



Price Responses to Index Additions and Deletions: A Systematic Review with Bibliometric Analysis

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ABSTRACT

The present study aims to systematically review the research evidence available on the impact of additions and deletions of companies from various stock indices on their stock prices and provide directions for future research. This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 flow diagram to select the final sample of 44 studies for systematic literature review using the Scopus database. These research studies have been reviewed subsequently to categorize, synthesize and map the extant literature using R studio. The study found that, on average, there is an increase in share prices of stocks being added to an index and stocks being excluded from the index evidenced negative abnormal returns. But the existing literature doesn't provide conclusive evidence on whether these price effects are long or short-term. The study guides the investors, traders and other market participants regarding their long and short positions in the market and also provides future research directions to academicians.

Introduction

An index's composition changes frequently. Some indices are updated (stocks being added or deleted) biannually, whereas some are updated annually. These regular changes in the constituents of an index affect the share

prices and trading volumes of the stocks being included or excluded from that benchmark index. This impact of change in index membership on a company's stocks is popularly known as '*index effects*' (Parthasarathy, 2011). These '*index effects*' create an opportunity for the market participants to gain short-term and long-

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term abnormal returns by taking short and long positions in the market based on market reactions to these index changes. The impact of changes in the composition of these indices can be permanent or temporary, and it can be either symmetrical or asymmetrical.

Numerous researchers have investigated the impact of changes in the composition of various benchmark indices on the stock prices and trading volumes by testing multiple hypotheses related to index effects, such as the Price Pressure Hypothesis (PPH), Downward Sloping Demand Curve (DSDC) Hypothesis, liquidity hypothesis, information hypothesis and investor awareness hypothesis.

Starting in the late 1980s, Harris & Gurel (1986) and Shleifer (1986) firstly investigated the impact of changes in the composition of the Standard & Poor's 500 index (S&P 500) on stock prices and found support for the price pressure hypothesis (PPH) and downward sloping demand curve (DSDC) respectively. Earlier, only S&P 500 index was the focus of study for the researchers. Following them, various other researchers investigated the price effects of changes in the composition of indices like the small-cap Russell 2000 index, Dow Jones Industrial Average (DJIA) index, S&P CNX NIFTY, Toronto Stock Exchange (TSE) 300 index, Johannesburg Stock Exchange (JSE) top 40 index etc. (Biktimirov et al., 2004; Biktimirov & Xu, 2019a; Chan et al., 2013; Chung & Kryzanowski, 1998; Joshipura & Janakiraman, 2015; Kaul et al., 2000; Kruger & Toerien, 2013; Lynch & Mendenhall, 1997; Mase, 2007; Yun & Kim, 2010) Standard and Poor's has (when possible. Despite the conflicts in the literature, most of the studies found that inclusions (exclusions) of stocks into (from) prominent market indices bring significant positive (negative) abnormal returns for those included (excluded) stocks.

In light of the foregoing discussions, using two popular techniques of literature review, i.e., systematic literature review and bibliometric analysis, the purpose of this study is to classify and map the literature on the price effects of changes in index composition and examine how prices of companies being included or excluded from various indices all over the world are impacted. As per the authors' knowledge, there is no literature available that has conducted a systematic

literature review and bibliometric analysis to map the area under study.

Methodology

The following research objectives guided the literature search:

1. To map the literature trends.
2. To analyze the impact of additions (deletions) of companies from stock market indices on their stock prices.
3. To provide insights for future research.

In order to achieve these research objectives, relevant literature has been extracted from the Scopus database and has been further cleaned by following the procedure described below.

Search Strategy, Data Retrieval Process and Inclusion Criteria

The prominent Scopus database has been used for the search strategy, as Scopus has a superior number of journals coverage compared to the Web of Science (Aghaei Chadegani et al., 2013). Guided by the research objectives, the following research string has been used to ensure the relevant and sufficient coverage of literature on May 30 2022: (TITLE-ABS-KEY ('index inclusion*' OR 'index exclusion*' OR 'index addition*' OR 'index deletion*' OR 'index revision*' OR 'index reconstitution*' OR 'index member*' OR 'index constitution*' OR 'index change*' OR 'change* in index') OR TITLE-ABS-KEY ('stock* addition*' OR 'stock* deletion*' OR 'stock* inclusion*' OR 'stock* exclusion*' OR 'price pressure hypothesis' OR 'downward sloping demand curve hypothesis' OR 'liquidity hypothesis' OR 'investor awareness hypothesis' OR 'information hypothesis' OR 'compan* addition*' OR 'compan* deletion*' OR 'compan* inclusion*' OR 'compan* exclusion*') OR TITLE-ABS-KEY ('price and volume effect*') AND ALL ('event study')) AND (LIMIT-TO (SUBJAREA, 'econ') OR LIMIT TO (SUBJAREA, 'busi')) AND (LIMIT-TO (LANGUAGE, 'english')). This search query resulted in 143 research studies.

Data Cleaning

To ensure the quality of the study, this initial sample of 143 studies was further refined by following the PRISMA 2020 flow diagram, as shown in Figure 1.

Analysis and Discussion

The finally selected 44 papers have been comprehensively reviewed using systematic review and bibliometric tools. Regarding the price effects of changes in the composition of index constituents, conflicting opinions from various authors have been found. To synthesize the literature, all the research studies have been further classified on various basis discussed below.

Are the Price Effects Positive or Negative?

The comprehensive systematic literature review revealed that there is conflict in the literature regarding the price

effects of additions (deletions) into (from) various indices.

Overall, on average, additions of stocks into prominent indices are followed by increased shareholders' wealth. At the same time, deletion of stocks from these prominent indices generated negative returns for shareholders (Aboud & Karlsen, 2019; Adamska & Dąbrowski, 2021; Akhigbe et al., 2022; Azevedo et al., 2014; Basse Mama et al., 2017; Becker-Blease & Paul, 2010; Biktimirov & Li, 2014; Biktimirov & Xu, 2019b, 2019a; Bildik & Gülay, 2008; Cheung, 2011; Hrazdil, 2009; Joshipura & Janakiramanan, 2015; Kappou et al., 2010; Kruger & Toerien, 2013; Labidi et al., 2022; Lackmann et al., 2012; Lamoureux & Wansley, 1987; Laokulrach & Trisupinyo, 2018; Liu, 2006, 2011; Marciniak, 2012; Mase, 2007; Mazouz & Saadouni, 2007b, 2007a; Papachristou et al., 2018; Park & Lee, 2018; Pfister & von Wyss, 2010; Ramchander et al., 2012; Sadeghi, 2011; Shankar & Miller, 2006a; C. Wang et al., 2015; Yun & Kim, 2010, 2011; Zhao et al., 2016).

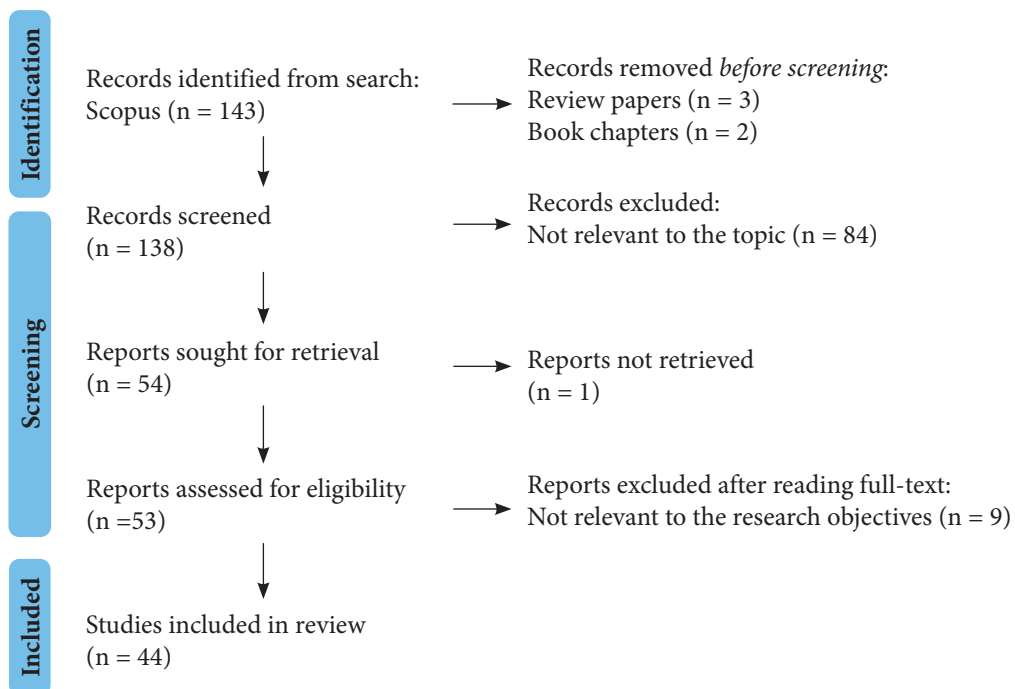


Fig. 1. PRISMA 2020 flow diagram for selection of final sample papers

Source: The authors.

In contrast to the overall findings, Lu & Ahmad (2019) found that the included stocks had a downward share price trend. And the share prices of the companies that were excluded rose sharply. Similarly, Rafik & Lantara (2016) investigated the price effects of stocks added to or deleted from various prominent indices of the Indonesia stock exchange and found that price responses were negative (positive) for stocks added to (or deleted from) indices. Furthermore, Chan et al. (2013) also evidenced that stocks being excluded from the S&P 500 index generated positive abnormal returns for the shareholders. Cheung & Roca (2013) also found opposite price responses to generally expected price reactions. They found that companies included in Dow Jones Sustainability World Index reacted negatively, depicting that market is not valuing sustainability positively. Miller & War (2015), in the post-event window, found that the companies' stocks being excluded from the indices of the Johannesburg stock exchange outperformed the stocks included.

In contrast to the above findings, some studies evidenced that price effects are neutral for inclusions and exclusions of stocks. Kappou & Oikonomou (2016) evidenced that the addition of stock into the social index, i.e., the MSCI KLD 400, didn't bring any significant changes in the abnormal returns. Rahman & Rajib (2014) also didn't find any significant abnormal returns for the stocks delisted from the S&P CNX Nifty 50 index. Qiu & Pinfeld (2007), in their research study, didn't find any abnormal returns for stocks either included or excluded from the S&P/ASX 100. Polonchek & Krehbiel (1994) also found that price effects were neutral for stocks being deleted from the DJIT index and DJTA index.

Are the Price Effects Temporary or Permanent?

Another significant finding from the literature is disagreement over whether the price effects are permanent or temporary. Some studies found evidence of long-term effects, while others find the opposite. The causes of the contradictory empirical findings are still unknown, despite the fact that some theoretical explanations have been offered for both effects. Generally, under-reaction and over-reaction by the investors and

traders to the changes in index composition are given as the explanation for permanent and temporary price effects.

These conflicting results concerning temporary and permanent price effects could also be due to varying event windows, estimation windows, methodology used for measuring the abnormal returns, market indices, time frames etc.

Significance Tests for Abnormal Returns

Various parametric and nonparametric tests are available to test the significance of abnormal returns. Parametric tests assume that companies' stock returns are normally distributed. In contrast, nonparametric tests don't have any assumptions like this. As observed from the extant literature, parametric tests mainly include the Brown & Warner (1985) test, Patell (1976) test, cross-sectional t-test and Boehmer et al. (1991) test. Whereas various nonparametric tests include Corrado's (1989) rank test, generalized sign test and Wilcoxon (1945) signed rank test.

As evidenced from the literature reviewed, the t-test is the most widely used parametric test for testing the significance of abnormal returns. And among the nonparametric tests, the sign test and rank test seemed to be the most reliable and popular tests among academicians.

Most Frequently Considered Stock Market Index

Extant literature is available on studying the impact of additions (deletions) of stocks in (from) various prominent indices all over the world. Multiple studies have been conducted till now, exploring the effect of inclusions and exclusions of companies from different indices such as market capitalization-based indices, leverage-based indices, sustainability indices, shariah indices etc.

However, based on the systematic review, S&P 500 and FTSE 100 are the focus indexes for eight research studies (4 each) out of a total of 44, as evident in

Figure 2. Following it, FTSE Bursa Malaysia KLCI, DJSWI, FTSE/JSE Top 40, DJIA index, KOSPI 200, Nikkei 225, S&P CNX NIFTY, S&P 400 index and S&P SmallCap 600 indexes with frequencies two each, are the widely observed indexes for analyzing the price effects of changes in index composition.

Most Global Cited Documents

Table 1 provides an overview of the top 10 articles based on total citations (TC). Among the top 5, Ramchander et al.'s (2012) work with the title 'The Informational Relevance of Corporate Social Responsibility: Evidence from DS400 Index Reconstitutions' has been cited 108 times with 9.82 citations per year. The paper authored by

Cheung (2011) received 94 citations in total. It ranks as 2nd most influential study and, using event study methodology, investigated whether investors value sustainability or not. 'Market Reactions to Increased Reliability of Sustainability Information' by Lackmann et al. (2012), with a total of 43 citations, has been ranked as 3rd most powerful research study in the current field. Following them, the study titled 'The Impact of Changes in the FTSE 100 Index' by Mase (2007) which are determined quarterly by market capitalization and should have no information content. Return reversal around index additions and deletions suggests that buying (selling is ranked as the 4th most influential paper with 37 TCs. Finally, the research study conducted by Shankar & Miller (2006) tests how the market reacts to changes in constituents of the S&P small-cap 600 index.

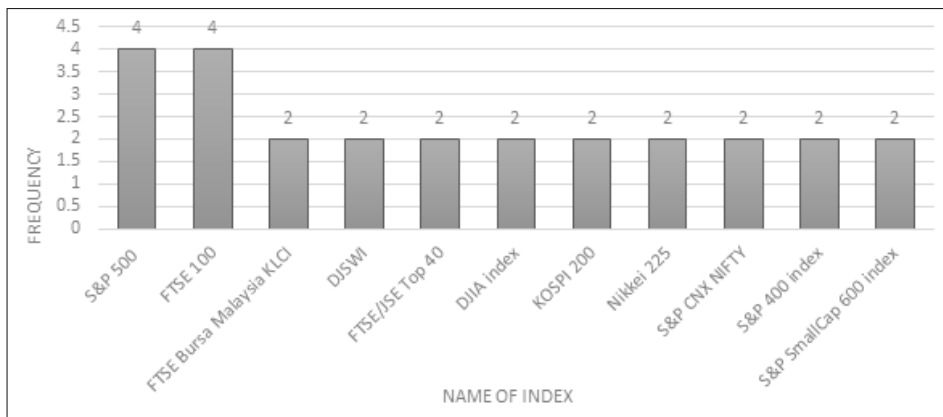


Fig. 2. Most frequent stock market indices

Source: The authors.

Table 1: 10 Most influential studies

Title	Source	Author(s) and Year	Total Citations	TC per Year
The Informational Relevance of Corporate Social Responsibility: Evidence from DS400 Index Reconstitutions	Strategic Management Journal	Ramchander et al. (2012)	108	9.82
Do Stock Investors Value Corporate Sustainability? Evidence from an Event Study	Journal of Business Ethics	Cheung (2011)	94	7.83
Market Reactions to Increased Reliability of Sustainability Information	Journal of Business Ethics	Lackmann et al. (2012)	43	3.91
The Impact of Changes in the FTSE 100 Index	Financial Review	Mase (2007)	37	2.31
Market Reaction to Changes in the S&P Smallcap 600 Index	Financial Review	Shankar & Miller (2006)	33	1.94

(Table continued)

(Table continued)

Title	Source	Author(s) and Year	Total Citations	TC per Year
The Effect on Price, Liquidity and Risk When Stocks are Added to And Deleted from a Sustainability Index: Evidence from the Asia Pacific context	Journal of Asian Economics	Cheung & Roca (2013)	28	2.80
Market Effects of Changes in the Standard & Poor's 500 Index	Financial review	Lamoureux & Wansley (1987)	28	0.78
A Comprehensive Long-Term Analysis of S&P 500 Index Additions and Deletions	Journal of Banking & Finance	Chan et al. (2013)	25	2.50
The S&P500 Index Effect Reconsidered: Evidence from Overnight and Intraday Stock Price Performance and Volume	Journal of Banking & Finance	Kappou et al. (2010)	23	1.77
Does Inclusion in a Smaller S&P Index Create Value?	Financial Review	Becker-Blease & Paul (2010)	18	1.38

Source: The authors.

Most Influential/Prolific Authors

Figure 3 exhibits the top 8 authors who have contributed at least two research studies in the field of examining the price effects of stock inclusion or exclusion from various indices. Ernest N. Biktimirov is found to be the most influential author with papers titled 'Asymmetric Stock Price and Liquidity Responses to Changes in the FTSE SmallCap Index' published in 2014, 'Asymmetric Stock Price and Investor Awareness Reactions to Changes in the Nasdaq 100 Index' published in 2019 and 'Market Reactions to Changes in the Dow Jones Industrial Average Index' also published in the year 2019.

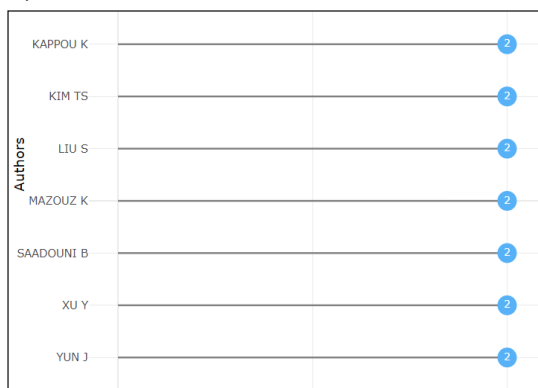


Fig. 3. Most influential authors

Source: The authors.

Annual Scientific Production

Beginning in 1987 with just one journal article, Figure 4 shows the annual publication trend of articles. The graph clearly shows that the publication trend has been relatively at its nascent stage in the early years (1987–2005). It also exhibits that since 2005 researchers' interest has increased in examining the impact of inclusions (exclusions) into (from) various indices on shareholders' wealth. However, since 2020, researchers' interest has faded away.

Most Relevant Sources

Figure 5 exhibits the top journals which have published at least two papers on the topic under study. Out of the total 28 journals, only nine have published approximately 57% of the total sample articles. 'Managerial Finance', with five papers published out of a total of 44, is found to be the most influential journal. This might have resulted from that journal's emphasis on research examining the financial markets. Followed by it, 'Financial Review' has been ranked as the 2nd most influential journal with four publications. Then, 'The Journal of Business Ethics' and 'International Review of Economics' were ranked subsequently with three publications each. The following five journals have published two articles each.



Fig. 4. Year-wise annual publication trend

Source: The authors.

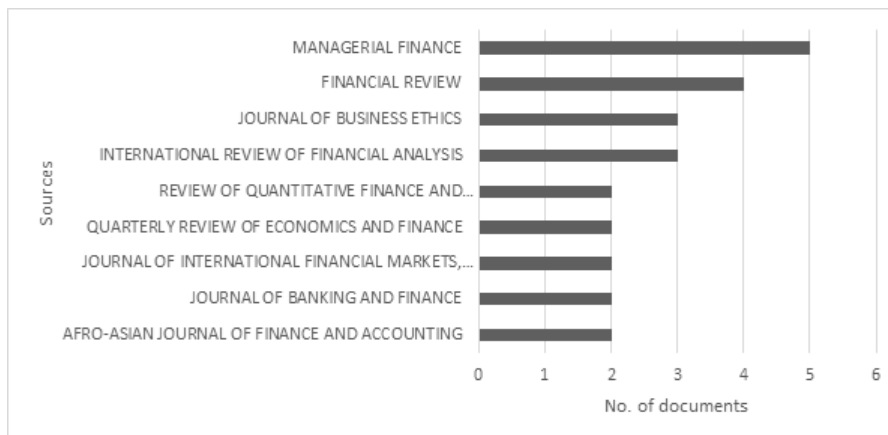


Fig. 5. Most contributing journals

Source: The authors.

Author’s Keywords Analysis

Keyword analysis sheds light on the development of disciplines (Wang & Chai, 2018) the following three bibliometric indicators/approaches were thus derived. Indicator K was derived using the ratio between the average unique keyword number and average keyword frequency of a discipline for quantitatively describing the discipline’s development stages highlighted by scientific-philosopher Kuhn. Next, the correlation matrix analysis was used after

k-core filtration to quantitatively expose the detailed correlations between topics for a large network. Thirdly, indicators I (node betweenness divided by node degree). The author’s keywords generally include 4 to 6 critical terms in the research study, as per the author’s opinion, that best reflect the topic of study. These most frequent author’s keywords, using the bibliometric analysis, indicate the objects of the study. Figure 6 depicts the word cloud of the 50 most frequently used author’s keywords in the area under study.

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