Meta-Analysis: A Discussion On Finance Studies[*]

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ABSTRACT

Nowadays, both the increase of technological opportunities and the globalization of information have also affected the quality and scope of scientific researches positively. Significant progress has been made in this direction. An important development of this process is the development of complex results with increasing research on specific subjects. Even though the subjects of the studies in finance as a social sciences are the same, complex results emerge. In this case, the efforts made in finance should be brought together to simplify and to produce more comprehensible results. This is also necessary for the scientific findings to turn the observed phenomena into an explanatory quality. Meta-analysis analyzes these complex results and plays a synthesizing role with the statistical methods used. The aim of this study is to talk about the meta-analysis process and to discuss the meta-analysis method in the finance field.

Keywords: *Meta-analysis, Finance, Firm Performance, Effect Size, Publication Bias.*

Jel Classification*: C10, C39, L25.*

Meta-Analiz: Finans Çalışmaları Üzerine Bir Tartışma
ÖZET

Günümüzde gerek teknolojik imkanların artması, gerekse bilginin küreselleşmesi bilimsel araştırmaların nitelik ve kapsamını da olumlu etkilemiştir. Bu yönde önemli bir ilerleme sağlanmıştır. Bu sürecin getirdiği önemli bir gelişme ise belirli konularda yapılan araştırmaların artmasıyla birlikte karmaşık sonuçların elde edilebilmesidir. Sosyal bir bilim dalı olarak finans alanında yapılan çalışmaların konuları aynı olsa bile karmaşık sonuçlar ortaya çıkmaktadır. Bu durumda finans alanında yapılan çalışmaların bir araya getirilerek sadeleştirilmesi ve daha anlaşılabilir sonuçların çıkarılması gerekmektedir. Bu durum aynı zamanda bilimsel bulguların gözlemlenen olguları açıklayıcı bir niteliğe dönüşmesi için de gerekli olmaktadır. Meta-analiz, bu karmaşık sonuçların tekrar ele alınması ve kullanılan istatistiki yöntemler ile çalışmaları sentezleyici bir rol oynamaktadır. Belirli bir konuda yapılan bağımsız araştırmaların genel sonucunu vermesi yönüyle meta-analiz, karar verme açısından önemli bir analiz metodu olarak görülmektedir. Bu doğrultuda çalışmanın amacı meta-analiz süreci ve finans alanında meta-analiz yöntemi ile ilgi bir tartışmaya yer vermektir.

Anahtar Kelimeler: *Meta-analiz, Finans, Firma Performansı, Etki Büyüklüğü, Yayın Yanlılığı.*

JEL Sınıflandırması: *C10, C39, L25.*

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1.   INTRODUCTION

As the details of the subjects are examined in scientific studies, the researches are increasing rapidly. However, although a scientific issue is dealt with in detail, it is difficult to answer clearly the research question that is desired to be answered in a single study. Even if the research is done in a very good way, it is thought that certain solutions cannot be reached even in a subject which is not very important (Hunter and Schmidt, 2004). On the other hand, studies in finance, even if they contain the same subject, are likely to reach very different conclusions. In this context, meta-analysis synthesizes the studies in different areas and at different times. Thus, it provides general explanations in decision making on a subject.

In addition, meta-analyzes are seen as both an alternative and complementary to literature reviews. Literature reviews come to the fore as qualitative researches. According to qualitative research, qualitative research and a higher number of meta-analyzes are considered as an alternative method of analysis. If qualitative research takes up more space than quantitative research, then meta-analysis contributes to qualitative research. Meta-analysis offers flexibility in order to generalize many types of quantitative research, especially relational and experimental research. Within this framework, independent studies are analyzed in order to reach detailed results. The analyzed studies are systematically combined.

The first meta-analysis was developed by Karl Pearson (1904) in his study on "Report on certain enteric fever inoculation statistics". Meta-analysis from the 1970s onwards was accelerated by Glass's (1976) study on "Primary, secondary, and meta-analysis of research". As of these dates, meta-analysis studies have increased in many fields, especially in the fields of medicine and education. The meta-analysis in the field of finance has gained momentum from the 1990s. The meta-analysis in finance has evolved since the 1990s after Capon et al. (1990) study on "Determinants of Financial Performance: A Meta-Analysis". Especially, the studies have gained speed in the last 10 years. Within these meta-analyzes, studies on the financial performance and the determinants of financial performance are predominant.

In this study, firstly general information about meta-analysis is given. In this respect, meta-analysis literature in finance has been examined. In this context, the advantages, disadvantages and limitations of meta-analysis are discussed. It is thought that it will contribute to the literature because it is the first study that includes discussion of meta-analysis in finance.

2. METHODOLOGY

In this study, a literature review on meta-analysis (particularly in finance) was performed. In this context, meta-analysis and its objectives, meta-analysis process and general meta-analysis procedures have been put in place and explanations have been made in accordance with the literature. Finally, the advantages, disadvantages and limitations of the meta-analysis in terms of finance are discussed.

Meta-Analysis and Its Objectives

Meta-analysis differs from literature reviews in terms of analyzing quantitative research rather than qualitative research. Meta-analysis is indicated as "the analysis of

analyses'' (Glass, 1976: 3). In other words, Glass (1976: 3) describes a meta-analysis as a method that analyzes the results of analysis individually or independently. In addition, meta-analysis is described as the quantitative analysis and synthesis of the results of interrelated and independent research using quantitative analysis methods (Normand, 1999: 321). Meta-analysis is also indicated as a statistical method that integrates quantitative research results according to the effect size (Card, 2012: 7). In this direction, it can be stated that common decisions can be made by summarizing more than one research in a single subject with statistical analysis by meta-analysis method.

The aim of the meta-analysis is to reach more general samples by combining small samples and to increase the statistical power of the studies in this direction and to increase the effect power in researches (Hemilä, 2006: 28). At the same time, to evaluate the discrepancies between variables and to reveal the power of the mediating variables in different researches can be stated among the objectives of the meta-analysis (Açıkel, 2009: 165-166).
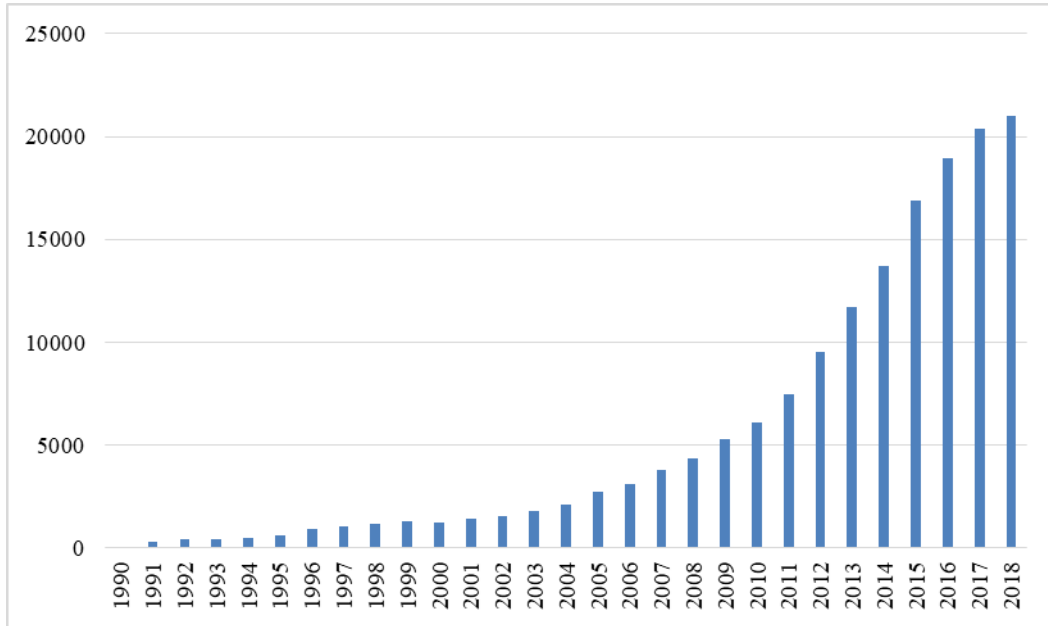
Source: Web of Science, 2019.

Figure 1. Number of Researches Involving "Meta-Analysis" (1990-2018)

In the 161,928 survey of the Web of Science[1] (WOS) since 1981, the subject of "Meta-Analysis" was encountered. Figure 1 presents the research numbers from 1990 to 2018. 55 research published in 1990, while there has been a huge increase over the years. In 2018, the number of published researches reached 21,034.

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[1] "Databases are Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts and Humanities Citation Index (A&HCI), Conference Proceedings Citation Index in Science (CPCI-S), Social Sciences and Humanities (CPCI-SSH)" and "Emerging Sources Citation Index (ESCI)".

Process of Meta-Analysis

In the meta-analysis method, researches should have the necessary data according to the determined subject due to the general result obtained in the direction of previous research. In addition, it is important to reach many studies (provided that they are reliable) which have common criteria to be used in meta-analysis (Şelli and Doğan, 2011: 47).

Meta-analysis process starts with determining the subject to be analyzed. From the point of analysis, it should be defined to clearly and reliably distinguish the primary studies on the subject from unrelated studies. For example, in the study examining the relationship between the two variables, the acceptable definition range of each variable must be clearly specified to control the effects of various variables (Greenwald et al., 1994: 3). In order to clearly see the meaning of the variables and the relationship between the variables, hypotheses should also be well defined. Thus, both similar and different hypotheses on the same subject can be tested. The study sample is formed according to the hypothesis-determined variables. Selection criteria should be determined in terms of the suitability of the studies in the study sample. Below is Wagner et al. (2015: 4) is given a selection criteria table.

Table 1. Example of inclusion and exclusion criteria for primary studies

A. *Inclusion criteria*
1. Primary studies showing either correlation and/or regression coefficients between the focal variables were considered.
2. Family firms were explicitly defined in primary studies and measured by dummy, percentage, or self-reported variables. Both ownership, management, and combined definitions of family firms were considered.
3. Studies with a wider definition of family firms that include also founder firms were considered and marked by an indicator variable. Studies without a family firm measure but only a founder firm measure were not considered.
4. Performance is measured in primary studies with ROA, ROE, ROS, sales growth, or market-to-book-ratio
5. We included effect sizes from peer reviewed articles, working papers, PhD theses, master theses as well as effect sizes calculated from relevant unpublished data sets
6. No restriction regarding time, language, research field, and geography were applied.
7. Primary studies with public, private and mixed samples were included.

B. *Exclusion criteria*
1. Qualitative primary studies were excluded.
2. Studies with only founder firm measures were excluded.
3. Studies with self-reported performance measures were excluded.
4. Studies with extreme effect sizes were removed as a result of the outlier diagnostics.

Source: Wagner et al. (2015: 4).

After the studies are determined according to the selection criteria, the coding procedure is applied.

Coding Procedure

In the meta-analysis, the descriptive information in all the studies included in the coding is converted to quantitative data. As the differential aspects of each study, there are moderator codes and different codes depending on subgroups. The coding will give a general framework that covers all the researches to be addressed, as well as the different aspects of each survey. Many studies should be included in order not to affect the overall effect level of the study. Otherwise, meta-analysis is affected by moderator variables (Hunter and Schmidt, 2014). In order to show the coding procedure, the table used in the study of Ülbeği and Yalçın (2016) is shown as an example.

Table 2. Example of coding procedure

Research	Author Year n (Total Sample Size)
Correlation Coefficients	Organizational Commitment-Job Satisfaction Emotional Commitment -Job Satisfaction Continuity Commitment -Job Satisfaction Normative Commitment-Job Satisfaction
Reliability Coefficient	Job Satisfaction Organizational Commitment Emotional Commitment Continuity Commitment Normative Commitment
Moderator Variables	Working Time Age Job Satisfaction Scale Organizational Commitment Scale Working Type Institution Type

*Source: Ülbeği and Yalçın (2016: 85).*

In Table 2, in the article examining the effect of organizational commitment on job satisfaction; research, correlation coefficients, reliability coefficient and moderator variables are observed. The coding procedure of the studies varies according to each subject.

Publication Bias

In terms of the subject to be discussed in the meta-analysis, it is necessary to investigate the publication bias after the studies are identified and classified. In this context, in many studies, the relationship between the variables cannot be established, because of the low relationship between dependent and independent variables, or because of a negative correlation, it is discontinued (Hedges et al., 1989: 11). In this context, considering only published research, reliable and accurate, these studies may increase the positive effect level. Thus, publication bias appears. Therefore, the overall impact level in the meta-analysis is adversely affected by publication bias (Card, 2012: 276). In order to test publication bias, two types of graphs are used: Funnel plot and Normal Quantile Plot (Başol et al., 2016: 717).

The funnel chart is used to see whether all research has come from a single population and whether there is a publication bias impact (Wang and Bushman, 1998: 46). As the sample

size increases, the sampling error decreases in this graph method. Compared to the normal quantile plot, this graph is used more frequently.
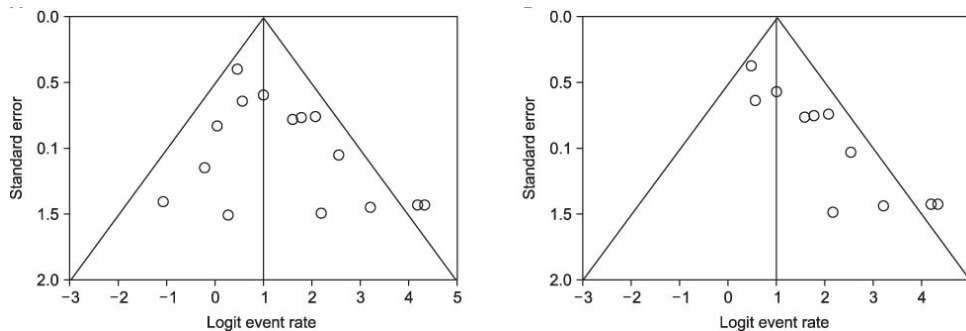
Figure 2. Funnel Plot

Figure 2 shows the distribution of the first graphical studies in the form of a funnel. Accordingly, it can be stated that there is no effect of publication bias. In the second graph there is an effect of publication bias because the research is not distributed in the form of a funnel. If there is a second case in a study, unpublished research should be included in the study.

The normal q-q is a chart type that uses the graph to detect publication bias. It also provides the normality of the distribution of the coefficients of influence. 95% confidence interval. In this context, it is seen as a more valid chart type due to the fact that the uncertainty is lower and easier to interpret according to the funnel plot (Wang and Bushman, 1998: 53).
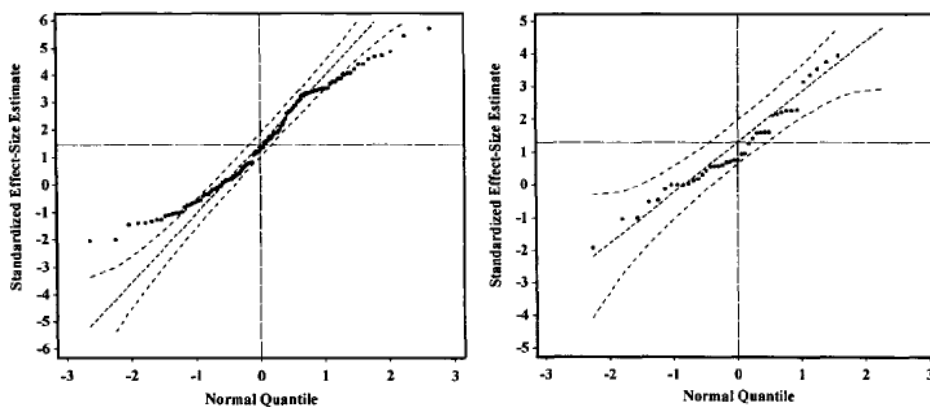
Source: Wang ve Bushman (1998: 51)

Figure 3. Normal q-q Graph (Normal Quantile Plot)

In Figure 2, the left graph shows that the studies evaluated in the meta-analysis do not show normal distribution and there is a publication bias effect. On the other hand, the graph on the right shows that the studies evaluated in the meta-analysis show normal distribution and there is no publication bias effect. Although it is possible to reduce publication bias in

meta-analyzes, it is not possible to reset publication bias since all unpublished studies cannot be reached.

Effect Size

The effect size can be expressed as the degree of the independent variable affecting the dependent variable either positively or negatively. When there is no relationship between variables, it can be said that there is no effect size (Göçmen, 2004: 189). The effect size is the result of one independent study in terms of meta-analysis. Can give information about the effect of the size of the study results in terms of giving appropriate results. Since the effect size is not affected by the sample volume, it is suitable for meta-analysis (Özsoy & Özsoy, 2013: 339).

In the calculation of the effect size; There are three different types of coefficients in general: Glass's Δ, Hedges's g and Cohen's d (Ellis, 2009; Ellis, 2010: 10). In this study, d and g effect coefficients are considered to be improved formulas according to the coefficient Δ, therefore Δ coefficient is not included.

The effect size of Hedges's g, the difference between the experimental and control groups are taken as basis. The difference is divided by the standard deviation and the effect coefficient is revealed. The formula is as follows:

$$g = \frac{\overline{x}_t - \overline{x}_c}{\sqrt{\dfrac{(n_t-1)s_t^2 + (n_c-1)s_c^2}{n_t+n_c-2}}} \quad (1)$$

g = Effect size of Hedges's g

$\overline{x}$ = Mean

s = Standard deviation

n = Sample size

Cohen's d, experimental and control groups are based on the difference between. The difference is divided by the standard deviation and effect size is revealed. There is no significant difference between these calculations. Cohen's d (effect size) makes it easier to compare in practice due to the fact that the effect size is higher in the literature than in other coefficients (Thalheimer and Cook, 2002: 2-3). Cohen's d is represented as a generalized formula (Thalheimer and Cook, 2002):

$$d = \frac{\overline{x}_t - \overline{x}_c}{\sqrt{\dfrac{(n_t-1)s_t^2 + (n_c-1)s_c^2}{n_t+n_c}}} \quad (2)$$

d = Effect size of Cohen's d

$\bar{x}$ = Mean

s = Standard deviation

n = Sample size

Cohen's d effect size formula used in the studies without standard deviation or standard error in studies using t-test:

$$d = t\sqrt{\left(\frac{n_t + n_c}{n_t\, n_c}\right)\left(\frac{n_t + n_c}{n_t + n_c - 2}\right)} \quad (3)$$

d = Effect size of Cohen's d

t = t statistics

n = Sample size

Cohen's d effect size formula used when there is a standard deviation in studies using the t-test:

$$d = \frac{\bar{x}_t - \bar{x}_c}{\sqrt{\dfrac{(n_t - 1)\left(SE_t\sqrt{n}_t\right)^2 + (n_c - 1)\left(SE_c\sqrt{n}_c\right)^2}{n_t + n_c}}} \quad (4)$$

d = Effect size of Cohen's d

$\bar{x}$ = Mean

n = Sample size

SE = Square Error

Cohen's d effect size formula for studies using the F-test:

$$d = \frac{\bar{x}_t - \bar{x}_c}{\sqrt{MSE\left(\dfrac{n_t + n_c - 2}{n_t + n_c}\right)}} \quad (5)$$

d = Effect size of Cohen's d

$\bar{x}$ = Mean

n = Sample size

MSE = Mean Square Error

Cohen's d effect size formula for studies using the F-test (when there is no mean squared error):

$$d = \sqrt{F\left(\frac{n_t + n_c}{n_t\, n_c}\right)\left(\frac{n_t + n_c}{n_t + n_c - 2}\right)} \quad (6)$$

d = Effect size of Cohen's d,,

F = *F* statistics,

n = Sample size

The formula 6 is only used in the case where a condition is compared with another condition with the F test.

Cohen developed a classification to evaluate the effect size after the effect size was calculated. Within the scope of this classification, the effect sizes based on arithmetic averages are as follows (Lakens, 2013: 1; Kim, 2015: 330; Quintana, 2017: 344-345):

- d = 0.20 (Small effect)
- d = 0.50 (Medium effect)
- d = 0.80 (Large effect)

Effect sizes (as indicated by d) when considered in more detail (Thalheimer ve Cook, 2002);

- -.15 ≤ d < .15 (Insignificant effect)
- .15 ≤ d < .40 (Small effect)
- .40 ≤ d < .75 (Medium effect)
- .75 ≤ d < 1.10 (Large effect),
- 1.10 ≤ d < 1.45 (Very large effect)
- 1.45 < d (The highest effect)

The effect sizes based on the correlation coefficients (when indicated by r) are as follows (Nothnagel, 2008: 183):

1. r ≤ 0.10 (Low effect)
2. 0.1 < r < 0.5 (Medium effect)
3. r ≥ 0.5 (Large effect)

Fixed and Random Effects Model

It is important to combine the results after the effect size is calculated for each study. Different statistical models are used to synthesize the results. There are two different types of

effect models, namely fixed and random effects model (Borenstein et al., 2007: 4; Yılmaz et al., 2015: 289). Homogeneity test is applied in the selection of models. The measure of homogeneity test is Q statistics (Göçmen, 2004: 190). While the homogeneity or heterogeneity of the research is determined by performing this test (Şen and Akbaş, 2016: 3), the effect sizes are the same or different. In this context, the effect size of previous studies shows that the studies show homogeneity (Bakioğlu and Göktaş, 2018: 40) and there is no standard deviation. In this case, the overall effect calculation is made with the fixed effects model. If the effect size of the studies show significant differences, the standard deviation is high (Dinçer, 2014: 19). In such a case, the overall effect should be calculated according to the random effects model. It is also used in the use of this model when there are differences in the specific structures of the work (Borenstein et al., 2007: 11; Hoffman et al., 2010: 4-5). With the use of the random effects model, not only the change between research but also the change in the structure of research itself can be analyzed. Thus, changes in the sub-groups within the research are included.

Each study is important in terms of showing the homogeneity of the results to show the confidence interval. Confidence interval shows the consistency between studies in the process of combining quantitative researches evaluated in meta-analysis (Dinçer, 2014: 20). Accordingly, it is not possible for the general result to be accurate if the confidence interval is large. The desired situation is that the confidence interval is narrow. As the confidence interval becomes narrower, the accuracy of the study result increases.

Study weight in terms of fixed and random effects models constitutes another factor to be considered. Study weight is important in that it affects the overall effect. If the weight of a study has a major effect on the overall effect (noting its reasons), it may not be included in the meta-analysis (Dinçer, 2014: 22). However, if study weights are low, the probability of disrupting the overall effect is reduced. For the fixed effects model, the weight of each study is shown directly. On the other hand, in the model of random effects, the weight of each study should be shown by giving the ratios.

The overall effect is obtained by calculating the weights of the effect sizes. Therefore, a common conclusion is reached on how much the dependent variable affects the independent variable by means of the moderator variable or variables. After this process, the results are reported..

Discussion of Meta-Analysis in Financial Studies

The first research on meta-analysis has emerged in the medical field. In this context, "Karl Pearson's 1904 report on Certain enteric fever inoculation statistics is seen as a key paper in the history of meta-analysis." (Shannon, 2016: 310). Chalmers et al. (2002: 30), although there are many studies on meta-analysis until the last quarter of the 20th century, they stated that working methods for meta-analysis have emerged in the real process in the next process. In this regard Glass (1976: 3) to put out his work "Meta-Analysis" concept to be presented to the literature and have contributed to the development of meta-analysis method. As of the 1970s, meta-analyses were also included in social sciences (Bakioğlu and Göktaş, 2018: 38). Meta-analysis has become increasingly popular in many fields of social sciences, as in many other disciplines (Eisen, 2017: 21). In this context, education (Hattie and Marsh, 1996; Bakioğlu and Göktaş, 2018), marketing (Johnson and Jaramillo, 2017; Lehmann, 2018),

advertising (Eisen, 2017), finance (Capon et al., 1990; Bausch and Krist, 2007), accounting (Khlif and Chalmers, 2015), management (Orlitzky et al., 2003; Ülbeği and Yalçın, 2016), sociology (Zhao, 1991) and psychology (Parks-Leduc, 2015) are rapidly spreading in the field of science.

Capon et al. (1990) meta-analysis on the determinants of financial performance and meta-analyses in the finance field gained momentum. There are 42 articles in the Web of Science (WOS) database when "meta-analysis" and "finance" scanning is performed for all areas. These articles increased especially after 2010 and 8 articles were published in 2018. On the other hand, when the same search was done in Google Scholar, it has been revealed that there are more than 100 researches. In the meta-analysis of finance, the first public offering (Daily et al., 2003), financial literacy and financial education (Fernandes et al., 2014), strategic planning and financial performance (Boyd, 1991), the relationship between information technology and firm performance (Liang et al., 2010), effects on firm performance (Krist, 2009; Bausch et al., 2015), the relationship between the number of managers and firm performance (Dalton et al., 1999), the impact of outsourcing on firm performance (Awe et al., 2018) and intellectual capital and financial performance (Albertini and Berger-Remy, 2019). Remarkably, the articles have been written on variables affecting financial performance and financial performance are more intense. This is due to the application of quantitative studies to the nature of meta-analysis. Meta-analysis is an effective tool for synthesizing many researches in finance as in other fields (Kim, 2017), and allows for increased interdisciplinary studies. In this context, the findings of many research results together increase the accuracy of the researches that reach similar results. If the independent research results are different according to the results of the meta-analysis, the reasons for this will be investigated and the new hypotheses will be raised with new questions that have not been answered yet and thus new findings will be possible (Abramson and Abramson, 2001: 329). This increases the value of meta-analyses (Haidich, 2010: 36). On the other hand, meta-analysis will provide information about whether the results of independent research have emerged by chance (Sağlam and Yüksel, 2007: 182).

The relationship between dependent and independent variables can also be seen whether there are effects of moderator variables in meta-analysis. Bausch et al. (2015) found a positive relationship between internationalization and firm performance. It was stated that mergers, acquisitions and the headquarters of the firms were effective as moderator variables. However, they concluded that the relationship between firms and the entered market had no effect as a moderator variable. In addition, Capon et al. (1990), when the explanatory variable is a large number and at the same time a limited number of databases, states that meta-analysis is an appropriate way to analyze in line with the current alternative explanations. In addition, Wagner (2012) examines the impact of family businesses on financial performance, the primary work includes comprehensive performance measures are stated. Due to differences in performance measurement, it is difficult to compare primary studies with univariate meta-analysis. Therefore, it is stated that these differences in performance measurement will be controlled by multivariate meta-analyzes.

According to Geyer-Klingeberg et al. (2018), one of the most advantageous aspects of meta-analysis is that it allows the inclusion of new information from the primary studies in terms of country and time constraint included in the analysis. In this way, it increases the value of meta-analysis in terms of more countries and longer term, risk protection literature.

Because 89% of the studies in risk protection literature focus on a single country. Therefore, differences between countries cannot be analyzed. Meta-analysis enables countries in all studies to be included in this analysis. In this context, Geyer-Klingeberg et al. (2018: 14) reached the average values of macroeconomic variables based on the degree of market friction and the theory of positive hedging. Similarly, Hansen et al. (2018) emphasized the inclusiveness of meta-analysis in an article in which the business cycle examines the impact of family businesses on financial performance. It is stated that all stages of the business cycle are included as an independent variable in terms of the scope of this study. As a dependent variable, when analyzing family companies, they expanded the meta-analysis to examine all periods of stagnation and recovery. In addition, many countries were considered in the study and factors such as the level of development and the development of corporate governance were also examined as variables.

Considering the disadvantages of meta-analysis in finance studies, the first one is the risk of publication bias in research (Biondi-Zoccai et al., 2011: 163; Card, 2012: 26). Capon et al. (1990: 1157), the studies to be included in the analysis instead of weak relationships, the use of more powerful relationships, including the use of research will lead to publication bias. Therefore, it is stated that more limited results will emerge instead of more comprehensive intellectual results. Kim (2017) stated the importance of publication bias, wrote articles on improvement of financial performance of social responsibility. He stated that the publications that have a positive relation in his study stem from the fact that they contain more effect size than the publications that have negative relation. Asongu (2015) stated that studies conducted on the relationship between financial development and economic growth are generally not published as a negative case for meta-analysis studies. Sağlam and Yüksel (2007: 182) indicate that combining studies with different statistical models may cause false results. If the effect size does not appear clearly in the studies discussed, related studies should be excluded from meta-analysis as a constraint (Margolis et al., 2007). Kersten et al. (2017) In their meta-analysis on the financial performance of SMEs, when the moderator variables in independent studies as a constraint showed insufficient effect size, they stated that these studies could not be included in the meta-analysis. When moderator variables have sufficient effect size, it is considered to provide valuable information. Greenwald et al. (1994) in his study on education finance, stated that a single study in meta-analysis could have a disproportionate effect on overall results. This disproportionate effect does not mean that the results will be wrong, but it is necessary to ask the right questions in order to influence the overall results. The study can be evaluated in terms of its effect on overall results in a sub-sample. Again, in the evaluation of studies whose effect sizes are too large or too low, the same authors proposed an approach to limit the impact of different values. The highest 5% of the effect sizes and the lowest 5% were excluded from the general sample of the study and evaluated separately as sub-samples. It is thought that 90% of the sample will give more accurate results as the general sample is free of differences. In addition, the evaluation of low-quality studies in a meta-analysis can adversely affect the results. (Card, 2012: 26). Wolf (1986: 15) stated that the difference between the coefficients of effect and the effect coefficients could be higher in low quality researches. Thus, it is possible to solve this problem by removing these studies from the meta-analysis.

One of the most important constraints of meta-analyzes can be analyzed based on past research (Dalton et al., 2003: 21). Meta-analysis method cannot provide the reason for the

relationship because it analyzes the retrospective studies (Bausch et al., 2015). However, in order to give an idea of causality, the results of previous studies and the meta-analysis results need to be compared. Another limitation is that only quantitative studies can be examined instead of qualitative research (Schwens et al., 2017: 25). This is a disadvantage if qualitative research (for example, literature reviews and case studies) are more involved in a study area than quantitative research. In such a case, meta-analyzes can be considered as complementary to, but not an alternative to, literature review. Another limitation of meta-analysis is that it cannot explain the reason for the relationship between variables. Dalton's et al. (1999) examined the relationship between the number of managers and firm performance. In order to examine the relationship between variables, meta-analyzes are performed only on studies involving Pearson correlation coefficients and standard β coefficients (Gallardo-Vázquez, 2019). The implementation of meta-analyzes in studies without these coefficients is not possible at this time. The measurement method in the study and the measurement method in the application must be the same. In this respect, Edeling and Himme (2018) stated that in the article which investigated the effect of market share on firm performance, enterprises could cause different results for meta-analysis due to differences in method of measuring market shares. In parallel, O'Boyle et al. (2016) in their study on the impact of employee ownership on firm performance, mentioned sample uncertainty in both dependent and independent variables. It has been stated that having different sampling patterns may have a negative impact on meta-analysis results. Because there are different opinions about the factors that make up the company performance and the factors that make up the employee ownership in the literature. In such a case, it would be a more appropriate approach to analyze the studies with the same viewpoint.

3. CONCLUSION

Meta-analysis is indicated as a systematic research method. Many specific studies, including specific statistical analyzes on a subject, synthesize in a single study. As the relationship between meta-analysis and dependent and independent variables is evaluated in a broader framework, it is possible to examine in detail the moderator variables and sub-groups in finance articles. Thus, it is also possible to observe which subgroups are more effective.

Meta-analysis that can be applied to quantitative studies are becoming more widespread in finance. There are different results in quantitative research in finance. This situation leads to information complexity. When these quantitative studies are synthesized according to their effect size, the relationship between the variables seem clearer. In this framework, with the meta-analysis, errors will be found in the previous financial studies and results will be found in the largest sample. Therefore, the accuracy of the results will be increased with the expansion of the sample.

The causality relationship between variables is important in finance studies. Meta-analysis is based on previous research and shows the existence and degree of the relationship between variables. However, causality is not established between the variables. The causality relationship can be demonstrated by examining previous studies. As another constraint, there are more studies that include strong relationships between variables. In this case, it causes publication bias in terms of meta-analysis. Publication bias is the most important problem in the meta-analysis literature. In simple terms, only the publication of published studies leads to publication bias. Factors such as poor quality of the studies to be included in the analysis,

involving only positive or negative studies, outlining the thoughts of a certain stream in articles and not including studies involving neutral relations cause publication bias. Although the risk of publication bias is reduced, it is not possible to eliminate publication bias. In addition, combining a study with a large sample volume and a larger sample volume may cause the overall effect size to be different. If necessary, the impact of the relevant study on the meta-analysis should be limited or excluded from the analysis. Articles that contain the same subject and different measurement methods cause the results of the analysis to be different. In this direction, methods with the same measurement method should be in the same group. Articles with different methods can be evaluated in a sub-group. On the other hand, qualitative research with meta-analyzes is excluded from the analysis. Only quantitative studies can be analyzed. While qualitative studies are predominantly involved in a study, the low number of qualitative studies provides that meta-analysis is complementary to qualitative research.

Although meta-analysis have certain limitations, it is thought to be more advantageous than any other study. Because the results of the evaluation of many research results together, it increases the accuracy of the researches that reach similar results. If independent research results are different according to the results of meta-analysis, the reasons for this will be investigated and new hypotheses will be raised with new questions that have not been answered yet. Thus, new findings will be possible in finance. In addition, meta-analysis gives the opportunity to work with a more comprehensive set of data than other studies. The fact that many countries and wider periods can be included in many countries provides better quality results. In addition to the effect size between dependent and independent variables, the effect of regulatory and intermediary variables on this effect size can be seen more clearly.

In addition, many research reports are analyzed with meta-analysis. Some changes to the studies will contribute to the meta-analysis in finance. The effect sizes should be clearly reported in the articles and the summaries presented should provide reliable results. Not only in finance but also interdisciplinary meta-analysis will be easier.

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