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## **A META-ANALYSIS OF THE RELATIONSHIP BETWEEN RELIGIOSITY AND SAVING BEHAVIOUR**

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### **ABSTRACT**

The purpose of this study was to synthesize the findings of previous studies on the relationship between religiosity and saving behaviour by using a meta-analysis approach. It also sought to determine the strength of the relationship, besides its direction. Eleven studies which met the five criteria and four techniques used in the study were used as samples for the meta-analytic analysis. The size of the effect in each study was then determined by Pearson's product-moment correlations ( $r$ ). To estimate the average distribution of relationship true effects, the Fisher  $r$ -to- $z$  transformation and random-effects methods were used. The empirical evidence showed that there was a positive correlation between religiosity and saving behaviour. However, according to Guilford's convention, the true effect size ( $r = 0.303$ ) would mean that religiosity had a weak correlation with saving behaviour. It is recommended that authorities and financial institutions use the findings of this study to develop plans focused on advocating and facilitating saving behaviour among religious people.

**Keywords:** Meta-analysis, religiosity, saving behaviour, Fisher r-to-z transformation, random-effects method.

JEL Classification: Z120, G410.

## INTRODUCTION

It appears that the global community is becoming more religious. Based on a Pew Research Center (2015) survey, all major religions are estimated to show a rise in the number of followers by 2050. The survey found that 84 percent of the world population was religiously affiliated in 2010, with projections predicting that this share would rise to 87 percent by 2050. These findings and projections appear to contradict the views of several influential scholars, such as Karl Marx, Emile Durkheim, and Max Weber, who predicted that religion would be less important in various socioeconomic activities as industrialization progressed, economic markets expanded, and science, technology, and education advanced rapidly (Basedau et al., 2018).

Furthermore, the findings of various studies in economics (e.g. Azzi & Ehrenberg, 1975; Iannaccone, 1998; Iyer, 2016), sociology (e.g. Geertz, 1973; Inglehart, 2018; Lenski, 1961), and psychology (e.g. Allport & Ross, 1967; Berry et al., 2002; Pargament, 1999) have acknowledged the importance of religion in human society. For example, it plays an important role in, energising people to work for social change, promoting mental well-being, or acting as a social control agent.

The investigation into the relationship between religion and economic growth has received considerable attention, ever since Max Weber (1905) recognized the significance of religious affiliations in economic performance. He argued that the values in Protestant teachings would shape their adherents' work ethic, resulting in professionalism and efficiency in economic activities. More than a century after Weber's thesis, a large body of literature has noticed a link between religion and macroeconomic prosperity. For instance, it has been discovered that religious beliefs, particularly beliefs in hell and heaven, have a positive effect on economic attitudes, leading to higher incomes and Gross Domestic Product (GDP), and Christianity is the religion with

the greatest impact on economic growth, with Protestants being more capitalists than other Christians (Barro & McCleary, 2003; Filipova, 2012; Guiso et al., 2003; Hayward & Kimmelmeier, 2011).

Moreover, religion has long been associated with the teachings of thriftiness and customary living. The research findings however, show that there are differences in which religions adhere to the most frugal and conventional ways of life. According to Keister (2003), Guiso et al. (2003), and Renneboog and Spaenjers (2012), Catholics appeared to value frugality and convenient living more than Protestants, whereas Arruñada (2010) and Filipova (2012) discovered the opposite. Although many studies found a correlation between religious belief and thriftiness, their findings are less convincing when used to explain a link between religious belief and saving decisions. This is due to the distinction between thriftiness and saving decisions. Thriftiness is the trait to try and reduce spending, whereas saving decisions are initiated by residual income. Therefore, research into how religion influences economic behaviour and financial decisions at the microeconomic level seems to remain limited (see Klaubert, 2010; Yayeh, 2014). In terms of empirical assessments that link individual saving attitudes to religious preferences or practices, it needs to be explored further. This investigation should be beneficial because it could help us to solve pressing issues in the national economy, for instance, pressing concerns such as wealth inequality (Bilen, 2016; Keister, 2003) and consumerism (Tjahjono, 2014), or even the issues of conserving energy and natural resources (Singh et al., 2021).

Since the investigation of religiosity on saving behaviour is an emerging research area, the present study is interested in knowing the ‘true’ effect size of the relationship between these variables. Therefore, this study has performed a meta-analysis to gain a more objective, robust, and less biased understanding of the relationship between the variables by investigating the distribution of effect sizes. A meta-analysis is an approach for aggregating effect-size indices from multiple studies (Borenstein et al., 2011). It contributes to answering the question of whether the observed variations in effect sizes across studies are due to a single population effect size (Law, 1995).

To date, there has been no other study examining religiosity and saving behaviour across samples, methodologies, and time. This study has utilized meta-analysis as a quantitative tool to synthesize the findings

of previous studies, and to determine the strength of the relationship between religiosity and saving behaviour, as well as the direction of that relationship. As a result, the strength of the correlation between previous findings and their direction, whether positive or negative, has been held to the same standards, as long as they meet the inclusion criteria set for the study sample. One of the inclusion criteria, for example, was that the study sample would include religiosity, religious belief, or religious faith as an independent variable. In addition, the other objective is to contribute to the growth of the literature in this area of study. This study can provide a retrospective summary of the existing literature and provide further empirical evidence of the true effect of religiosity on saving behaviour. It could help shape new research by describing what was already known and synthesizing the new body of evidence.

After reviewing previous studies and establishing the inclusion criteria, eleven journal articles were identified as the study sample; all together these sources provided a total of 1,063 participants coming from various locations. More specifically, Yayeh (2014) collected samples in Ethiopia, while Ababio and Mawutor (2015) did so in Ghana. Satsios and Hadjidakis (2017) gathered data in Greece. In Indonesia, questionnaires were administered by Murdayanti et al. (2020); Prastiwi (2021); Priyo Nugroho et al. (2017); Wijaya et al. (2019). Meanwhile, data was collected in Malaysia by Abdullah and Abd. Majid (2001); Ismail et al. (2018); Kassim et al. (2019); Mei Teh et al. (2019). As a result, this meta-analytic study was able to generate numerous plot functions, such as the forest plot, standardized residual plot, and Cook's Distance plot, as well as measurements, such as the random-effect model, heterogeneity statistics, outliers, and influential case diagnostics.

## **LITERATURE REVIEW**

The relationship between religiosity and saving behaviour is typically measured using one of two methods: methods which are either economically or psychologically oriented. In the economic approach, the goal is to create forecasts about behaviour as accurately as possible. However, this approach often neglects to explore the true underlying causes of why individuals behave the way they do (Nyhus,

2017). Researchers who employ this approach rely on secondary data surveys, such as the World Values Survey (WVS), the International Social Survey Program (ISSP), the Gallup Millennium Survey, the Panel Study of Income Dynamics (PSID), or the *Konda Araştırma ve Danışmanlık*, to determine an individual's religious behaviour. From these data sources, researchers discovered that the 'average' person's religiosity could be measured in the following five ways, namely participation in religious services, belief in heaven and hell, belief in the afterlife, faith in God, and self-identification as a religious person (Barro & McCleary, 2003). These religious aspects are then examined in relation to the adherents' amount of income or consumption using various econometric methodologies so as to understand the significance of religiosity in saving behaviour. Klaubert (2010), for example, used the PSID to investigate the link between individual saving decisions and religiosity, as measured by church attendance, in the United States. Using the Konda data survey, Davutyán and Öztürkcal (2016) investigated the effect of religious affiliation on financial behaviour in Turkey. They discovered however, weak evidence that religious people have distinct preferences for saving decisions. This was due to there being no difference between religious and non-religious people when it comes to saving decisions. Meanwhile, Guiso et al. (2003) discovered a link between religious intensity and thriftiness in a cross-national study using the WVS sample statistics.

On the other hand, the psychological viewpoint begins from a different place. This approach frequently concentrates on psychological factors, and examines individual differences rather than average human behaviour. Therefore, various explanatory variables and methods have been employed in the analysis of the relationship between religiosity and saving behaviour, which makes it different from the economic approach. The psychological viewpoint often employs primary data sources and applies behavioural theories, for example the theory of planned behavior (Ajzen, 1991) or social learning theory (Bandura, 1977). The theory of planned behavior identifies specific factors, namely intentions and perceived behavioral control, that can be utilised to estimate and describe human behavior in various contexts. Intentions are motivational variables that demonstrate how far individuals are willing to go and how much effort they intend to put in, whereas perceived behavioral control refers to the perception of how easy or difficult it is to control an interest (Ajzen, 1991). Meanwhile,

attitudes toward behavior, subjective norms, and perceived behavioral control can all have an impact on intentions. Furthermore, social learning theory is often used as a base theory to describe the role of financial literacy in saving behavior. The theory hypothesizes that the cognitive abilities of individuals, i.e., knowledge and skills, impact on changing their behaviors. This cognitive ability can be learned by seeing, imitating, practicing, and processing information from the behaviour of others and its environments, including families, friends, neighbours, the workplace, or the media.

The psychological viewpoint also employs religiosity measurement scales, such as the orthodoxy measurement (Glock, 1962) or the religious orientations (Allport & Ross, 1967). The orthodoxy measurement uses the following five scales: belief, practice, knowledge, experience, and consequences, and these would inform the preferred faith. Belief is an ideological dimension that a religious person will adhere to. Prayer, fasting, involvement in special sacraments, worship, and other ritualistic activities are included in the practice. Knowledge refers to the understanding of the fundamental tenets of a religious person's faith and its sacred scriptures. Experience gives a religious emotional experience, and consequences are all of the religious prescriptions for what a religious person should do.

Meanwhile, the measurement of religious orientation uses the following two dimensions: intrinsic and extrinsic, and they would inform us of the primary motive for life in religion. Those who are intrinsically motivated find that their primary motive in religion is to live according to their religious convictions and prescriptions. However, extrinsically oriented people may find religion useful in a variety of ways, including stability and reassurance, social connection and diversionary tactics, status, and self-justification. Few researchers have adopted this approach in their studies. For example, Priyo Nugroho et al. (2017) expanded the theory of planned behaviour by including two new variables: religiosity and self-efficacy. They then employed Allport and Ross's (1967) scale for measuring religiosity to investigate the saving behaviour of Islamic bank customers. In the meantime, Kassim et al. (2019) who used the social learning theoretical framework and the religiosity measurement scale which had its root in Glock's (1962) work, discovered that whereas religiosity had no effect on saving behaviour, financial literacy did.

## METHODOLOGY

### Criteria and Search Procedure

The samples for the present meta-analytic study were selected because they had discussed the influence of religiosity on saving behaviour directly. To be included in the meta-analytic sample, the studies must fulfil five criteria. They are as follows:

- The studies used religiosity, religious belief, or religious faith as an independent variable.
- The studies used saving behaviour or saving habits, saving money, or saving decisions as a dependent variable.
- The studies used a quantitative research approach.
- The studies used primary data at a micro analytical level.
- The studies presented the Pearson's  $r$  effect size clearly or could be processed using another statistical method.

Studies would be excluded if they had found a relationship between religiosity and saving behaviour indirectly.

Finding studies from various journals, such as journals on economics, business, management, finance, marketing, religion, culture, and social science, that fit the inclusion and exclusion criteria for a meta-analysis study was challenging. For example, to avoid the possibility that this might turn out to be a time-consuming process, an effective search strategy was used from start to finish. The present study has implemented four techniques to conduct a wide-ranging literature search. They were as follows: (1) deciding search terms and keywords, (2) searching for specific phrases, (3) using truncated and wildcard searches as well as Boolean logic, and (4) using citation searching. Firstly, these terms and keywords were applied in the search process: religiosity, religious belief, religious faith, saving behaviour, saving habits, saving money, and saving decisions. Secondly, quotation marks were used for words which appear next to each other, e.g., "religious belief," "religious faith," "saving behaviour," "saving habits," "saving money," "saving decisions." Thirdly, the search used combined truncation and wildcard searches with Boolean logic, e.g., "*religio\**" AND "*saving behavio?r*". Fourthly, articles that were cited in other publications were also included in the search. These techniques were then employed to search for studies in the various research search engines and databases, such as Semantic Scholar,

Google Scholar, Research Gate, EBSCOhost, ProQuest, JSTOR, and Wiley Online Library.

All potentially relevant titles and abstracts were then saved and managed systematically for the next stage, which was screening. The first stage of the screening was to import all the references into a reference management software package and de-duplicate them. In this case, a software called EndNote was used. The next stage was to read and identify all the saved articles of study, and filter them out if they were irrelevant. The stages of screening resulted in 11 journal articles identified as the relevant data selected for the meta-analysis.

### **Data Extraction**

Once screening has been done and all relevant articles selected for the study have been identified, the next step is the data extraction (see Teshome et al., 2018; Zuckerman et al., 2013). In this process, the key aspects that will be used for the statistical meta-analysis will have to be extracted from the articles. Some key aspects of the articles are set, namely the authors' name and year of publication, sampling methods, measurement techniques, variables identification (independent and dependent), methods of statistical analysis, and a summary of the results (see Table 1). The characteristics of each article that met the criteria for inclusion were also highlighted. For example, the eleven studies used various themes related to religiosity and saving behaviour as independent and dependent variables, respectively. These are described in the column on variables. In another column, such as the measurement technique, it is stated that all studies applied a questionnaire survey to ensure that primary data was used. The most useful information, however, is in the results column. It discusses the significance of the relationship between religiosity and saving behaviour, as well as various goodness of fit tests, e.g., chi-square, odds ratio, or t-statistic, that can be used to compute the effect size  $r$ .

### **Effect Size Computation**

Following data extraction, the next task was to determine the size of the effect in each study and ensure that this effect size was expressed in the same way. The effect sizes are used to describe the strength of the relationship between the variables. There are two common types of effect size: the  $r$  type and the  $d$  type. The two most commonly

used of the  $r$  type are Pearson's product-moment correlations ( $r$ ) and Fisher's  $r$ -to- $z$  transformation ( $Z_r$ ), whereas the three most commonly used  $d$  type are Cohen's  $d$ , Hedges's  $g$ , and Glass's  $D$  (Rosenthal, 1995). In this study, Pearson's  $r$  was the preferred effect size. In this regard, it involved calculating the  $r$  value for each study carrying out the meta-analysis. There was no need to do anything if a study had used the  $r$  value. However, because some studies had no effect size value and only provided various fit test indicators (e.g., chi-square, odds ratio, t-test statistic), a conversion to Pearson's  $r$  was performed via an online calculator at [www.psychometrica.de/effect\\_size.html](http://www.psychometrica.de/effect_size.html) (Lenhard & Lenhard, 2016). Meanwhile, if the authors did not provide the indicators and could not compute a conversion to the  $r$  value, they were contacted via email to gain the relevant information. A reminder was sent if they did not reply.

### **Method of Analysis**

The analysis is carried out using the Fisher  $r$ -to- $z$  transformed correlation coefficient as the outcome measure. The Fisher's  $r$ -to- $z$  transformation is commonly used because samples from a meta-analysis contain a variety of effect sizes. It is also to achieve normality in the effect sizes (Cheung et al., 2012). There are three steps in implementing this method (Borenstein et al., 2011; Field & Gillett, 2010). To begin, use Fisher's  $r$ -to- $z$  transformation to convert the effect size in each study into a standard normal metric. The Fisher's  $r$ -to- $z$  transformation formula is given as  $z_{r_i} = 0.5 \log_e \left( \frac{1+r_i}{1-r_i} \right)$ , where  $r_i$  is the effect size in each study. After that, for each study, a weighted average of  $z_r$  scores are computed by the formula  $\bar{z}_{r_i} = \frac{\sum_{i=1}^k n_i z_{r_i}}{\sum_{i=1}^k n_i}$ , where  $k$  is the number of studies and  $n_i$  is the sample size. Finally, it should be converted back to  $r_i$  using the formula  $r_i = \frac{e^{2z_{r_i}} - 1}{e^{2z_{r_i}} + 1}$ .

In addition, the random-effects statistical model was applied to estimate the average distribution of true effects. The random-effects method was chosen because the effect size was extracted from a series of studies conducted by various authors in various populations at various times. The present analysis also reported on the estimate of the  $\tau^2$  index, the  $H^2$  index, the  $I^2$  index, and the Q-test (Cochran, 1954) with a p-value as the heterogeneity statistics outcome. The Q-test was used to assess the null hypothesis that all effect sizes

from all studies were homogenous (Chen & Peace, 2021). If the p-value was less than  $\alpha$  (the typical significance level is 0.05), the null hypothesis should be rejected, indicating that the effect sizes from all studies were not homogenous. Meanwhile,  $\tau^2$ ,  $H^2$ , and  $I^2$  were used to determine the strength of the distribution of true effect sizes. The  $\tau^2$  index was estimated using the Hedges' estimator (Hedges & Olkin, 1985) to measure the variance of the true effect sizes, and the index should be greater than zero. The  $H^2$  index was quantified using the Higgins and Thompson's (2002) formula to inform the relative extent of heterogeneity in comparison to all studies, and the index should be greater than 1. The  $I^2$  index was also calculated using the Higgins and Thompson's (2002) formula to determine the percentage of observed heterogeneity versus real heterogeneity. As a rule of thumb, the  $I^2$  index could be considered as having low heterogeneity ( $I^2 = 25\%$ ), moderate heterogeneity ( $I^2 = 50\%$ ), and high heterogeneity ( $I^2 = 75\%$ ). To display the conclusions of the meta-analyses, forest plots were generated. Forest plots provided information about each study's effect size and confidence interval, as well as the average distribution of true effects.

The analysis also examined whether studies may be outliers and/or influential in the random-effect model. They can have a significant impact on the value of the estimated random-effect model coefficients, i.e., the intercept. If they had remained in the analysis, they could have changed the entire outcome. The standardized residuals are used to detect outliers, while the Cook's distances (Cook, 1977) and DFFITS (Difference in Fits) are applied to diagnose the influential studies. Studies are considered as potential outliers if they have a standardized residual larger than 3 or smaller than -3 ( $t_{\text{student}} > \pm 3$ ), while they are considered to be influential if the Cook's distance value is more than 1 ( $\text{cook.D} > 1$ ) and DFFITS is larger than 2 ( $\text{dffits} > 2$ ) (Gerbing, 2014).

The meta-analysis was carried out with the help of an open-source statistical software the Jamovi version 1.6.23 (The Jamovi Project, 2021). The MAJOR meta-analysis module library was used to compute r-to-z transformations, as well as to generate a random-effect model, heterogeneity statistics, a forest plot, and outlier and influential case diagnostics.

**Table 1**  
*Overview of Studies Included in Meta-Analysis*

Authors (year)	Sampling Method	Measurement Technique		Variables		Statistical Analysis	Result
		Independent	Dependent	Independent	Dependent		
Abdullah and Abd. Majid (2001)	Not mentioned	Questionnaire survey	Religiosity index and income	Saving		Multiple linear regression	“... there exist a conclusive relationship between saving and Religiosity Index ...” (t-statistics = 1.993, $p < 0.05$ ) (p. 75).
Yayeh (2014)	Multistage cluster sampling and probability proportional to size (PPS) sampling	Questionnaire survey	religion affiliation, religious attendance, religion identity, household net income per month, gender, household accepting interest payment, level of education, family size, age, marital status, wealth, and knowledge about saving interest payment.	saving		Linear and probit regression	“... the more often people going to church/mosque, i.e. the more religious they are, the lower is their propensity to save money.” (Wald chi-square of 62.58 with p-value of 0.000)
Ababio and Mawutor (2015)	Simple random sampling and convenience sampling	Questionnaire survey	religiosity, uncertainty, liquidity constraint, stage in life, and intergenerational effect income	saving		Logit model	Church attendance very significantly explains that religiosity effects saving behavior (odds ratio = 0.822, $p < 0.05$ ) (p. 55).

(continued)

Authors (year)	Sampling Method	Measurement Technique		Variables		Statistical Analysis	Result
		Questionnaire survey	Questionnaire survey	Independent Self-efficacy, Religiosity, Attitude, and Subjective norm	Dependent Intention and Behavior		
Priyo Nugroho et al. (2017)	Purposive sampling	Questionnaire survey	Questionnaire survey	Self-efficacy, Religiosity, Attitude, and Subjective norm	Intention and Behavior	Simultaneous Equation Modeling	“... religiosity has a positive and significant influence on customer behavior using products and services of Islamic banks” (i.e. bank savings or deposits) (p. 44).
Satsios and Hadjidakis (2017)	Snowball sampling	Questionnaire survey	Questionnaire survey	religiosity and self-mastery	five intentions to saving subscales: thrift, saving involvement, saving habits, shame of debt and no need to save	Pearson correlation	“... religiosity is significantly positively correlated with all 5 intention subscales, ...” (p. 20). The subscale of saving habits is significantly positively correlated with religiosity ( $r(100) = 0.332, p < 0.01$ ).
Ismail et al. (2018)	Purposive sampling	Questionnaire survey	Questionnaire survey	Service quality, religious belief, and knowledge.	saving behavior	Multiple linear regression	“... religious belief is significantly related to saving behaviour ( $t = 4.60, p = 0.00$ )” (p. 1076)
Kassim et al. (2019)	Disproportionate stratified sampling	Questionnaire survey	Questionnaire survey	Family background, Religiosity, Attitude, Literacy, Household Income, Age, Level of education, and Locality.	Saving behavior	Multiple linear regression	“... the results demonstrate that religiosity, ... are not significantly related to saving behavior.” (p. 248) (t-statistics = 1.418)

(continued)

Authors (year)	Sampling Method	Measurement		Variables		Statistical Analysis	Result
		Technique	Questionnaire	Independent	Dependent		
Mei Teh et al. (2019)	Convenience sampling	Questionnaire survey	Individual characteristic, Socialisation, Cognitive ability, Religion faith, and Self-efficacy.	Private saving	Logistic regression	“As for religious faith, divine guidance (odds ratio = 6.51) significantly predicted an individual’s likelihood to save money.” (p. 10)	
Wijaya et al. (2019)	Convenience sampling	Questionnaire survey	Religiosity level	Saving decisions	Chi-square test	“... a chi-square test between religiosity level and saving decisions criteria, which showed there is a significant difference ( $p < 0.01$ ). More than 60 per cent of the respondents decided to save money in BMTs because of their products being in accordance with Sharia.” (p. 1475) (chi-square = 6.46367)	
Murdayanti et al. (2020)	Proportionate stratified random sampling	Questionnaire survey	Financial knowledge, self-control, and religious beliefs.	Saving behavior	Partial Least Square	“... religious beliefs have a significant positive effect on savings behavior, ...” (p. 8) (t-statistics = 6.77, $p < 0.001$ )	
Prastiwi (2021)	Not mentioned	Questionnaire survey	Religiosity, Environment, and Reputation.	Saving decision	Multiple linear regression	“... Religiosity; ... have a significant positive effect on saving decisions.” (p. 222) (t-statistics = 2.161, $p < 0.05$ )	

(continued)

80 **Table 2**

*Overview of Descriptive Statistics and Effect Size*

Authors (year)	N	Age (y/o)	Gender	Marital status	Religion	Location (Country)	Pearson r
Abdullah and Abd. Majid (2001)	160	78.13% 18 to 23 19.38% 24 to 29 2.50% 30 to 35	34.38% Male 65.63% Female	95.63% Single 4.38% Married	Muslim	International Islamic University Malaysia (IIUM)-Selangor (Malaysia)	0.1576
Yayeh (2014)	384	42 (Mean)	Not mentioned	74% Married 16% Widowed	67.5% Orthodox Christian 30.8% Muslim 1.7% Protestant	West Amhara national regional state (Ethiopia)	0.4037
Ababio and Mawutor (2015)	200	Not mentioned	Not mentioned	Not mentioned	Christian	Accra Metropolitan (Ghana)	0.054
Priyo Nugroho et al. (2017)	220	42% less 31 45% 31 to 40 13% above 40	Not mentioned	Not mentioned	Muslim	Yogyakarta (Indonesia)	0.566
Satsios and Hadjidakis (2017)	100	Not mentioned	Not mentioned	Not mentioned	Muslim	Xanthi, Rodopi and Evros - Thrace (Greece)	0.332
Ismail et al. (2018)	150	2.7% less 20 54% 20 to 30 29.3% 31 to 40 14% above 40	42.7% Male 57.3% Female	Not mentioned	61.3% Muslim 15.3% Buddha 12.7% Hindu 7.3% Christian 3.3% others	(Malaysia)	0.3756

(continued)

Authors (year)	N	Age (y/o)	Gender	Marital status	Religion	Location (Country)	Pearson r
Kassim et al. (2019)	531	Not mentioned	Not mentioned	51.2% Married 48.8% Single	Muslim	Selangor (Malaysia)	0.0615
Mei Teh et al. (2019)	224	16 to 60	Not mentioned	Not mentioned	Muslim	(Malaysia)	0.4588
Wijaya et al. (2019)	523	2.68% 10 to 20 13% 21 to 25 18.16% 26 to 30 20.65% 31 to 35 21.03% 36 to 40 24.47% above 40	50.86% Male 49.14% Female	Not mentioned	Muslim	Surakarta and Sukoharjo (Indonesia)	0.1112
Murdayanti et al. (2020)	268	13 to 20	Not mentioned	Not mentioned	Muslim	Darunnajah Islamic Boarding School - Jakarta (Indonesia)	0.4135
Prastiwi (2021)	100	12% less 18 27% 18 to 25 36% 25 to 30 25% 30 to 40	Not mentioned	45% Male 55% Female	Muslim	KSPPS BMT Amanah Ummah - Surabaya (Indonesia)	0.2161

## RESULTS

Table 1 shows the results of data extraction processing. The 11 studies were published between 2001 and 2021, with Abdullah and Abd. Majid (2001) being the oldest and Prastiwi (2021) is the most recent. The studies used two types of sampling methods: probability sampling and non-probability sampling. Ababio and Mawutor (2015); Kassim et al. (2019); Murdayanti et al. (2020); and Yayeh (2014) applied the probability sampling method, whereas Ismail et al. (2018); Mei Teh et al. (2019); Priyo Nugroho et al. (2017); Satsios and Hadjidakis (2017); and Wijaya et al. (2019) employed the non-probability sampling method. Meanwhile, Abdullah and Abd. Majid (2001); and Prastiwi (2021) there was no mention of the method used in their studies. To collect primary data, all studies developed a self-administered questionnaire. Furthermore, various themes of religiosity and saving behaviour, such as religious attendance (Yayeh, 2014), religious belief (Ismail et al., 2018; Murdayanti et al., 2020), religion faith (Mei Teh et al., 2019), saving habits (Satsios & Hadjidakis, 2017), and saving decisions (Prastiwi, 2021; Wijaya et al., 2019), were used to as the independent and dependent variables.

Various statistical analyses were also applied, namely Pearson correlation (Satsios & Hadjidakis, 2017), chi-square test (Wijaya et al., 2019), multiple linear regression (Abdullah & Abd. Majid, 2001; Ismail et al., 2018; Kassim et al., 2019; Prastiwi, 2021), logit regression (Ababio & Mawutor, 2015; Mei Teh et al., 2019), probit regression (Yayeh, 2014), partial least square (Murdayanti et al., 2020), and simultaneous equation modelling (Priyo Nugroho et al., 2017). On the other hand, various fit test indicators, such as chi-square (Wijaya et al., 2019; Yayeh, 2014), odds ratio (Ababio & Mawutor, 2015; Mei Teh et al., 2019), and t-statistic (Abdullah & Abd. Majid, 2001; Ismail et al., 2018; Kassim et al., 2019; Prastiwi, 2021), have been used to assess the significance of the relationship between religiosity and saving behaviour. These indicators had to be converted into Pearson's  $r$  before they are used in a meta-analysis. Meanwhile, Priyo Nugroho et al. (2017) have provided another fit test indicator, namely the critical ratio (8.395) (personal communication).

Table 2 summarizes the descriptive statistics from each study, including the number of observations, age, gender, marital status, religion, and location, as well as the estimated effect sizes. As previously stated, 11 articles were used as samples for the meta-

analytic study, and these gave a total of 1,063 observations. Kassim et al. (2019) observed 531 people, making it the largest population sample, while Prastiwi (2021); as well as Satsios and Hadjidakis (2017) had 100 observations, making it the smallest. Meanwhile, the age range varied from 13 to more than 40 years. Furthermore, only four studies provided gender information, i.e., Abdullah and Abd. Majid (2001); Ismail et al. (2018); Prastiwi (2021); and Wijaya et al. (2019), in which most of their respondents were women. Similarly, marital status was only provided by three studies, i.e., Abdullah and Abd. Majid (2001); Kassim et al. (2019); and Yayeh (2014), with the majority of their respondents being married. On the other hand, all studies provided religious information, with Muslims representing the majority of their respondents. Furthermore, the study locations reveal that respondents were from a variety of countries, including Ethiopia, Ghana, Greece, Malaysia, and Indonesia. Meanwhile, all studies were ready to use the same method to express effect sizes in Pearson's  $r$ . The study conducted by Priyo Nugroho et al. (2017) had the largest effect size (0.566), while the study performed by Ababio and Mawutor (2015) had the smallest one (0.054).

**Table 3**

*Random-effect Model*

	Estimate	<i>se</i>	<i>z</i>	<i>P</i>	CI Lower Bound	CI Upper Bound
Intercept	0.303	0.0587	5.17	<.001	0.188	0.418

**Table 4**

*Heterogeneity Statistics*

$\tau$	$\tau^2$	$I^2$	$H^2$	<i>Df</i>	$Q$	<i>P</i>
0.181	0.0328 (SE= 0.0171)	89.08%	9.155	10	108.574	<.001

Table 3 provides the random-effects model, and Table 4 presents the heterogeneity statistics. Based on the random-effects model, the estimated average Fisher  $r$ -to- $z$  transformed correlation coefficient was 0.303. (95% CI: 0.188 to 0.418) and was statistically significant ( $z = 5.17, p < 0.001$ ). It showed that statistically there was a positive correlation between religiosity and saving behaviour, with a true effect

size of 0.303 and a significance value less than 0.001. Meanwhile, according to heterogeneity statistics, the true effects appear to be non-homogenous ( $Q(10) = 108.574, p < 0.001$ ). By using the Hedges' estimator, the  $I^2$  index (0.0328) agreed with the Q-test result, indicating that there was some between-study heterogeneity in the data, whereas  $I^2 = 0.181$  indicated that the true effect sizes had an estimated standard deviation of  $SD = 0.181$ . In addition, the  $H^2$  (9.155) and  $I^2$  (89.08%) indices confirmed that true effect size differences account for more than half of the variation in the studies, which meant that the level of heterogeneity was high.

**Table 5**

*The Source of Heterogeneity Analysis*

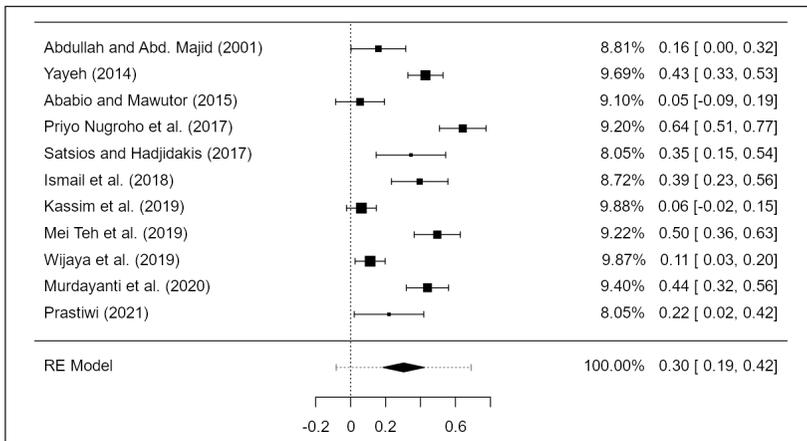
Heterogeneity source	Coefficients	T	P	95% Confidence Interval	
				Lower	Upper
Publication year	-0.131	-0.395	0.703	-0.895	0.634
Sample size	-0.334	-1.007	0.343	-1.098	0.431
Muslim religion	-0.535	-1.79	0.111	-1.22	0.153

Based on a random-effects model, Figure 1 depicts correlation coefficients with corresponding 95 percent confidence intervals for each study graphically. The estimated  $r$  from each study ranged from 0.0541 (Ababio & Mawutor, 2015) to 0.6416 (Priyo Nugroho et al., 2017). Meanwhile, the weights ranged from 7.99 percent to 9.92 percent, in Prastiwi (2021), with Satsios and Hadjidakis (2017) having the lowest and Kassim et al. (2019) having the highest. On the other hand, with Kassim et al. (2019) having the shortest interval and Prastiwi (2021) having the longest interval, the 95 percent confidence intervals ranged from (-0.02, 0.15) to (0.02, 0.42). Furthermore, the majority of confidence intervals were completely positive of zero, indicating that the majority of studies had a statistically significant positive effect. However, in some studies, i.e., Ababio and Mawutor (2015) and Kassim et al. (2019), the confidence intervals were not entirely positive of zero, indicating that these studies had a statistically insignificant positive effect (0.05 and 0.06). Thus, all observed dispersions reflected genuine differences in effect size and p-value between studies. However, a meta-analysis method only uses the effect size from each study rather than the p-value (Borenstein et al., 2011).

Figures 2, 3, and 4 provide the outcomes of outlier and influential case diagnostics. Figure 2 shows the standardized residual values, which are used to identify outliers, while Figures 3 and 4 show the DFFITS values and Cook’s distances, which are used to detect influential cases. A look at the studentized residuals revealed that none of the studies had a value greater than  $\pm 3$ , indicating that there were no outliers in the random-effect model. Meanwhile, based on the DFFITS values of no more than 2 and Cook’s distances of no more than 1, none of the studies could be considered overly influential.

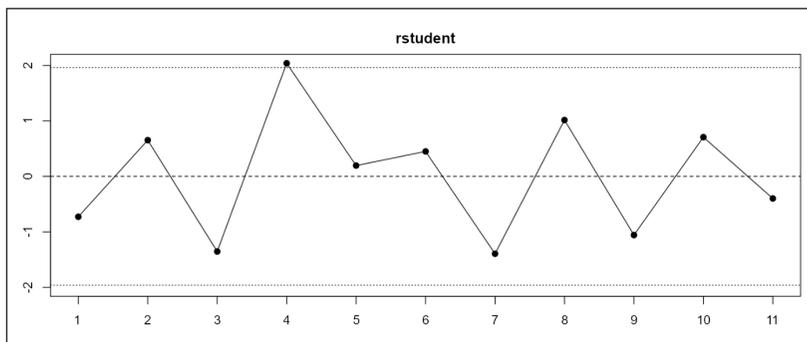
**Figure 1**

*Forest Plot*



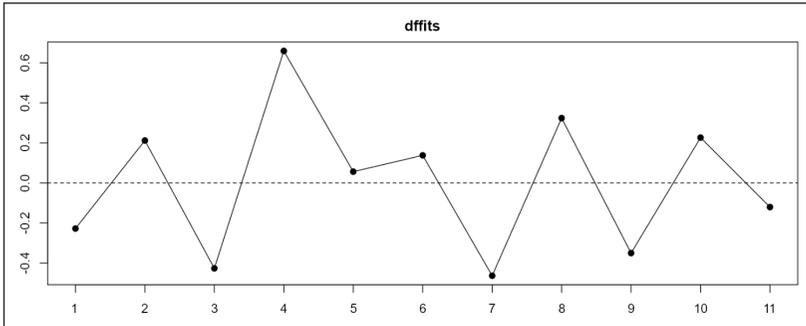
**Figure 2**

*Standardized Residual*



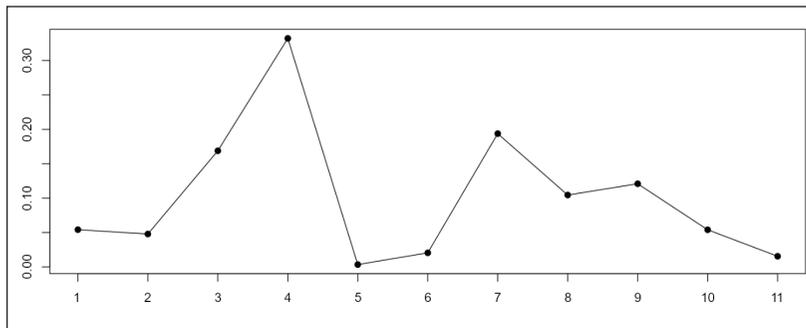
**Figure 3**

*DFFITS Values*



**Figure 4**

*Cook's Distances*



The current study's goal was to examine the existing empirical evidence on the relationship between religiosity and saving behaviour through a meta-analysis approach. The findings show that religiosity has a positive, but weak correlation with saving behavior with  $r = 0.303$  ( $p < 0.001$ ; 95% CI = (0.188; 0.418)). As a rule of thumb, the correlation strength is described as negligible ( $r < 0.2$ ), low ( $0.2 \leq r < 0.4$ ), moderate ( $0.4 \leq r < 0.7$ ), high ( $0.7 \leq r < 0.9$ ), or very high ( $r \geq 0.9$ ) (Guilford & Fruchter, 1973). According to this rule of thumb, the correlation will be ignored when its strength is less than 0.2. This finding implies that changes in religiosity have little impact on changes in saving behaviour. Moreover, the low  $r$  value was caused by the fact that the  $r$  values of the observed studies were mostly low (see Figure 1), and even two of them were negligible, i.e., Ababio and

Mawutor (2015), and Kassim et al. (2019). Meanwhile, there were only four studies that provided empirical evidence that religiosity had a moderate impact on saving behaviour, namely Mei Teh et al. (2019), Murdayanti et al. (2020), Priyo Nugroho et al. (2017), and Yayeh (2014). On the other hand, Ababio and Mawutor (2015) obtained the lowest  $r$  value (0.05), showing that religious belief had no effect on household savings. They assumed that religious beliefs that promoted values like frugality, hard work, and honesty did not increase the savings habits of households in Ghana. Likewise, Kassim et al. (2019) found that religiosity had no effect on saving behaviour ( $r = 0.06$ ). They assumed that an individual's level of religiosity would lead to the preference to spend money in God's name rather than saving it. Unfortunately, neither of them tried to dig a bit deeper into this finding, such as linking it to the lowest frequency value of the saving questions in their questionnaire. In fact, it could be a clue to crucial evidence showing the low impact of the relationship between religiosity and saving behaviour.

The result obtained also supports the notion that religious people have varying understandings of saving behaviour. These understandings stem from two opposing perspectives on saving money taught by various religions, including Christianity and Islam. These religions consider saving to be either a positive or negative practice (Yayeh, 2014). In terms of saving as a positive practice, Christianity and Islam, for example, teach saving when there is enough to go around in times of scarcity (Genesis 37-50; Sahih al-Bukhari 5357). Religious people who put into practice this belief will also use their saving behaviour to support their frugal lifestyle (Agarwala et al., 2019). Meanwhile, in terms of saving as a negative practice, religions such as Christianity and Islam, for example, warn against the dangers of hoarding wealth (Luke 12:16-21; Quran 9:34). Religious people who engage in this practice are motivated by fears that if saving money becomes a passion, they will become trapped in a cycle of amassing wealth and being stingy one day (Sawyer, 1954). As a result, in studies where there is empirical evidence that religiosity has a moderate impact on saving behaviour, their respondents are likely to view saving as a positive practice. In contrast, respondents in studies with empirical evidence that religiosity has a low impact on saving behaviour may be less open to the idea of saving as a positive practice.

In addition, the current study discovered heterogeneity at a high level ( $Q(10) = 108.574, p < 0.001; I^2 = 89.08\%$ ). Heterogeneity may exist,

because of differences in study quality (e.g., values for effect size and significance), methodology, sample size, demographic factors, and respondent characteristics. From a statistical perspective, quantifying heterogeneity can be used to determine whether or not population effect sizes are likely to be consistent or varying (Borenstein et al., 2011; Hedges & Olkin, 1985). Meanwhile, the summary information shown in Tables 1 and 2 demonstrates that the characteristics of studies were not all the same. There were differences even within the studies themselves, like variation in religious factors (see Table 2). For instance, Ismail et al. (2018); and Yayeh (2014) collected data from a variety of religious adherents, whereas other studies only collected data from a single religious adherent. As a result, the present study was motivated to investigate the cause of heterogeneity using a technique known as meta-regression analysis. In meta-regression, the effect size of each study as the independent variable is regressed on the study characteristics as the dependent variable (Chen & Peace, 2021). Furthermore, the year of publication, sample size, and Muslim religion were investigated to determine the source of heterogeneity. They acted as independent variables in the meta-regression analysis because they were relatively complete data. The results of meta-regression analysis then revealed that publication year, sample size, and Muslim religion were not statistically significant for the presence of heterogeneity (see Table 5).

## **CONCLUSION AND FUTURE STUDIES**

The current study used a meta-analysis to synthesize the findings of previous studies to determine the effect of religiosity on saving behaviour. The meta-analysis of 11 journal articles and 1,063 respondents revealed that religiosity has a low impact on saving behaviour. The current study also confirmed the notion that religious people have two different perspectives on saving behaviour, holding the divergent view that saving can be either a negative or positive practice. Because the study's findings indicated that religiosity has little influence on saving behaviour, it is possible that people with a high level of religiosity have a less rigid perspective on saving as a positive behaviour.

The findings have important implications for the development of theories in the field of saving behaviour. In researching religiosity and

saving behaviour, this study has pioneered a new analytic approach known as meta-analysis. It has provided a retrospective summary of the existing literature on the relationship between religiosity and saving behaviour. It could help researchers make a more informed decision about which variables to use. Furthermore, this study has added to the body of knowledge about the true effect of the relationship between religiosity and saving behaviour. It could be used as a model for future research as well as a tool for additional analysis.

The findings also have practical implications for increasing public awareness. This study has provided insights for authorities and financial institutions interested in encouraging religious people to save. More understanding of the findings can aid them in the improvement of plans focused on savings advocacy and savings facilitation. Savings advocacy would help religious households and individuals understand the importance of saving and resource management. It would be a critical step in developing their saving habits. Meanwhile, financial institutions can create a type of savings account that corresponds to the religious predisposition. It would promote the notion that saving money is a good deed. The plans are beneficial in encouraging religious people to engage in responsible financial behaviour. Collective savings will have a significant impact on the economy if these individuals have a strong savings predisposition.

However, a number of important limitations of the study have to be considered. First, the current meta-analytic method has synthesized only a few studies. Although the limited sample used in the present study was acceptable, the findings would be more reliable if a larger number of studies could be synthesized. Second, of the 11 previous studies that were synthesized, Islam was the religion which had the highest proportion of adherents, with only a small proportion of adherents from other religions. Although that was the nature of the meta-analytic samples, the current pattern of results could be more generalizable if the proportion of adherents was more balanced. Third, the current study synthesized 11 studies had used primary data and measured variables with a questionnaire. This technique opens the possibility of a person's proclivity to respond to a questionnaire with a positive self-image, also known as a socially desirable response (Van de Mortel, 2008). Although bias has been reduced by selecting studies from reputable journals, it is still possible to be biased when answering sensitive questions, such as religious ones.

Furthermore, more research is needed to examine the relationship between religiosity and saving behaviour, more specifically, the importance of using longitudinal studies at multiple points in time. This type of research could shed light on the minor impact of the relationship and contribute to a critical explanation for this phenomenon.

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