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The Influence of One's Own Database on the Accuracy of Forecasting Future Movements of Investment Portfolio Value

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Abstract

The main purpose of this article is to present the test results of the hypothesis that the use of one's own (and foreign) database (used by investment portfolio managers to create indicators of individual stock analyses) has an effect on the accuracy of forecasting future movements of investment portfolio value. In addition to the use of different indicators and methods of stock analysis, the creation of an optimal investment portfolio requires assessment of the suitability and adequacy of the database used in investment portfolio managers' decision-making process; in other words, it is necessary to determine which stocks are to be included in the specific investment portfolio and which are not. The problem of the selection and use of different databases is linked to the question of determining the importance of numerous relevant elements when creating an optimal investment portfolio.

Keywords: Database, investment portfolio, investment portfolio managers, stocks

Introduction

The job of stock market analysts and portfolio managers is to try to find the best method or the best model to forecast future stock prices during a certain period of time, since such methods and models are continuously updated and supplemented (Murg, 2015). On the stock market, one can find many portfolio managers who have tried to predict the long-term stock price trend by implementing new trading strategies and models on the stocks, which, in turn, significantly outran the stock performance itself (Yuqing & Yuning, 2016; Larsen, 2010; Sarno & Valente, 2005; Verdickt, 2016). Of course, it would be irrational for stock analysts to continuously use the current "safest" methods and databases.

Based on numerous pieces of information provided by the financial market, the main purpose of financial analysts and portfolio managers is to single out relevant pieces of information and come to the right conclusions about optimal investment possibilities (Bizer, Scheier, & Spiwojs, 2013), as well as to create additional value for the investor by means of active investment management (Saunders & Cornett, 2013; Budelmann, 2013). For this reason, this article examines the question of whether the accuracy of the future movement of investment portfolio value is influenced by the use of the database, or whether the use of a foreign general database contributes to the success of foretelling the future movement of investment portfolio value to the

same extent as the use of one's own (and a foreign) database. Therefore, our main task was to determine whether investment portfolio managers use their own database to ascertain the future movement of their portfolio values and whether they also use the same database to calculate their own indicators for analysis and future stock selection for portfolios.

History shows that traditional active management does not work. The majority of actively managed funds do not beat the S&P 500. Passive index fund managers have seen their assets rise as a result, from \$10 billion in 1980 to more than \$250 billion in 1990 (O'Shaughnessy, 1999).

There is no product similar or identical to the method or apparatus of the present invention. Due to the magnitude of the sums involved and the complexity of the relevant investment information, it is very desirable to use an objective rule-based strategy and system for automating, to the extent practicable, the conduct of this decision-making (O'Shaughnessy, 1999).

Financial institutions such as stock markets produce huge datasets that build a foundation for approaching these enormously complex and dynamic problems using data mining tools. Potential significant benefits of solving these problems have motivated extensive research for years. The research in data mining has gained high attention due to the importance of its applications and the increasing generated information (Davari, 2010).

Proper data selection enables us to estimate and foresee what will happen with regard to the prices of stocks in the future (Baker & Nofsinger, 2010; Goldberg & Nietzsche, 2000; Braun, 2007). When studying the use of databases, it is important to emphasize that investment portfolio managers most frequently use previously analyzed data, which are acquired from foreign sources such as Deutsche Bank, Bloomberg, Telekurs, Financial Times, Reuters, and the like. Marc (2013) emphasizes the use of the Bloomberg database and the retrieval of annual financial reports in order to collect data for financial analysis and portfolio optimization.

On the other hand, investment portfolio managers rarely undertake the process of data acquisition and analysis on their own; consequently, investment portfolio managers are seldom used in deciding about the composition and structure of their portfolios.

With regard to the above statement, the question arises whether such behavior of portfolio managers truly helps to achieve their primary goal – that is, the ennoblement of investor capital while optimizing the relationship between risk-taking and profitability. The only way to create unique portfolios is to create an effective database. Unique

portfolios¹ with market potential symbolize a type of reward for one's prudence, enterprise, knowledge used and efforts made in the detailed analysis of the market situation, stock analysis, correct selection of indicators and the use of one's own database.

Since success is achieved only by those who plan and act deliberately and thoughtfully (Born, 2009; Budelmann, 2013; Buffett, 2008; Daeubner, 2014; Graham, 2009; Heese, 2011), occasionally we are able to witness the birth of the so-called "stars" among investment portfolio managers. Due to their consistent market assessment and accurate company analysis, these individuals have been able to surpass the value of the stock market index at least once (Jurczyk, 2011). However, the period of such success, which lasts for about a year, is often followed by a period of failure. As a consequence, investors are entitled to ask the following questions: Can investment portfolio managers achieve better results by using passive investments in the amount of the stock index? Where can they find the best financial information possible?

The research question that was used as the basis for the hypothesis is whether the awareness of portfolio managers about the use of their own database (which is used to create indicators of individual stock analyses) influences the accuracy of forecasting future movements of investment portfolio value, and whether it consequently changes their attitude towards the creation and use of their own database to such an extent that the expenses of their own database become irrelevant.

By analyzing the behavior of investment portfolio managers, our goal was to determine whether investment portfolio managers are aware that the use of one's own database (together with the foreign ones) influences the accuracy of forecasting future movements of investment portfolio value and is thus, with the help of a foreign database, one of the key components of quality investment products and services.

Verification of Hypothesis

To test the hypothesis, we used an online questionnaire and conducted an interview with randomly selected investment portfolio managers. In this way, information about different

¹ A unique investment portfolio is an individual investment portfolio designed by an individual analyst or portfolio manager with specific, individual methods and techniques of fundamental and technical stock analysis and the proper selection of information databases. Stock market success means that the portfolio manager stands out from the crowd and with the help of the proper selection of owned and foreign databases designs his own model or principle of stock selection, which enables him to create an optimum portfolio.

types of databases used by investment portfolio managers to acquire information about the financial market was obtained.

The questionnaire enabled us to obtain opinions and assessments on the use of fundamental and technical analysis of stocks, the influence of *database type* used in the stock analysis on the profitability of the portfolio and the effects correlation of selected information databases on the accuracy of forecasting value movements of the investment portfolio.

The acquired information about the databases used by investment portfolio managers for stock selection was used, along with calculation of the indicators of individual stock analyses, to determine the effect of the chosen database on the accurate forecasting of the future movement of portfolio value. The aforementioned verification also demonstrates the efficiency, enterprise and creativity of investment portfolio managers in the process of data searching and processing in the context of combining their own and foreign databases to create their own indicators.

In order to examine the effect of one's own database on the accuracy of forecasting the future movement of investment portfolio value, we first transformed the primary variable of the database into a dichotomous variable, which is equivalent to the independent variable in regression analysis. The dependent variable was obtained through the following task: "Estimate your own database's accuracy in forecasting the movement of portfolio value." Our aim was to establish whether the accuracy of forecasting future movements of portfolio value is greater if the investment portfolio managers use their own or a combination of both their own and foreign databases compared to using only the foreign one(s).

Due to smaller frequencies in the category *one's own database* and *one's own and foreign database*, the primary variable of the information database was merged into a new category called *one's own (and foreign) database*. The dependent variable *the accuracy of forecasting value movements of investment portfolio* was measured on an ordinal scale: 1 – "very bad", 2 – "bad", 3 – "good" and 4 – "very good". The non-parametric Mann-Whitney U test was used to verify whether there are significant differences between the two groups of database users in the accuracy of forecasting future movement of investment portfolio. The descriptive statistics was also applied to analyse the research problem.

Limitations and Hypotheses

The research was based on the assumptions that investment portfolio managers' use of their own and foreign databases

differs depending on the organizational policy of the individual investment portfolio manager; that the choice of database influences the decision-making about the creation of the portfolio. We verified the hypothesis that the choice of database influences the accuracy of forecasting future portfolio movements. Two major limitations of our research were the closed and inaccessible information system of investment portfolio managers and the lack of knowledge about the respondents' environment while filling in the questionnaire.

Database Characteristics

To test the hypothesis, we used a database comprising answers obtained in the online questionnaire and the interviews carried out with investment portfolio managers.

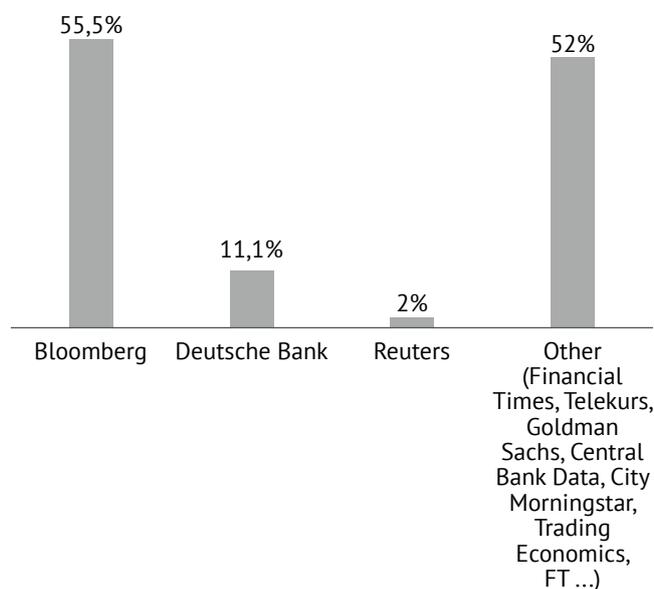
To ensure the representativeness of the research sample, the online questionnaire was sent to randomly selected portfolio managers who are active members of stock exchanges from different countries: the Nordic Market (Denmark, Finland, the Faroe Islands, Iceland, Norway and Sweden), West Europe (Germany, Italy, Ireland, Great Britain and France), East Europe (Bulgaria, Bosnia and Hercegovina, Serbia, Croatia, Hungary, Albania, Austria, Slovenia), East Asia (Hong Kong, Japan) and North America (NYSE, NASDAQ).

A total of 72 properly completed questionnaires were received. The data collected from portfolio managers from different countries were treated collectively as a whole in the process of preparing descriptive statistics on the basis of the sample.

The results show that 52.9% of all portfolio managers use their own and foreign databases, whereas 44.4% use only a foreign database, and only 3% use only their own database (Graph 2).

Regarding the choice of foreign databases, investment portfolio managers prefer Bloomberg (55.5%), Deutsche Bank (11.1%) and Reuters (2%), followed by Financial Times, Telekurs, Goldman Sachs, Central Bank Data, City Morningstar, Trading Economics, and company websites, as shown in Figure 1.

The following reasons were listed by the investment portfolio managers to explain why they prefer the use of foreign databases over their own: 1) 23.6% believe that the outcomes of one's own database are similar to those of foreign databases; 2) 63.9% believe that the accuracy of forecasting future value movements of investment portfolios

Figure 1. The Most Commonly Used Foreign Information Databases for Stock Analysis

Source: author's

based on foreign databases is good; 62.5% claim that one's own database requires the help and knowledge of more professionals and analysts; and 48.6% say that the creation of one's own database is more expensive and more complex. In addition to this, 38.9% respondents agree completely that the accuracy of forecasting future movements of portfolio value is influenced by the correct choice of database, and 44.5% believe that the most successful method is to combine both databases, as shown in Table 1. Figure 3 shows that the accuracy of forecasting future movements of investment portfolio value based on one's own database is good (61.1%) or very good (32%).

Analysis and Results

To test the hypothesis, we first transformed the primary variable *database type* into a dichotomous variable. Value 1 was represented by the category *one's own (and foreign) database*, and Value 0 was represented by the category *foreign database*.

The primary variable *database type* was, due to smaller frequencies in the category *one's own database* and *one's own and foreign database*, merged into a new category called *one's own (and foreign) database*.

Figure 2 show that more than half of investment portfolio managers use a combination of their own and foreign databases.

Figure 2 also shows that barely 2.7% of respondents use one their own database, 52.9% use their own and foreign databases, and 44.4% use only a foreign database.

The primary variable *the accuracy of forecasting value movements of investment portfolio* was, due to smaller frequencies in the categories "very bad" and "bad", transformed in such a way that the aforementioned categories were merged into a new category called "(very) bad".

Figure 3 shows that the majority of investment portfolio managers believe that the accuracy of forecasting value movements of the investment portfolio by using one's own database is good (61.1%), very good (31.9%), bad (5.6%) and very bad (1.4%).

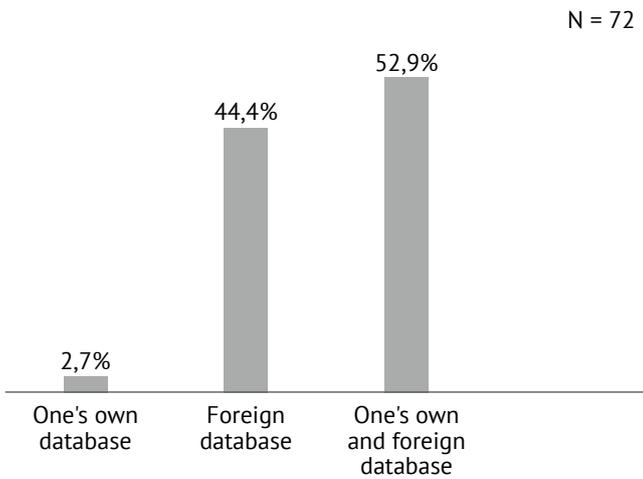
Before continuing with the statistical analysis, we also examined the accuracy of forecasting based on both types of database.

Table 1: Effects of Proper Selection of the Information Database

N = 72	I strongly disagree	I partially agree	I mostly agree	I totally agree
The creation of your own information database is more expensive and complex	6.9%	30.6%	13.9%	48.6%
Having one's information database requires more experts and analysts	6.9%	5.6%	25.0%	62.5%
Having one's information database requires more time	4.1%	4.3%	22.2%	69.4%
One's one information database gives similar results as a foreign information database	15.3%	22.2%	38.9%	23.6%
The use of foreign data databases is simpler	5.6%	4.2%	36.1%	54.1%
Proper selection of the information database affects the accuracy of forecasting trends in portfolio value	5.6%	20.8%	34.7%	38.9%
For a more detailed forecast of the value of the portfolio, the combination of the both information databases is best	9.7%	20.8%	25.0%	44.5%

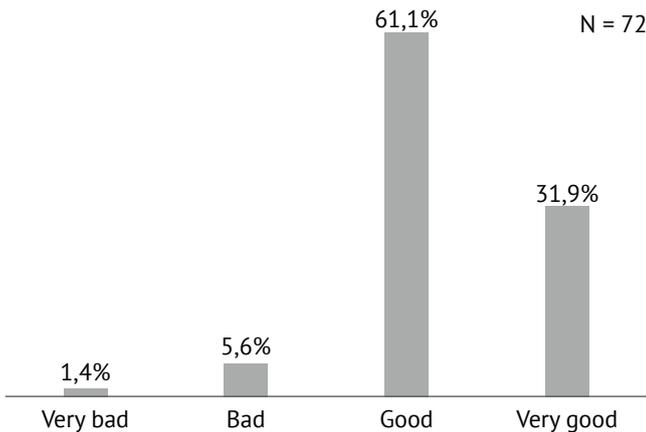
Source: author's

Figure 2. Information Databases Used for Stock Analysis



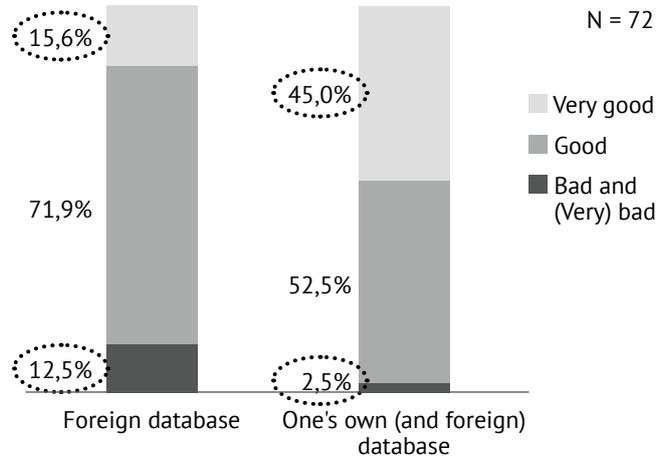
Source: author's

Figure 3. Transformed Variable – The Accuracy of Forecasting Value Movements of Investment Portfolio Using One's Own Database



Source: author's

Figure 4. The Accuracy of Forecasting Future Value Movements of Investment Portfolio Using Database



Source: author's

Figure 4 shows that the proportion of “bad and (very) bad” forecasting of investment portfolio movement is at least 10% bigger when using only a foreign database in comparison with one’s own (and foreign) database. Of the respondents, 45% who use their own (and foreign) databases believe that the chosen database is very good; on the other hand, only 15.6% of those who use only a foreign database share the same opinion.

The results of the Mann-Whitney U test (Tables 2, 3) show that there are statistically significant differences in the accuracy of forecasting value movements of investment portfolio between the two groups.

Based on the acquired results, the hypothesis in question is confirmed, since the use of one’s own (and foreign) database truly influences the accuracy of forecasting future movements of investment portfolio values.

Table 2: Mann Whitney U test: Ranks

Category	N	Mean Rank	Sum of Ranks
Foreign database	32	29,66	949,00
One's own (and foreign) database	40	41,98	1679,00

Source: author's

Table 3: The results of the Mann-Whitney U test

Null Hypothesis	Test	Significance	Decision
The distribution of accuracy is the same across categories of database.	Independent Samples Mann-Whitney U Test	0.004	Reject the null hypothesis.

Note: Asymptotic significances are displayed. The significance level is 0.05. Test statistics: Mann-Whitney U: 421.000, Wilcoxon W: 949.000, Z: -2.887.

Source: author's

Conclusion

Our research was based on statistical analysis of results acquired from an online questionnaire and interview with randomly chosen investment portfolio managers who are members of stock markets from different countries. The aim of this research was to determine whether or not the chosen database has an influence on the accuracy of forecasting future movements of portfolio values.

We proved that using one's own (and foreign) database influences the accuracy of forecasting future movements of portfolio values in comparison with using only a foreign database, thus verifying our hypothesis.

The acquired data showed that the majority of respondents (52.9%) use foreign databases, 2.9% use only their own database, and 44.4% use only foreign databases. The most commonly used foreign databases are Bloomberg and Deutsche Bank, followed by Reuters, Financial Times, Telekurs, Goldman Sachs, Central Bank Data, City Morningstar and Trading Economics. The majority of investment portfolio managers (70.8%) agree that the correct choice of database has an important effect on the accuracy of forecasting future movements of investment portfolio values.

Nowadays, there are many possibilities available to portfolio managers for effective portfolio management. In addition to the right combination of stock analyses (fundamental and technical), one also needs to choose the right information database, since it minimizes the risk of assets management. In this light, the proverb "Never put all your eggs in one basket" is true not only for investors but also for portfolio managers. The responsibility of achieving the optimum proportion between profitability and risk of investments is in the hands of portfolio managers themselves, since the use of the right methodology and computer-assisted systems enables them to design a unique model, which can be created through a varied selection of different models of stock analyses and by using a combination of information databases (i.e., one's own and foreign databases).

In this light, the article presents one of the many alternatives for achieving a better relationship between risk-taking and anticipated profit in the area of intelligent investment and investment portfolio management, which can be immediately implemented in practice in order to increase the value of capital.

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Vpliv lastne informacijske baze na natančnost napovedovanja prihodnjega gibanja vrednosti naložbenega portfelja

Izvelek

V prispevku predstavljamo rezultate testiranja hipoteze, da uporaba lastne informacijske baze, na osnovi katere upravljavci naložbenih portfeljev oblikujejo kazalnike posameznih analiz delnic, vpliva na natančnost napovedovanja prihodnjega gibanja vrednosti naložbenega portfelja. Pri oblikovanju optimalnega naložbenega portfelja je treba upoštevati oceno primernosti in zadostnosti informacijske baze, ki se uporablja v procesu odločanja upravljavcev naložbenih portfeljev, katere delnice vključiti v določen naložbeni portfelj in katere ne. Razumevanje problema izbora in uporabe različnih informacijskih baz se navezuje tudi na vprašanje določitve pomena številnih pomembnih elementov upravljavcev portfeljev v trenutku oblikovanja optimalnega naložbenega portfelja.

Ključne besede: informacijska baza, naložbeni portfelj, upravljavci naložbenih portfeljev, delnice.