

The results imply that the Dogs of the Dow strategy was successful in all economic environments. In particular, it was quite robust even during the recession and performed very well in the period of boom.

4. Risk Adjustment. While Table 2 shows that the Dogs of the Dow strategy had a mean return higher than that of NIKKEI 225, it also shows that in most periods, the Dogs of the Dow strategy had standard deviations higher than those of NIKKEI 225. With only 10 stocks in the portfolio, there were some unsystematic risks that led to the higher standard deviations. Therefore, we need to adjust the risk of the Dogs of the Dow strategy to more precisely judge the performances of different strategies.

The Sharpe Ratio is the most popular and powerful technique for comparing the returns of two portfolios with different risks [12]. By assuming that the investor allocates a part of his portfolio to some risk-free assets, the Sharpe Ratio eliminates the risk premium from the portfolio, thereby enabling the comparison of portfolios with different degrees of risk.

Here, we use Japanese government bonds as the risk-free asset. In this scenario, the adjustment for the entire 30-year period is the same to invest some 75 percent ($24.17\%/32.27\% = 74.90\%$) of the wealth in the Dogs of the Dow strategy and the remaining 25 percent (1-75%) in government bonds. With this 25% investment in the national debt, we can adjust the higher risk of the Dogs of the Dow strategy to have nearly the same standard deviation as that of NIKKEI 225. Then, by using the government bonds mean annual return of 2.68%, the return of the Dogs of the Dow strategy can be transformed to 10.87% (i.e., $(13.61\%-2.68\%) (24.17\%/32.27\%)-2.68\%$). The Dogs of the Dow strategy clearly outperformed NIKKEI 225 even after the adjustment, although the difference of average return now shrinks to 6.90 percentage points (Table 3).

TABLE 3. The difference between the risk-adjusted Dogs of the Dow and NIKKEI 225

| <i>Subperiod</i> | <i>return of risk-adjusted Dogs of the Dow</i> | <i>return of NIKKEI 225</i> | <i>Risk-adjusted difference</i> |
|------------------|----------------------------------------------------|---------------------------------|-------------------------------------|
| <i>1981-1990</i> | <i>16.37%</i> | <i>15.17%</i> | <i>1.20%</i> |
| <i>1991-2000</i> | <i>-3.88%</i> | <i>-4.41%</i> | <i>0.53%</i> |
| <i>2001-2010</i> | <i>12.29%</i> | <i>1.16%</i> | <i>11.13%</i> |
| <i>1981-2010</i> | <i>10.87%</i> | <i>3.97%</i> | <i>6.90%</i> |

The second column in Table 3 is the risk-adjusted average return of the Dogs of the Dow strategy, and the fourth column is the difference between the return of the risk-adjusted Dogs of the Dow strategy and that of NIKKEI 225. Before the adjustment, the Dogs of the Dow strategy performed better than NIKKEI 225 for all three 10-year subperiods, and this remained true even after the adjustment. Note that for the 1991-2000 subperiod, the difference was greater because NIKKEI 225 had higher risk before the adjustment. Consequently, the Dogs of the Dow strategy is superior to NIKKEI 225 even after eliminating the risk factors.

5. The Performance for Other Numbers of Dogs. We also tested other portfolios with fewer Dogs, and compared the performance of each portfolio using the Dogs of the Dow strategy and NIKKEI 225 between 1981 and 2010. We named the portfolio with the top N stocks as Dow N strategy. The simulation of this strategy was conducted in a manner similar to that of the Dogs of the Dow strategy but by using the top N stocks instead of the top-10 stocks.

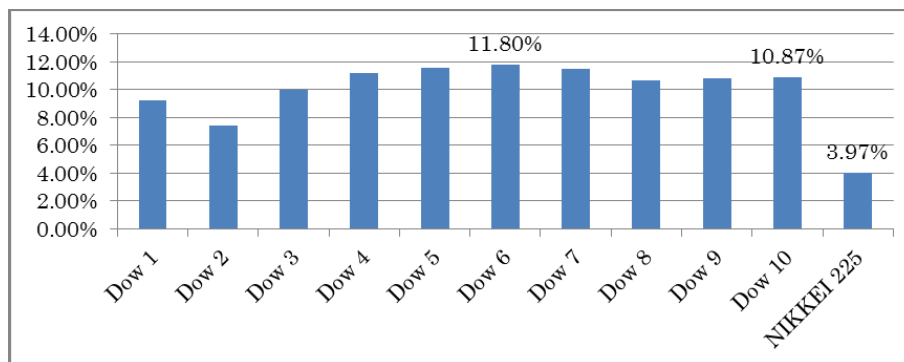


FIGURE 3. Average annual returns of the risk-adjusted Dow N strategies and NIKKEI 225

Figure 3 exhibits the average annual returns of the portfolios. We can see that all portfolios of the Dogs of the Dow investment strategy outperformed NIKKEI 225 during the 1981-2010 period. After the risk adjustment, the Dow 6 portfolio had the highest average annual return. The Dow 10 strategy, which is the original Dogs of the Dow strategy, had the fifth-highest return, with a value of 10.87%. The return of NIKKEI 225, however, was as low as 3.97%. Hence we conclude that portfolios with fewer Dogs are also effective in the Japanese stock market.

6. Advantages of the Strategy. The results in previous sections have shown the superior performance of the Dogs of the Dow strategy. In the long term, it outperformed the benchmark before and after risk adjustment. As stated in Section 1, three quarters of the professional funds underperformed benchmarks. Hence, the performance of this strategy can beat most professional fund managers.

Hereafter, we discuss the advantages of the strategy from a practical viewpoint, especially for individual investors.

Most individual investors lack the advance skills of professionals. Hence, simple investment strategies are preferable. As described above, the Dogs of the Dow strategy is very simple. With elementary arithmetic, each investor can understand the method without any difficulty.

Usually individual investors do not have enough time to study the market. Hence, an easy-to-implement strategy is an advantage for them. Each year, investors need to perform only two operations: selling 10 old stocks at the end of the fiscal year and buying 10 new stocks at the beginning of the fiscal year. It only takes a few hours for the investor to select the 10 stocks.

Transaction cost is a factor that needs to be further investigated. In Japan, to invest in a fund, the average purchase commission is approximately 1%. In addition, investors need to pay a trust fee each year, which varies from 2% to 10%. However, the average commission of purchasing or selling stocks is approximately 1% for non-internet trading, and 0.1% for internet trading. Therefore, the transaction cost for maintaining a Dogs of the Dow portfolio is the same or less than purchasing a fund in the 1981-2000 period, and much less than purchasing a fund after 2001.

For simplicity, we assume that the transaction costs for the Dogs of the Dow portfolio and NIKKEI 225 portfolio are the same, and conduct simulation again for 1981-2010 data. As indicated by Table 4, the accumulated performance of the Dogs of the Dow strategy was 1015.39%, whereas that of NIKKEI 225 was 103.28%, with 1% transaction costs. When the transaction costs increased, the return of the two portfolios fell sharply. However, even after calculating for the highest transaction cost, the Dogs of the Dow

TABLE 4. Comparison of accumulated performance after adjusting transaction costs

| <i>Portfolio</i> | <i>Transaction costs</i> | | | |
|------------------------|--------------------------|-----------------|----------------|----------------|
| | <i>0%</i> | <i>1%</i> | <i>2%</i> | <i>3%</i> |
| <i>Dogs of the Dow</i> | <i>1372.71%</i> | <i>1015.39%</i> | <i>748.79%</i> | <i>550.47%</i> |
| <i>NIKKEI 225</i> | <i>139.62%</i> | <i>103.28%</i> | <i>76.16%</i> | <i>55.99%</i> |

strategy still had a high value of 550.47%. For all transaction cost rates, the performance of the Dogs of the Dow strategy was remarkably higher than the returns of NIKKEI 225.

In fact, after calculating the turnover of the 10 companies of the Dogs of the Dow strategy, we found that the annual rate of the turnover was 5.4, which means that there were approximately 5.4 companies changed in the 10 stocks for ever year. Hence, in actual practice, the transaction costs of the Dogs of the Dow strategy must be remarkably lower than the simulation in Table 4, which states the returns after adjusting the transaction costs for all 10 stocks.

Consequently, even assuming that the transaction costs are the same for both portfolios, the Dogs of the Dow strategy outperforms the bench mark. Moreover, because most individual investors have been trading stocks via the Internet since the end of the last century, the maintenance cost of the Dogs of the Dow portfolio is much less than buying a fund. The superiority of the Dogs of the Dow strategy is therefore even more evident.

7. Conclusions. In this study, we apply the Dogs of the Dow strategy to the Japanese stock market and compare the performance of the strategy with NIKKEI 225 on the basis of the results of a simulation. We find that the Dogs of the Dow strategy outperforms NIKKEI 225 in Japanese stock market during the 1981-2010 period. The results are statistically significant. Even after adjusting for risk by using the Sharpe Ratio, the Dogs of the Dow strategy outperforms NIKKEI 225. Moreover, we find that even portfolios with fewer than 10 Dogs outperform NIKKEI 225. Moreover, in practice, the Dogs of the Dow strategy is simple to understand, easy to operate, and has lesser transaction cost than investing in a fund. Therefore, we conclude that the Dogs of the Dow strategy is powerful and practical in the Japanese market.

The results presented in this study show that the Dogs of the Dow strategy performs better in long-term investment rather than short-term investment. Hence, it is recommended that investors view the Dogs of the Dow strategy as a long-term investment strategy.

For further exploration of this topic, we plan to extend the simulation to 50 years and analyze more detailed information on the Dogs of the Dow strategy. We also intend to investigate whether the Dogs of the Dow strategy is effective even after adjusting for tax.

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