Nasir Ganikhodjaev
Farrukh Mukhamedov
Pah Chin Hee

VOLUME 1

$$x' = 2xy$$
$$y' = 2xz$$

INVESTIGATIONS ON PURE MATHEMATICS, FINANCE MATHEMATICS AND OPTICS

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$$\varphi_1(x, y, z) = z$$

$$z' = x^2 + y^2 + z^2 + 2yz$$

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Investigations on Pure Mathematics, Finance Mathematics and Optics

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A STUDY ON THE EFFECT OF PUBLICATION BIAS IN META ANALYSIS

Nurina Mohd Nasir
Assist. Prof. Dr. Nik Ruzni Nik Idris

Abstract. *This project paper examines the effects of publication bias in meta analysis estimates. The hypothetical meta analysis with different level of study size and different levels of degree of missing has been used. The objective of this study is to quantify the effect of different degrees of publication bias on overall meta analysis estimates. The overall estimate and its corresponding error in the absence of publication bias were computed and compared with those in the presence of bias. The trend of publication bias can be seen through the funnel plot graph. In addition, the relative bias has been calculated in order to assure the trend and degree of publication bias.*

1 Meta Analysis Model

There are two types of meta-analysis model which are fixed effect model and random effect model.

1.1 Fixed Effect Model

In statistics, a fixed effect model is a statistical model that represents the observed quantities in terms of explanatory variables that are all treated as if those quantities were non-random. In this model, the true treatment difference is considered to be the same for all the trials. The standard error of each trial estimated based on sampling variation within the trial. Under this fixed-effect model it was assumed that there is one true effect size which underlies all the studies differences in observed effects are due to sampling error. We let $\mathbf{y_i}$ be the treatment effect for study *i*, $i = 1, 2, \ldots, N$. Then, the fixed effect model for $\mathbf{y_i}$ may be written as:

$$\mathbf{y_i} = \boldsymbol{\theta} +$$

where $\boldsymbol{\varepsilon_i}$ are error terms and are realizations of normally distributed random variables with expected value $\mathbf{0}$ and variance $\boldsymbol{\sigma_i^2}$. Initially, it is assumed that the error terms are uncorrelated and homogeneous.
Fixed effects models usually used in conjunction with assumption about the homogeneity of effect parameters. The logic of fixed effects model is that inference are not about any hypothesized population of studies but about the particular collection of studies that is observed.

In this model, there is only one level of sampling, since all studies are sampled from a population with effect size $\boldsymbol{\theta}$. Thus, we need to deal with only one source of sampling error within studies. More weight will be assigned to the studies that carry more information; the study might be proposed the weight by its sample size so that a study with 1000 subjects would get 10 times the weight of a study with 100 subjects.

1.2 Random Effect Model

In statistics, a random effect model also known as a variance components model is a kind of hierarchical linear model. It assumes that the data set being analyzed consists of hierarchy of