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Stock Return Response to Changes in MSCI Standard and Small Cap Index Composition for Turkey

Hisse Senedi Getirisinin 'MSCI Standard' ve 'Small Cap' Endeks Kapsam Değişimine Tepkisi: Türkiye Örneği

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Abstract: The effect of index reconstitution on stock return and volume have been one of the controversial subjects in finance. Although, there are several researches, which are analyzing the domestic stock market index effect on stocks, a few studies focused on the effects of an international index. By the use of event study methodology, this paper analyzes the price effect of changes in constituents of two MSCI indexes (Standard Index and Small Cap Index) for Turkish companies as of announcement and effective dates. Overall, there are four analyses; namely, addition to Small Cap Index with respect to announcement (effective) day, deletion from Small Cap Index with respect to announcement (effective) day, addition to Standard Index with respect to announcement (effective) day, and deletion from Standard Index with respect to announcement (effective) day. The findings of the study present that index effect appears or disappears, resting upon the index, on which index reconstitution is being analyzed. Moreover, existence of the index effect is also subject to event day definition, which may be either announcement date or effective date of the index event. Significant index effect strongly exists for the additions to MSCI Standard Index around announcement date, while deletions have significant, but weaker, effect around the effective date. No significant index effect has been found for deletions around announcement date. Index effect is also documented around announcement and effective dates for MSCI Small Cap Index additions; however, such effect is quite stronger for deletions from MSCI Small Cap Index around the announcement dates.

Keywords: Index Effect, MSCI Index, Index Reconstitution, Event Study

JEL Classification: G12, G14, C18

Öz: Endeks kapsam değişimlerinin hisse getirisi ve hacmi üzerindeki etkisi finans alanında tartışılan konulardan biri olmuştur. Birçok çalışma yurtiçi endeks değişimlerinin hisse senetleri üzerindeki etkisini analiz ederken, uluslararası endeks değişimlerinin etkisini inceleyen çalışmalar daha azdır. Bu çalışma, iki MSCI endeksindeki (Standard Index and Small Cap Index) Türk firmalarının endeksten çıkarılması ve endekse eklenmesi ile ilgili değişimlerin hisse fiyatını nasıl etkileyeceğini vaka analizi yöntemi kullanarak incelemektedir. Değişimlerin hem ilan edildiği hem de gerçekleştiği tarih dikkate alınarak dört analiz yapılmıştır. Bu analizler ilan ve gerçekleşme günlerini dikkate alarak Small Cap endeksine eklenmeyi ve endeksinden çıkarılmayı, ayrıca Standard endekse eklenmeyi ve endeksten çıkarılmayı içermektedir. Çalışmanın bulguları, değişimin analiz edildiği endekse bağlı olarak endeks etkisinin ortaya çıkabildiğini ya da ortadan yok olabildiğini göstermiştir. Buna ek olarak, endeks etkisinin varlığının ilan günü veya yürürlük günü gibi olay günü tanımlarından etkilendiği gözlemlenmiştir. İlan günü civarında MSCI Standart Endeksine yapılan eklemeler için anlamlı ve güçlü bir endeks etkisi bulunurken, endeksten çıkarmaların

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yürürlük günü civarında anlamlı ancak daha zayıf bir etkisi vardır. İlan günü civarındaki çıkarmalar için ise anlamlı bir endeks etkisi bulunmamıştır. MSCI Small Cap endeks eklemelerinin ilan ve yürürlük günleri civarında da endeks etkisi bulunmuştur; ancak bu etki, ilan günü civarında endeks kapsamından çıkarmalarda oldukça güçlüdür.

Anahtar Kelimeler: Endeks Etkisi, MSCI Endeksi, Endeks Kapsam Değişimi, Vaka Analizi

JEL Sınıflandırması: G12, G14, C18

1. Introduction

Efficient market hypothesis states, in a naive form, that all publicly available information is reflected to asset prices such that no one can continuously beat the market. Such claim has been argued in finance literature for the last few decades from several different aspects, starting with market anomalies to investors' psychological grounded behaviors.

Index effect, in another saying, the relation between the stock returns/volume and index reconstitutions has been one of the controversial phenomena among those arguments; and several hypotheses have been devoted to explain such relation. While some researchers state index additions (deletions) have permanent price increase (decrease) effect (Shleifer, 1986), some others argue that such fluctuations in prices are not permanent (Harris and Gurel, 1986). Besides the duration of the price effect of index reconstructions, some researchers argue that changes in index constituents lead information to the market and increase the investor awareness (Chen et al., 2004).

Following the emergence of such hypotheses in finance literature, several studies have been devoted to reveal the effect of national index reconstitutions, like S&P, Russell, Nikkei indexes for developed equity markets. While the literature has been also enriching for national indexes of developing countries especially for the last two decades, there is still another side of the issue, which is the effect of changes in international index constituents.

With the growth of international investments and globalization of equity markets, tracking international indexes has become an important task for money managers. Increasing international equity investments arise the need to follow the developing financial markets, where availability of reliable information might be limited or hard to acquire. Moreover, those managers, sometimes, cannot follow all markets. Thus; international portfolio managers, exchange traded funds, and also index tracking funds need to follow international indexes closely and treat them as benchmarks (Chakrabarti, 2002; Hung and Shiu, 2016; Chen et al., 2019). Other than serving as a benchmark, international indexes provide some advantages like increasing the number of investors, decreasing in the cost of information gathering. Moreover, increasing number of

foreign investors decreases the equity risk premium and cost of capital; hence, increases stock price (Hacibedel and Van Bommel, 2007). On the other hand, it should also be noted that any index reconstitution has been aimed to increase index representativeness but not the future prospects of a firm (Coakley et al., 2008).

In order to satisfy the needs of internatonal investors, several international indexes have been calculated.The FTSE Global Equity Index Series, Thomson Reuters Global Equity Indices, Nasdaq Global Indexes, S&P Global Equity Index series, Morningstar Global Equity Index series, and Morgan Stanley Capital International (MSCI) international Indexes are the most well known examples. Among those indexes, MSCI has been taken as a benchmark index as it is a widely used index by money managers (Chakrabarti et al., 2005; Authers, 2015; Hung and Shiu, 2016). Furthermore, foreign investors tend to invest more on the stocks, which are included in MSCI indexes (Ferreira and Matos, 2008; Ammer et al., 2012). Chakrabarti et al. (2005) also state that MSCI index reconstitution can have a permanent effect on price and volume on equities in all countries, while Hung and Shiu (2016) claim that change in MSCI index has a great impact on Asian security prices. Moreover, Hau et al. (2010) present that MSCI weighting changes cause international capital flows, which also effect the exchange rates.

MSCI has been calculating several equity indexes under a general name of Global Investable Market Indexes. In order to achieve the company comparability, index integrity, and consistent market coverage; the indexes are calculated with Size-Segment. Size-Segment indexing results in Large Cap, Mid Cap, Small Cap Indexes and also a Standard Index, which is the sum of Large Cap and Mid Cap (MSCI, 2014). By regular and irregular reviews, MSCI maintains the indexes. After index reviews, while additions and deletions are possible, transition from one index to another is also possible (MSCI, 2022). The changes in index constituents become effective within 15 to 20 days following the announcement.

Thus; in this study, we attempt to analyze the price effect of changes in constituents of two MSCI indexes; namely, Standard and Small Cap indexes, in terms of announcement and effective dates. To the best of our knowledge, this is the first study that analyses the price effect of two MSCI index reconstitutions for Turkish stocks for both announcement and effective dates.

The remainder of this study is organized as follows. Section 2 gives the theoretical background, and Section 3 provides the related literature on the index effect, Section 4 presents

the data and methodology. Section 5 covers the empirical findings and discussions. Finally, Section 6 is dedicated to concluding remarks.

2. Theoretical Background

Since 1980s, studies about the relation between changes in index constitutions and stock returns have built an extensive literature. Some of these studies test the validity of the associated hypothesis in single or multi-country markets, while some analyze the effect of institutional ownership or corporate governance, and so on. For the interested readers, all dimensions of the topic have been reviewed by Afego (2017).

As briefly mentioned in the introduction, several hypotheses have been developed to explain the effects of changes in index constituents. As classified by Hacibedel and von Bommel (2007) and Afego (2017) such hypotheses can be grouped under two main headings as (1) demand-based and (2) information-based. In demand-based theories, the upward pressure on stock prices is exerted by the increased demand of the investors tracking the index for the stocks that are newly added leading to a positive abnormal return (Harris and Gurel, 1986). On the other hand, information-based hypotheses state that news related with stock additions to an index give positive signals, those related with stock deletions give negative signals to the investors. Accordingly, the price of an added share can be driven up since additions can be perceived as signaling positive information regarding the firm's future prospects (Chen et al., 2004). While the Price Pressure Hypothesis (PPH) and Imperfect Substitute Hypothesis (ISH) can be explained under the demand-based hypotheses; Information Signal Hypothesis (ISH), Liquidity Hypothesis (LH), and Investor Awareness Hypothesis (IAH) can be explained under the group of information-based hypotheses.

The Price Pressure Hypothesis, which is initially popularized by the study of Scholes (1972), emphasizes that in the case of large share trades of seasoned equity offerings, the decline in stock price acts as a sweetener to make investors buy these additional shares. On the condition that the demand curve is downward sloping for the shares, these additional shares will be purchased only at lower prices, which will further act as an additional profit to the buyers of these shares. Additionally, Harris and Gurel (1986) state that investors have to be compensated for the transaction costs they incur and the portfolio risks that they assume when they immediately buy and sell securities that they otherwise would not. The immediate price drops (rises) associated with large sales (purchases) attract these liquidity suppliers. According to Harris and Gurel

(1986); the prices are assumed to increase before the change date as a result of the fund managers' excess demand. After this change date the prices reverse as the passive sellers are attracted by this increase in prices. As a result, a temporary price increase (decrease) is predicted by PPH when a new stock is added (deleted). As summarized by Azevedo et al. (2014), at the full-information price, long-term demand curve is perfectly elastic in that after the index changes, the stock prices adjust back to their ex-ante levels. However, short-term demand curve might be less than perfectly elastic since the immediate information about the demand shifts that are not motivated by information may be costly.

The Imperfect Substitutes Hypothesis (ISH) assumes that securities do not have perfect substitutes and demand in the long-term is less than perfectly elastic. Thus, price reversals are not expected and the equilibrium prices change with a shift in demand curve to eliminate excess demand. Therefore, the same reactions to announcements are expected as PPH with permanent price changes (Hanaeda and Serita, 2003; Bildik and Gülay, 2008; Azevedo et al., 2014;). The reason why this price effect is expected to be permanent rests upon the fact that the stocks that are added to an index do not have close substitutes (Afego, 2017).

Jain (1987) argues that being included on an index can be considered as a sign of the firm's reduction in its risk level, and improvement in its management quality. Thus, according to Information Signal Hypothesis, whereas positive information about a stock increases the price immediately, negative information decreases the price in efficient markets. This reaction to new information is permanent and a new equilibrium level is reached upon the announcement dates. Thus, information regarding index compositions; namely, stock additions or deletions are considered as signals to the investors (Bildik and Gülay, 2008; Azevedo et al, 2014; Wang et al., 2015).

Liquidity Hypothesis, which is closely related to ISH, states that a stock's liquidity is increased when it is added to an index leading to higher prices and reduced transaction costs. In addition to that, more time and effort is devoted by stock analysts to evaluate these shares and distribute additional information about them, which eventually increases the total amount of publicly available information regarding the share. Thus, bid and ask spread is reduced resulting in higher trading volume and liquidity (Amihud and Mendelson, 1986; Afego, 2017). Chen et al. (2004) further states that when a stock is added to an index, information asymmetry is reduced leading to an additional increase in liquidity. On the other hand, investors require an additional

premium for holding stocks not included on an index as a result of less available information and higher transaction costs. Contrarily, deletion of a stock from an index results in opposite effects regarding price and liquidity.

Investor Awareness Hypothesis documents asymmetric reactions to stock additions and deletions with a permanent price increase displayed as a response to an addition and a short-term decrease being observed for deletions. According to Chen et al. (2004, p. 1917), the asymmetry that is seen in these price effects occur due to the fact that while more investors become aware of stock additions, the number of investors aware of stock deletions does not fall at the same degree since becoming unaware may be more difficult. Therefore, index additions result in a larger price increase in comparison to the decrease that occurs due to deletions from an index.

The hypotheses explained above have different price effects on stocks for index additions and deletions. Such price effects can be temporary, permanent or no price effect may exist. Table 1 summarizes the expected price changes for a stock after an index event.

Table 1. Price Effect Hypotheses and Expected Price Changes

		Additions		*Deletions*	
		Temp.	*Per.*	*Temp.*	*Per.*
Demand Based	*Price Pressure Hypothesis*	+		-	
	Imperfect Substitutes Hypothesis		+		-
Information Based	*Liquidity Hypothesis*		+	(-)	(-)
	Information Signal Hypothesis		+		-
	Investor Awareness Hypothesis		+	-	

Temp = Temporary Effect; Per.= Permanent Effect; + = Positive price effect; - = Negative price effect; ( ) = Uncertain

Source: Adopted from Miller and Ward (2005) and Epöz Aydıner and Altay (2020)

3. Literature Review

Although, the hypotheses mentioned above have been evident for S&P 500, following the evidence for index effect, several studies have been published in literature for developing and developed markets with effects of national index reconstitutions being the main theme of those studies. One of the pioneering studies belonging to Woolridge and Ghosh (1986) investigates the impact of stock additions to and deletions from the S&P 500 index on stock valuation and liquidity for the period covering the years 1977 and 1983. The results support the presence of positive abnormal returns for the stocks being added to the index; while; negative abnormal returns are observed for the stocks being deleted from the index. For the case of additions, the prices are found to significantly increase on the day following the S&P's announcement to the subscribers with the increase seeming to be permanent. For the case of deletions, even though the

prices are found to decrease, this decrease in prices is not as significant as the increase in prices for the case of additions. Another prominent study performed by Harris and Gurel (1986) evaluates the influence of index composition changes on stock returns and volume for S&P 500. It is observed that additions to the index are associated with significant increases in price on the first day of trading. The prices are found to be increasing by more than 3 percent with a full reversal of that increase after a passage of two weeks' time. A further study that is performed for the similar period belonging to Goetzmann and Garry (1986) evaluates the influence of stock delisting on returns by focusing on the deletion of seven stocks from S&P 500 index. The findings of the study reveal significant and long-term negative returns associated with delisted stocks.

Lynch and Mendenhall (1997) also focus on data belonging to S&P 500 for the March, 1990 and April, 1995 period to explore the potential price and volume effects of stocks as a result of changes in index composition. For additions to the index, a positive abnormal return is observed beginning with the announcement date and ending with the effective change date. Furthermore, after the addition, a significant and negative abnormal return is detected. For the case of deletions, a similar but inverted price movement is revealed. The returns are found to be significant and negative between the announcement and change date with the return being positive after the delisting.

A study conducted on TSE 300 Index on Canadian shares attempts to reveal information as to abnormal price movements due to additions to and deletions from the index. Even though positive and significant abnormal returns are observed for additions, the negative returns observed for deletions are found to be insignificant (Masse et al., 2000). One other study conducted on Nikkei 500 index reveals significant price increases for stock additions together with decreases for stock deletions. This result is found to be permanent in that no significant post-event reversals are observed (Liu, 2000).

Another study performed on data belonging to FTSE Bursa Malaysia Kuala Lumpur Composite Index (KLCI) for the time span between 2005 and 2012 focuses on changes of stock price and volume due to additions to and deletions from the index. The findings based on 15 additions and 13 deletions reveal evidence for the presence of temporary price pressure for KLCI especially close to announcement and change dates (Azevedo et al., 2014).

Wang et al. (2015) perform a study on Shanghai Shenzhen CSI 300 index evaluating the impact of stock additions to or deletions from the index on price and trading volume for the period between June, 2005 and December, 2012. The final sample includes 368 permanent additions together with the same number of deletions after leaving out temporary changes. Overall, the results show price increases to be associated with additions to the index together with price decreases being associated with deletions from the index. These findings reveal the presence of short-term price pressure due to index reconstitutions.

Škrinjarić (2019) examines the potential influence of changes in index composition on the returns of the stocks listed on Zagreb Stock Exchange for the period between January 2, 2015 until March 21, 2018. The selected stocks are classified into three groups on the basis of how they influence index composition in that those entering, leaving, and keeping on staying in the market index. The findings resting on event study methodology with respect to leaving the index are found to be associated with negative and significant returns. However, index entrance demonstrates insignificant but positive abnormal returns upon the announcement date. Lastly, staying on the index is not documented to have any influence in terms of returns.

A study conducted by Bildik and Gülay (2008) on Istanbul Stock Exchange (ISE) 100 and ISE 30 indexes for the respective periods; namely, January 1995 and October 2000, January 1997 and October 2000, examines how changes in index composition affect the price and volume of stocks. The findings reveal that inclusion to the index generate significant and positive abnormal returns; whereas, exclusion does the reverse with significant and negative abnormal returns. These results are found to be in line with price-pressure and imperfect substitute hypotheses. Another study performed for the Turkish stock market for the years between 2011 and 2013 focus on how changes in index composition influence the volume and price of shares. Based on the results of the study, specifically addition to the index is found to have a significant positive effect on share prices in line with price pressure hypothesis. Furthermore, additions and deletions are also both seen to increase trading volume significantly (Bayraktar, 2012). The recent study of Yılmaz et al. (2020) document contrary findings for the Turkish stock market on BIST Sustainability Index for the period between 2014 and 2017 in that no significant link is found between addition to and deletion from the index on stock returns.

As far as the literature review is concerned, the effects of international index reconstitutions are limited to a few studies though such international index changes are important especially for

international equity investments. With this respect, prior studies with an international index (MSCI) perspective will be summarized below.

The first study with an international perspective, analyzing the effects of MSCI index reconstitutions, is that of Chakrabarti (2002), which presents significant and permanent price effect but no volume effect for Indian companies added to MSCI-India index during 1998-2000. Such a finding has been interpreted as additions to index is a positive signal, which causes a sudden price increase without changing the volume. Therefore, the study concludes that information effect can explain the price/volume effect of index additions.

In a further study, Shu et al. (2004) study the MSCI free indexes with Taiwanese listed firms for 1999-2001 period and find significant positive price reaction in short-term but price reversion in the long term for additions. A similar price pattern in the opposite direction has been found for deletions, where deleted stocks' returns are negative in the short-run but positive in the long run especially after the effective date. While similar findings are reported for Taiwanese market by Shiu and Wu (2009) and Hung and Shiu (2016); they, moreover, state that foreign ownership increases (decreases) in stocks, which are added to (deleted from) index. Change in foreign ownership is higher in additions, which means that foreigners do not sell off all stocks after deletions.

Coakley et al. (2008) study MSCI-Canada for the effect of index additions and deletions on the co-movement behavior of added (deleted) firms with the other stocks in the index. The findings reveal that international investors cause excess co-movement in returns.

The evidence for the international index effect for Turkish stocks is relatively limited to the best of our knowledge. One of those studies is that of Küçüksille (2019) finding a weak relation between stock returns and MCSI Turkey index additions and deletions during 2006-2018 period when the effective dates are taken as event days. In a similar study, Ellialtıoğlu et al. (2019) examine the same index reconstitutions on stock returns of added and deleted stocks during the 2014-2018 period. Taking the announcement date as the event date, they conclude that MSCI Turkey index reconstitutions do not have any significant effect on Turkish stocks and it is not possible to have abnormal returns.

Besides the studies that are focusing on the index effect limited with a single market, there are three studies for multi-country evidences as far as our literature review is concerned. The first study, Chakrabarti et al. (2005) examine the effect of additions to and deletions from MSCI

country indexes for 29 countries. They find a significant positive abnormal return for the stocks, which are added to index. Moreover, on the next day of announcement, such return is also experienced at the next day of effective day but gradually declining. On the other hand, there is a significant negative abnormal return documented for deleted stocks. Given these findings, they state the existence of downward sloping demand curve and some evidence on price-pressure and liquidity effect. In another study, Chen et al. (2019) analyze the effects of additions to and deletions from MSCI Standard Index for 38 countries, 22 of which are developed countries, for the years between 2000 and 2015. They find significant positive returns for additions and significant negative returns for deletions; however, abnormal returns for deletions are temporary. Moreover, they find a stronger index effect for emerging countries. And, index reconstitution is found to have more effect on foreign institutional investors. The study concludes that all findings are consistent with investor awareness hypothesis.

MSCI has been calculating several indexes, some which are calculated for developed, emerging economies, and transition markets like MSCI Developed World index, MSCI Emerging Markets Index, and MSCI Frontier Markets Index. MSCI can reclassify some markets according to some criteria and a market, which was classified as frontier, can be reclassified as emerging market. Burnham et al. (2018) investigate effects of MCSI reclassification and find that the country indexes that are reclassified as more benchmarked index (like from frontier to emerging, or from emerging to developed) realize a strong return since announcement date to effective date. And vice versa is also valid for countries that are reclassified as less benchmarked index. On the other hand, they also claim that such strong return reaction in either way is temporary, as returns reverses in one-year period after effective date of the reclassification.

4. Data and Methodology

The current study attempts to analyze the price effect of changes in constituents of Morgan Stanley Capital International (MSCI) international indexes on Turkish stocks, which are added to or deleted from the MSCI indexes. Additions to and deletions from two indexes have been analyzed, namely MSCI Global Standard Indexes and MSCI Global Small Cap Indexes. Moreover, analyses have been carried out for two event dates, one for the information of news release (announcement day) and the other for the actual date that the firm is added to or deleted (effective date) from the index.

As can be seen on Table 2 below, there are 70 additions and 76 deletions for MSCI Global Small Cap Indexes between November 2008 and November 2018 in this study. There are 18 additions and 31 deletions for MSCI Global Standard Indexes between November 2007 and November 2018. The announcements for additions to and deletions from the MSCI Global Small Cap Indexes and MSCI Global Standard Indexes firms are downloaded from the MSCI index review webpage (https://www.msci.com/index-review). The announcements for index reviews have been downloaded from November 2008 to November 2018 for MSCI Global Small Cap Indexes; and from November 2007 to November 2018 for MSCI Global Standard Indexes.

Table 2. Number of Turkish Stocks Added to or Deleted from MSCI Indexes

	MSCI Global Standard Indexes	*MSCI Global Small Cap Indexes*
Additions	18	70
Deletions	31	76

After identifying the additions and deletions, the data is analyzed for each index, for each event and for each date (announcement and effective dates) by the use of the event study metrics software.

Daily closing prices for the firms, which are subject to addition to or deletion from an index, and BIST-100 index value are used to calculate Abnormal Return (AR) that can be expressed as,

$$AR_{it} = R_{it} - E(R_{it}) \quad (1)$$

where R_{it} logarithmic return of firm i at day t; $E(R_{it})$ expected logarithmic return at day t; AR_{it} abnormal return of firm i at day t.

In order to calculate the AR, expected logarithmic return has to be calculated. Expected return is going to be calculated by using the market model as given below,

$$E(R_{i,t}) = \alpha_i + \beta_{m,t} R_{m,t} + \varepsilon_{i,t} \quad (2)$$

where $R_{m,t}$ is the market return (BIST-100) at day t; $\propto_i$ and $\beta_{m,t}$ are the regression coefficients. Expected return is calculated for an estimation window of (t-121, t-6).

The average of ARs within a T window will give the Average Abnormal Return (AAR) for that window. Different event windows have been used to calculate AARs like (-5…5), (-3…3), (-1…1), (0…5), (0…3) and (0…1).

$$AAR = \frac{1}{N}\sum_{t=1}^{T} AR_{i,t} \tag{3}$$

Cumulative average abnormal return (CAAR), which is the sum of all AARs for an event window, is used to test the statistical hypothesis of whether CAAR is equal to zero or not. In this study, Patel test and Corrado Rank test are used.

Patell (1976) proposed a test statistic under the assumption that abnormal returns are uncorrelated and has a constant variance. Standardized abnormal return is calculated as,

$$SAR_{i,\tau} = \frac{AR_{i,\tau}}{S(AR_i)} \tag{4}$$

The standard deviation is estimated from the time-series of abnormal returns of the estimation window as below,

$$\hat{\sigma}^2_{ARi} = \frac{1}{M_i - d}\sum_{t=Est_{min}}^{Est_{max}} \left(AR_{i,t}\right)^2 \tag{5}$$

where M_i is the number of non-missing returns and d is the degrees of freedom (e.g. market model=2).

Corrado (1989) proposed a test statistic to examine if the cumulative average abnormal return is equal to zero or not. In order to calculate the test statistics, abnormal returns transformed into rank $K_{i,t} = rank\ (AR_{i,t})$. Tied ranks are calculated as midranks and if there are missing values, ranks are adjusted by $U_{i,t} = \frac{K_{i,t}}{(1+M_i)}$ where M_i is the number of non-missing returns for each asset. Test statistic is calculated as

$$T_{Corrado} = \frac{1}{\sqrt{N}}\sum_{i=1}^{N} \left(U_{i,\tau} - 0{,}5\right)/S(U) \tag{6}$$

where standard deviation is defined as

$$S(U) = \sqrt{\frac{1}{L_1 + L_2}\sum\nolimits_{\tau}\left[\frac{1}{\sqrt{N_\tau}}\sum_{i=1}^{N_\tau}\left(U_{i,\tau} - 0.5\right)\right]^2} \tag{7}$$

5. Findings and Discussions

The findings of the analyses for changes in constituents of MSCI Global Standard Index (Standard Index) and MSCI Small Cap Index (Small Cap Index) are presented through Table 3 to

Table 4 Each table has two panels, where Panel A in each table presents the results for announcement date and Panel B in each table displays results for effective dates. The event date, which has been presented by "0", is announcement date in Panel A and effective date for Panel B. The bold figures in the tables are the statistically significant findings at either 1% or 5%.

As presented by Panel A of Table 3, the findings of the study reveal that there is strong information effect of the addition to the Standard Index. While the CAAR for (0...1) event window is 2.47%, CAAR is increasing to 3.07 % for (0...3) event window. All CAARs for different event windows are positive and statistically significant for both significance tests. Interestingly, the highest return can be attained in (-5...5) event window with CAAR of 4.3%, which can be interpreted as an information linkage or market inefficiency.

The Panel B of Table 3, on the other hand, presents only one significant CAAR for (-1...1). It would be accepted that the effective date has weak effect (or even no effect) on the stock return. It should be noted that the CAARs turn out to be negative after the effective date, although the findings are insignificant, which may be accepted as weak evidence for return reversal. The abnormal returns realized after announcement of addition have been slightly offset by the losses.

Table 3. Price Effect of Additions to MSCI Global Standard Indexes

	Panel A - Announcement Date					*Panel B - Effective Date*				
Event Window	*CAAR*	*Patel Z*	*Prob*	*Corrado Rank*	*Prob*	*CAAR*	*Patel Z*	*Prob*	*Corrado Rank*	*Prob*
(-5...5)	0,0432	2,758	**0,006**	2,421	**0,016**	0,0251	1,601	0,109	1,507	0,132
(-3...3)	0,0423	3,509	**0,000**	3,055	**0,002**	0,0186	1,323	0,186	1,201	0,230
(-1...1)	0,0320	3,949	**0,000**	3,070	**0,002**	0,0175	2,028	**0,043**	1,876	0,061
(0...5)	0,0209	2,678	**0,007**	2,126	**0,034**	-0,0048	-0,330	0,741	-0,495	0,621
(0...3)	0,0307	3,536	**0,000**	2,953	**0,003**	-0,0062	-0,801	0,423	-0,973	0,330
(0...1)	0,0247	3,999	**0,000**	3,004	**0,003**	0,0042	0,631	0,528	0,116	0,908

In the case of deletions from Standard Index, all CAARs are negative and none of the findings are significant as presented by Panel A in Table 4. This finding indicates that the market does not react to deletions from Standard Index, at least around the announcement date.

Panel B of Table 4 presents the CAARs for deletions as of effective date. While all CAARs are negative, two of the event windows (-1...1) and (0...1) are statistically significant for both tests. Such a finding is an indication of investors or index funds repositioning their portfolios just before and after the effective date.

Table 4. Price Effect of Deletions to MSCI Standard Indexes

	Panel A - Announcement Date					*Panel B - Effective Date*				
Event Window	*CAAR*	*Patel Z*	*Prob*	*Corrado Rank*	*Prob*	*CAAR*	*Patel Z*	*Prob*	*Corrado Rank*	*Prob*
(-5...5)	-0,0063	-0,134	0,894	0,717	0,474	-0,0183	-1,572	0,116	-0,919	0,358
(-3...3)	-0,0029	-0,119	0,905	0,506	0,613	-0,0255	-2,462	**0,014**	-1,906	0,057
(-1...1)	-0,0122	-1,666	0,096	-0,471	0,637	-0,0231	-3,347	**0,001**	-2,414	**0,016**
(0...5)	-0,0094	-1,037	0,300	-0,642	0,521	-0,0134	-1,470	0,142	-1,223	0,221
(0...3)	-0,0143	-1,945	0,052	-1,118	0,264	-0,0137	-1,754	0,079	-1,700	0,089
(0...1)	-0,0112	-1,930	0,054	-1,099	0,272	-0,0185	-3,129	**0,002**	-2,592	**0,010**

Combining the findings about additions to and deletions from MSCI Standard Index, investors somehow closely follow index additions, on the other hand they also seem to ignore the deletions from the index. The index effect for additions can be accepted as permanent, although negative CAARs, which are insignificant, have been found especially after the effective date.

One should expect to have similar findings (abnormal positive returns) for all additions regardless of the index; however, as Panel A of Table 5 shows the opposite. The additions to MSCI Global Small Cap Index results negative CAARs for all event windows, while two of them are significant under both tests. The abnormal negative return is about -1.7% for (0...3) event window, and the losses are deepening for (-5...5) event window. Moreover, when the pre-event days are accounted, losses reached up to -4.3%.

On the other hand, Panel B is telling another story, with positive CAARs for all except one event window, but four of them are significant under Patel Z test. Such a finding can be interpreted as portfolio rebalancing just before and after the effective date of the additions.

Table 5. Price Effect of Additions to MSCI Global Small Cap Indexes

	Panel A - Announcement Date					*Panel B - Effective Date*				
Event Window	*CAAR*	*Patel Z*	*Prob*	*Corrado Rank*	*Prob*	*CAAR*	*Patel Z*	*Prob*	*Corrado Rank*	*Prob*
(-5...5)	-0,0428	-3,539	**0,000**	-2,288	**0,022**	0,0093	1,481	0,139	0,760	0,447
(-3...3)	-0,0152	-1,471	0,141	-0,863	0,388	0,0187	2,740	**0,006**	1,634	0,102
(-1...1)	-0,0095	-0,629	0,530	-0,510	0,610	0,0121	2,227	**0,026**	1,787	0,074
(0...5)	-0,0343	-4,071	**0,000**	-3,182	**0,002**	0,0092	1,987	**0,047**	0,699	0,485
(0...3)	-0,0169	-2,286	**0,022**	-1,777	0,076	0,0095	2,107	**0,035**	0,898	0,369
(0...1)	-0,0122	-1,518	0,129	-1,228	0,219	0,0046	1,344	0,179	0,940	0,347

As presented by Panel A of Table 6, the deletions from Small Cap Index result in negative CAARs as for all event windows, where all CAARs are statistically significant under both tests.

While the losses are around -1.16 % for the event day and the day after and it reaches up to -1.67% for (0...5) event window. Panel B also presents negative CAARs for all event windows but only two of them are statistically significant under both tests. Significant event widows are (-1...1) and (0...1) where CAARs are -1.87% and -1.62%, respectively. Such findings indicate a permanent price effect of deletions.

Table 6. Price Effect of Deletions to MSCI Global Small Cap Indexes

	Panel A - Announcement Date					*Panel B - Effective Date*				
Event Window	*CAAR*	*Patel Z*	*Prob*	*Corrado Rank*	*Prob*	*CAAR*	*Patel Z*	*Prob*	*Corrado Rank*	*Prob*
(-5...5)	-0,0116	-2,133	**0,033**	-1,975	**0,048**	-0,0036	-0,335	0,738	-0,334	0,738
(-3...3)	-0,0118	-2,682	**0,007**	-2,105	**0,035**	-0,0051	-1,021	0,307	-0,418	0,676
(-1...1)	-0,0159	-4,752	**0,000**	-3,990	**0,000**	-0,0187	-5,567	**0,000**	-2,417	**0,016**
(0...5)	-0,0167	-3,437	**0,001**	-3,303	**0,001**	-0,0054	-1,168	0,243	-0,764	0,445
(0...3)	-0,0137	-3,458	**0,001**	-3,188	**0,001**	-0,0071	-2,068	**0,039**	-0,915	0,360
(0...1)	-0,0116	-3,982	**0,000**	-3,858	**0,000**	-0,0162	-6,143	**0,000**	-2,817	**0,005**

The findings presented above contradicts with the previous studies on the index effect of MSCI Turkey index. Küçüksille (2019) has reported insignificant CAARs for additions and deletions around the effective date (-10 and +10 days), while a few significant ARs for the same event window are found. One possible explanation for contradictory findings is the differences in significance test used to test the abnormal returns. Similarly, Ellialtıoğlu et al. (2019) have reported that additions and deletions do not cause abnormal returns, they have not reported the significance of their findings.

Among the findings of the study, presented through Tables 3 to 6, three of them are noteworthy. First of all, regarding the changes in the MSCI Standard Index constituents are only priced when there is an addition to index; while deletions are not affecting the prices adversely as of announcements. It seems that investors become aware of index additions and react accordingly. But such reaction is not valid for deletions; that is, it is not possible to become unaware easily (Chen et al. 2004). Although, the current evidence is not sufficient enough to accept one of the alternative hypotheses, we can assert that the findings regarding MSCI Standard Index favor Investor Awareness Hypothesis.

Second finding to be noted is the negative price reaction for Small Cap Index additions around the announcement date but positive price effect around the effective date. Such finding is a bit puzzling, as the price effect expectations under various hypothesis are positive (negative) for

index additions (deletions). Such negative return puzzle may be explained by the unrealized investor expectations; that is, majority of investors, who are expecting stock addition to Standard Index (not Small Cap), may be investing on the stock before the announcement. However, announcement of stock addition to Small Cap Index (not to the Standard Index as expected) can be interpreted as bad news, which in turn results in stock sell off and negative returns. Another possible explanation is the adverse effect of stocks, which are deleted from Standard Index but added to Small Cap Index. Such news may be accepted as bad news and priced accordingly. However, such explanation is not supported by the insignificant negative returns as a result of deletion from Standard Index, presented by Panel A in Table 4. On the other hand, positive returns around the effective date can be explained by portfolio adjustments. Further analyses are needed to explain such a puzzle. Similar findings of negative returns on announcement date of additions has also been reported by Chakrabarti et. al. (2005) for emerging markets.

The third finding to be noted is that the price effect of the changes in index constituents depends on the index itself. As represented above, the price effect for MSCI Standard Index and Small Cap Index is subject to change, which can be interpreted as that the market places more value to one index than others. Moreover, it can also be asserted that index funds most probably follow some indexes more than the others. Similar findings are also reported by Burnham et al. (2018), not for different indexes but for country re-classification. Moreover, different levels of price effect are also documented by Bildik and Gülay (2008), Epöz Aydıner and Altay (2020), who studied the index effect for various indexes calculated under Borsa Istanbul (BIST). On the other hand, while such price effects exist for different BIST indexes at different levels, such effect does not exist for sustainability index (Yılmaz et al, 2020).

6. Conclusion

The relation between the stock returns/volume and index reconstitutions; namely, the index effect has been one of the controversial phenomena in finance literature. While several hypotheses have been developed, contradicting findings exit in the related literature.

By analyzing the MSCI index reconstitutions, this study aims to reveal the possible index effect from an international index perspective for the stocks, which are traded in Borsa Istanbul. The possible price effects of two MSCI indexes, namely MSCI Standard Index and MSCI Small Cap Index, have been studied for announcement and effective dates by the use of event study methodology.

The findings of the study reveal existence of the index effect is also subject change according to event day definition, which may be either announcement date or effective date of the index event, and index reconstitution being analyzed. Significant index effects strongly exist for the additions to MSCI Standard Index around announcement date, while deletions have significant but weaker effect around the effective date. Moreover, announcements about deletions form MSCI Standard Index, do not have a significant effect around the event windows studied. Index effect is also documented around announcement and effective dates for MSCI Small Cap Index additions; however, such effect is quite stronger for deletions from MSCI Small Cap Index around the announcement dates.

The finding on the additions to MSCI Small Cap Index is puzzling, as the addition to the index results in negative CAARs, where three of them are significant, for all event windows. Such finding can be explained by investors' unsatisfied expectations (about standard index inclusion) or small sized companies can be out of sight of the international investors. Such puzzle need to be addressed in further studies.

REFERENCES

Afego, Pyemo. N. 2017. "Effects of Changes in Stock Index Compositions: A Literature Survey", *International Review of Financial Analysis*, 52: 228-239.

Amihud, Yakov, and Haim Mendelson. 1986. "Asset Pricing and the Bid-ask Spread", *Journal of Financial Economics*, 17(2): 233-249.

Ammer, John, Sara. B. Holland, David C. Smith, and Francis E. Warnock. 2012. "U.S. International Equity Investment", *Journal of Accounting Research*, 50(5): 1109-1139.

Authers, John. 2015. "Investing: The Index Factor", *Financial Times*, 16: Available at: https://www.ft.com/content/40bb7c10-419f-11e5-9abe-5b335da3a90e.

Azevedo, Alcino, Mohamad Karim, Andros Gregoriou, and Mark Rhodes. 2014. "Stock Price and Volume Effects Associated with Changes in the Composition of the FTSE Bursa Malaysian KLCI", *Journal of International Financial Markets, Institutions and Money*, 28: 20-35.

Bayraktar, Ahmet. 2012. "Endeks Etkisi: İMKB Uygulaması", *Aksaray Üniversitesi İİBF Dergisi*, 4(2): 89-110.

Bildik, Recep, and Güzhan Gülay. 2008. "The Effects of Changes in Index Composition on Stock Prices and Volume: Evidence from the Istanbul Stock Exchange", *International Review of Financial Analysis*, 17: 178-197.

Burnham, Terence C., Harry Gakidis, and Jeffrey Wurgler. 2018. "Investing in the Presence of Massive Flows: The Case of MSCI Country Reclassifications", *Financial Analysts Journal*, 74(1): 77-87.

Coakley, Jerry, Periklis Kougoulis and J. C. Nankervis. 2008. "The MSCI-Canada Index Rebalancing and Excess Comovement", *Applied Financial Economics*, 18(16): 1277-1287.

Chakrabarti, Rajesh. 2002. "Market Reaction to Addition of Indian Stocks to the MSCI Index", *Money and Finance*, 2(11): 1-24.

Chakrabarti, Rajesh, Wei Huang, Narayanan Jayaraman, and Jinsoo Lee. 2005. "Price and Volume Effects of Changes in MSCI Indices - Nature and Causes", *Journal of Banking & Finance*, 29(5): 1237-1264.

Chen, Honghui, Gregory Noronha, and Vijay Singal. 2004. "The Price Response to S&P 500 Index Additions and Deletions: Evidence of Asymmetry and a New Explanation", *The Journal of Finance*, 59(4): 1901-1930.

Chen, Hung-Ling, Cheng-Yi Shiu, and Hui-Shan Wei. 2019. "Price Effect and Investor Awareness: Evidence from MSCI Standard Index Reconstitutions", *Journal of Empirical Finance*, 50: 93-112.

Corrado, Charles J. 1989. "A Nonparametric Test for Abnormal Security-price Performance in Event Studies", *Journal of Financial Economics*, 23(2): 385-396.

Ellialtıoğlu, Nurettim, Müge Gürgül, and Ahmet Çakmak. 2019. "MSCI Türkiye Endeksine Dâhil Edilen veya Bu Endeksten Çıkarılan Türk Hisse Senetlerinin Borsa İstanbul'daki Getiri Değişimi Üzerindeki Etkisinin İncelenmesi", 23. International Finance Symposium, Marmara University, Antalya, 326-342.

Epöz Aydıner, Hülya and Erdinç Altay. 2020. "Endeks etkisi: Getiri Oranlarının Endeks Değişimlerine Olan Reaksiyonunun Borsa İstanbul'da Analizi", *Ankara Üniversitesi SBF Dergisi*, 75(4): 1347-1382.

Ferreira, Miguel A., and Pedro Matos. 2008. "The Colors of Investors' Money: The Role of Institutional Investors Around the World", *Journal of Financial Economics*, 88(3): 499-533.

Goetzmann, William N., and Mark Garry. 1986. "Does Delisting from the S&P 500 Affect Stock Price?", *Financial Analysts Journal*, 42(2): 64-69.

Hacibedel, Burcu. and Jos van Bommel. 2007. "Do Emerging Market Stocks Benefit from Index Inclusion?", in *Money Macro and Finance (MMF) Research Group Conference 2006*. Dhillon and Johnson, 1-64.

Hanaeda, Hideki, and Toshio Serita. 2003. "Price and Volume Effects Associated with a Change in the Nikkei 225 Index List: New Evidence From The Big Change On April 2000", *International Finance Review*, 4: 199-225.

Harris, Lawrence, and Eitan Gurel. 1986. "Price and Volume Effects Associated with Changes in the S&P 500 List: New Evidence for the Existence of Price Pressures", *The Journal of Finance*, 41(4): 815-829.

Hau, Harald, Massimo Massa, and Joel Peress. 2010. "Do Demand Curves for Currencies Slope Down? Evidence from the MSCI Global Index Change", *Review of Financial Studies*, 23(4): 1681-1717.

Hung, Chung-Wen, and Cheng-Yi Shiu. 2016. "Trader Activities, Ownership, and Stock Price Reactions to MSCI Standard Index Changes: Evidence from Taiwan", *Journal of Multinational Financial Management*. Elsevier, 36: 49-63.

Jain, Prem C. 1987. "The Effect on Stock Price of Inclusion or Exclusion from the S&P 500", *Financial Analysts Journal*, 43: 58-65.

Küçüksille, Engin. 2019. "MSCI Değişim Duyurularının Hisse Senedi Getirilerine Etkisi", *Muhasebe ve Finans İncelemeleri Dergisi*, 2: 155-166.

Lynch, Anthony W., and Richard R. Mendenhall. 1997: "New Evidence on Stock Price Effects Associated with Changes in the S&P 500 Index", *The Journal of Business*, 70(3): 351-383.

Liu, Shinhua. 2000: "Changes in the Nikkei 500: New Evidence for Downward Sloping Demand Curves for Stocks", *International Review of Finance*, 1(4): 245-267.

Masse, Isidore, Robert Hanrahan, Joseph Kushner, Felice Martinello. 2000. "The Effect of Additions to or Deletions from the TSE 300 Index on Canadian Share Prices", *Canadian Journal of Economics*, 33(2): 341-359.

Miller, Craig, and Michael Ward. 2015. "The Market Impact on Shares Entering or Leaving JSE Indices", *Investment Analysts Journal*, 44(1): 84-101.

MSCI. 2014. "MSCI Global Investable Market Indexes Methodology Summary", https://www.msci.com/eqb/methodology/meth_docs/MSCI_May14_GIMIMethod_Summary.pdf

MSCI. 2022. "MSCI Global Investable Market Indexes Methodology", https://www.msci.com/eqb/methodology/meth_docs/MSCI_GIMIMethodology_Apr2022.pdf

Patell, James M. 1976. "Corporate Forecasts of Earnings per Share and Stock Price Behavior: Empirical tests", *Journal of Accounting Research*, 14(2): 246-274.

Scholes, Myron S. 1972. "The Market for Securities: Substitution versus Price Pressure and the Effects of Information on Share Prices", *The Journal of Business*, 45(2): 179-211.

Shiu, Cheng-Yi. and Jessie Y. Wu. 2009. "Foreign Ownership and Local Market Reaction to Changes of the Constituents in the International Stock Index: Evidence from Additions to and Deletions from MSCI Taiwan Index", 22nd Australasian Finance and Banking Conference, August 28 2009. Available at http://dx.doi.org/10.2139/ssrn.1463337

Shleifer, Andrei. 1986. "Do Demand Curves for Stocks Slope Down?", *The Journal of Finance*, 41(3): 579-590.

Shu, Pei-Gi, Yin-Hua Yeh, and Yu-Chen Huang. 2004. "Stock Price and Trading Volume Effects Associated with Changes in the MSCI Free Indices: Evidence from Taiwanese firms added to and deleted from the indices", *Review of Pacific Basin Financial Markets and Policies*, 7(4): 471-491.

Škrinjarić, Tihana. 2019. "Effects of Changes in Stock Market Index Composition on Stock Returns: Event Study Methodology on Zagreb Stock Exchange", *Croatian Review of Economic, Business and Social Statistics (CREBSS)*, 5(1): 43-54.

Yılmaz, Mustafa K., Mine Aksoy, and Ekrem Tatoğlu. 2020. "Does the Stock Market Value Inclusion in a Sustainability Index? Evidence from Borsa Istanbul", *Sustainability*, 12(2): 1-22.

Wang, Chuan, Zoltan Murgulov, and Janto Haman. 2015. "Impact of Changes in the CSI 300 Index Constituents", *Emerging Markets Review*, 24: 13-33.

Woolridge, J. Randall, and Chinmoy Ghosh. 1986. "Institutional Trading and Security Prices: The Case of Changes in the Composition of the S&P 500 Index", *The Journal of Financial Research*, 9(1):13-24.