Available online at www.sciencedirect.com

Borsa İstanbul Review

Borsa İstanbul Review 22-S1 (2022) S24–S34

http://www.elsevier.com/journals/borsa-istanbul-review/2214-8450

Developing a purification method for the stock exchange market gains: An application for Borsa Istanbul

Zeyneb Hafsa Orhan [a], Murat Işıker [b,*], Hüseyin İçen [a]

[a] *Department of Islamic Economics and Finance, Istanbul Sabahattin Zaim University, Kucukcekmece, Istanbul, Turkiye*
[b] *Department of Business Administration, Istanbul Sabahattin Zaim University, Kucukcekmece, Istanbul, Turkiye*

Received 14 August 2022; revised 26 November 2022; accepted 26 November 2022
Available online 6 December 2022

Abstract

Islamic indices provide a guideline for deciding which stocks to invest in; however, they mostly ignore investment purification. Despite the vitality of purification, the related literature is not well developed for several reasons. This paper aims to develop a purification method by considering the existing literature and applications. In this regard, ten Shariah-compliant firms listed in Borsa Istanbul from different industries were selected for 2021. Three scenarios are applied, suggesting holding shares for different periods. The findings suggest that investors are obliged to purify non-compliant income even when their rate of return is negative. The cost of purification can be severe when the investment firm has a high purification ratio. Conversely, investors should also purify their investments when there is a capital gain.

Keywords: Islamic finance; Stock exchange investment; Purification method; Borsa Istanbul

1. Introduction

Islamic finance, including the theory and practice of finance-related issues from the Islamic perspective, has been in the global arena since the second half of the 20th century. Regarding its practice, Islamic finance primarily comprises Islamic banks, Islamic capital markets and *sukuk* (Islamic bond), Islamic funds, Islamic insurance, Islamic social finance, and Islamic microfinance. This paper focuses on Islamic funds and mainly Islamic indices. Of the total 269 trillion US dollars in Islamic financial assets, the ratio of Islamic funds is 5.3% (IFSB, 2021). Even though that ratio may seem low, the number and value of Islamic funds increased between 2008 and 2019, except for a throwback period of 2015–2016 (IFSB, 2021).

The first Islamic index was established in 1999 by Dow Jones (Mckenzie, 2022). Since then, the number of index providers has increased. Furthermore, the methods used by the indices have become more developed, and the screening methodology includes qualitative and quantitative filters to decide on *Shariah*-compatible companies and stocks. Even though the screening closely connects with purification, meaning purifying non-permissible income from the Islamic perspective, the latter has not been well developed. There are different reasons for this lack of development. First, the purification process is quite complex and has many elements, such as who would purify, how much to purify, and what to purify. Second, homogeneity is lacking due to the differences in laws and regulations of different jurisdictions. Some countries, such as Malaysia, have improved more in terms of purification by establishing related platforms to help investors to purify efficiently. It can be argued that a similar lack of homogeneity is also valid for screening; however, more common initial grounds exist for screening shared by all the related actors, such as a dual screening process with

* Corresponding author.
E-mail addresses: hafsa.orhan@izu.edu.tr (Z.H. Orhan), murat.isiker@izu.edu.tr (M. Işıker), Huseyin.icen@izu.edu.tr (H. İçen).
Peer review under responsibility of Borsa İstanbul Anonim Şirketi.

https://doi.org/10.1016/j.bir.2022.11.019

qualitative and quantitative filtering. There is also unanimity that the quantitative screening should be based on three financial ratios. Opinions on purification vary, starting from what to purify and continuing with how to purify, when, and who should purify.

Even though Türkiye is a country where Islamic finance practices started relatively early, in the 1970s–80s, *Shariah* screening and purification developments fell short of expectations. One official participation (Islamic) index provider currently operates in Türkiye, Bosra Istanbul. Early index providers Ziraat Portfolio and Bizim Menkul Değerler (BMD) Securities, functioning since the 2010s, recently merged their experience under the umbrella of Borsa Istanbul; however, Borsa Istanbul has not announced an official purification process. Details of the purification process are only reported in a standard issued by the Participation Banks Association of Türkiye (TKBB), the details of which are shared below.

This paper aims to develop and apply an empirical purification model using data from ten companies in Borsa Istanbul (BIST). This way, we can calculate the percentage of purification from investment.

This paper's method is explained in more detail below. The importance of the paper depends on the following. First, the paper includes all the crucial steps for the purification method: Islamic jurisprudential background, formula development, and application. Related works in the literature do not simultaneously include all three aspects. In connection, no work comprises all possible suggestions and current applications regarding the subject, discusses them, or develops a new model concerning their shortages. This current paper makes these two contributions related to the literature. Third, more practically, BIST provides no official guideline for calculating purification. Even though TKBB prepared a guideline, there is no direct formula for it, and an exemplary application for investors is also missing. Thus, this paper aims to develop a purification formula specifically cut for the case of BIST, which can be replicated for other countries.

The rest of the paper is constructed as follows. The next section focuses on the critical overview of the related literature. At the end of this section, as a novelty in the literature, a comparative table presenting the purification processes of the outstanding index providers worldwide is shared. The third section explains the method, while the fourth section analyzes the theoretical background of our model and our calculations regarding the purification process in Türkiye. The fifth section concludes, followed by the implications and further studies.

2. Critical review of the related literature

As mentioned above, the Islamic index is a recent phenomenon that dates back to the end of the 1990s. Since then, studies have examined improving *Shariah* screening to select the stocks that would take place in such indices. Even though purification, explained in the first section, is an essential aspect of *Shariah* screening for Islamic indices and funds, it did not receive equal attention in the literature as much as qualitative and quantitative filtering for indexation. That can be due to the debatable structure of the issue itself and the difficulties in practice mentioned below.

Before continuing with the related literature, it should be clarified that the issue is initially about investing in mixed stocks (Bayındır, 2015). Thus, for those who disapprove of investment in mixed stocks, there is no issue such as indexation and purification. Islamic Fiqh Academy, Islamic Fiqh Council, and *Shariah* boards of Kuwait Finance, Dubai Islamic Bank, and Sudan Islamic Bank state that the company is the *wakil* (agent) of the investor. If the *wakil* involves in interest, it should remember that the *Qur'an* and *hadith* prohibit such involvement, which is also harmful from the point of view of *maslahah* (public interest). Henceforth, purification is only significant for those who believe buying mixed stocks is acceptable with some conditions that *haram* (illegitimate) gain should be cleansed. Furthermore, there should be no record in the contract that the company engages in *haram* activities. The *Shariah* boards of the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), Rajhi Bank, and Jordan Islamic Bank opine that something unacceptable when there is independence becomes acceptable with dependence from the perspective of the investor. Furthermore, general need can be reduced to specific necessity (*darurah*), and investment in companies is a need; when an acceptable part is dominant over a non-acceptable part for something, then it can be accepted as well, and there is evidence of *maslahah* (Bayındır, 2015). Briefly, the following studies in this section are assumed to agree, directly or indirectly, with the second opinion.

Mulcahy (2014) has one of the earliest studies that consider the deduction of interest expense and tax effect on it to calculate the *haram* amount to be purified. Tax is also included because interest has a tax shield on it. In the suggested formula, the *haram* amount is calculated as follows:

$$P_{jt} = \left[H_{jt} + I_{jt} + \tau_{jt} X_{jt}\right] \times \frac{CSO_{jt}}{TCS_{jt}} \tag{1}$$

where P is the amount of the purification, j is the company in concern, and t represents the year. H is the pre-tax haram amounts from operations, I is the pre-tax interest income received, CSO is the number of common shares owned by the investor, and TCS represents the total number of common shares outstanding.

The third expression in the bracket, $\tau_{jt} X_{jt}$, represents the interest tax shield. As Equation (1) shows, the purified amount is calculated as the totality of pre-tax *haram* amounts, pre-tax interest income received, and the tax shield multiplied by the ratio of the shares owned by an investor within total shares.

Mulcahy and two authors (Hutchinson et al., 2018) prepared another study in which the cost of purification was calculated from 1994 to 2014. In the end, purification negatively impacts portfolio performance, up to 0.95% per annum, depending on the method used. This result also explains why the authors titled their work "What is the cost of faith?"; in this case, purification has a cost.

Gamaleldin (2015) attempts to underline the possibility of an optimized purification method within the *maqasid* (objectives of

Shariah) framework. After summarizing the *fiqhi* (the study of Islamic legal code), reasons behind the acceptance of purification ("hardship begets facility," "general need takes the status of necessity," "the rules of minimal versus large," "dependence rule," and "little is forgiven"), the author shares purification strategies of different indices. In our opinion, the first reason summarized as "hardship begets facility" does not seem proper since there is a clear *haram*,[1] and such reasoning, depending on the *Qur'an,* can be applied in case there is no related *hadith*; however, there are *hadith* examples about the *haram* structure of *riba*. Regarding the second reason, what should be of concern is a necessary need, not an everyday need.[2] Thus, what must be determined is whether investing in stocks before purification is necessary. Regarding the argument about "little is forgiven," the issue of involvement in interest should be taken separately. In sum, regarding the primary approach of the paper of Gamaleldin (2015), the *maqasid* approach legitimizes current practices in Islamic finance; however, it must be considered that *maqasid* and *maslahah* became used as separate sources of evidence, especially after Shatibi, which is more commonly used in Maliki school. In the context of the relationship between *maqasid*, *maslahah*, and making investments in Islamic stocks, it can be argued that no evidence shows the necessity of making such investments for *maslahah*.

In a study investigating the methodology of The International Shariah Research Academy for Islamic Finance (ISRA) Bloomberg on purification, **Hashim et al. (2017)** list four issues of purification:

1. Cleansing the *Shariah* non-compliant portion of the income from *Shariah*-compliant shares while an investor continues to hold the shares
2. Cleansing capital gains realized from selling *Shariah*-compliant shares
3. Cleansing of any income generated during the process of disposing of shares excluded from the *Shariah*-compliant list after the latest periodic review
4. Cleansing of any *Shariah* non-compliant income from shares excluded from the *Shariah*-compliant list that an investor continues to hold

Salleh and Zakaria (2015) list the purification items as a dividend, capital gain, and assets-liabilities. The purification process for these items has two main methods: the investor can purify by themselves (such as in Malaysia), or the manager can do so (as in Singapore). **Abdul Manan (2019)** also mentions similar purification items and concentrates on the standards from the AAOIFI regarding who would purify, whether the distribution is required before purification, and what would be purified.

Instead of purification, some authors use the term purging; in our opinion, while there is near unanimity about the term purification, developing a new term like purging seems confusing. Mohammed et al. (2017) define purging as the cleansing of impure income that can be listed under interest income, impure income from *Shariah* non-compliant investment, and impure income from *Shariah* non-compliant business sources. Regarding the purging methods, the authors list the dividend-based purging method, the AAOIFI purging method on shareholding, and the modified AAOIFI method used by Taqwaa Advisory and Shariah Investment Solutions (TASIS).[3]

As an index provider, TASIS (n.d.) shares the purification processes of six different index providers and their comparison with TASIS's method. The formula used by TASIS is as follows:

$$Interest\ Income = \frac{Total\ Interest\ Income\ Earned\ Per\ Day}{Outstanding\ Number\ of\ Shares} \quad (2)$$

This formula's result must be multiplied by the number of an investor's shares and the days the shares are held. Regarding the formula used by TASIS, we must ask why only interest income is considered and not the other non-compatible incomes.

Bandukda and Aijaz (n.d.) suggest a new formula that considers administrative expenses. The suggested formula has the following steps:

$$Administrative\ Expenses\ on\ Interest = \frac{Administrative\ Expenses}{Total\ Revenue} \times Interest\ Income \quad (3)$$

$$Final\ Interest\ Income = Interest\ Revenue - Administrative\ Expenses\ on\ Interest \quad (4)$$

$$IIPS(Interest\ Income\ per\ Share) = \frac{Final\ Interest\ Income}{Total\ Number\ of\ Shares\ Outstanding} \quad (5)$$

[1] The ruling took place in the 17th article of *Majallah* (Akgündüz, 2018); however, their examples do not fit the case here.

[2] This took place in *Majallah* (Akgündüz, 2018), on the 32nd article.

[3] TASIS is especially mentioned in this work because the authors work with TASIS.

[4] Meaning the total revenues. https://www.msci.com/eqb/methodology/meth_docs/MSCI_Islamic_Indexes_Methodology_Oct2021.pdf.

[5] ISRA-Bloomberg argues that despite the existence of the debates, there is no need for purification for capital gains from the sale of *Shariah* compliant stocks.

[6] Gross revenue plus any other income earned by the company.

Table 1
Summary of the main ideas regarding purification in literature.

Name	Purification
Mulcahy (2014)	(Non-compatible income + Interest Income + Tax Shield) × ratio of the shares owned in total shares: $P_{jt} = [H_{jt} + I_{jt} + \tau_{jt}X_{jt}] \times \frac{CSO_{jt}}{TCS_{jt}}$
Salleh and Zakaria (2015) Abdul Manan (2019)	Dividend Capital gain Asset-liability
Mohammed et al. (2017)	Interest income Impure income from *Shariah* non-compliant investment Impure income from *Shariah* non-compliant business sources
Bandukda and Aijaz (n.d.)	$IIPS(Interest\ Income\ per\ Share) = \frac{Final\ Interest\ Income}{Total\ Number\ of\ Shares\ Outstanding}$

Source: Prepared by the authors depending on the literature.

The formula suggested by Bandukda and Aijaz (ibid.) also follows the logic of TASIS, in which only the interest income is purified.

As a *fiqh* scholar, **Kahf (2019)** distinguishes between establishing a company and becoming a shareholder at a company since the shareholder vote is not influential in the second one, where some violations can be tolerated because shareholders are not dominant; thus, purification can be applied. Kahf (2019) summarizes the purification procedure as "What you need to do is to look into the companies, one by one, calculate the percentage of non-permissible income, and add your educated guess for the effect of retained income and leveraging on capital gain, add them together and derive your purification percentage." In contrast to the application of ISRA

Table 2
Summary of the purification Methods practiced by the related institutions.

Index Provider	Method of Purification	Subject of the Purification	Period of Purification
S&P Dow Jones Indices (n.d.)	$Dividend \times \frac{Non - Permissible\ Revenue}{Total\ Revenue}$	Provided to index subscribers	Dividend Basis
MSCI (2015)	(Total earnings[4]-(Income from prohibited activities + interest income))/Total earnings	*Not specified*	Semi-Annual Index Review
FTSE (n.d.)	Appropriate purification of dividends at 5%	*Not specified*	Dividend Basis
AAOIFI (2015)	(Interest income/Total outstanding shares) × Number of shares held at the end of the year	Investor	Issue of the final financial statements
TASIS (n.d.)	(Total impure income/Total outstanding shares) × (number of shares held) × (Number of days [or months] the shares were held/Total number of days [or months] in the entire accounting period)	*Not specified*	Latest available financial data
ISRA-Bloomberg (Hashim et al., 2017)	-Cleansing Shariah non-compliant income while holding Shariah-compliant shares (cleansing of cash income from dividends, cleansing of non-cash benefits)[5] -Cleansing of income generated during the process of disposing of shares excluded from the *Shariah*-compliant list (the baseline is the acquisition price) -Cleansing of income generated while holding shares excluded from the *Shariah*-compliant list (how much exceeds the threshold is important; 5% is acceptable)	Investor	After the latest periodic review
Meezan (n.d.a)	Non-compliant income/Total Revenue[6]	Investor	Six-month period
Azzad (n.d.)	5% of company revenues for all fund holdings are tallied and earmarked for purification by Azzad	Investor	*Not specified*
TKBB (2020) and TKBB (2022)	The earnings that should be purified is the ratio of the non-compliant income per share. Thus, there is no difference in whether dividends have been distributed or the company had a loss or profit. Inflation indexation should also be considered	Investor	Six-month period

mentioned by Hashim et al. (2017), Kahf also considers capital gain; therefore, our model follows Kahf's approach.

Regarding the example of Türkiye, as mentioned above, the only source is the standard prepared by TKBB. The first document prepared by the institution was in 2020 (TKBB, 2020). The document provides necessary explanations about the purification process in articles 3.2, 3.2.1, 3.2.2, and 3.2.3; however, details of the purification calculation were not shared. Thus, a new document was issued in 2022 (TKBB, 2022). This document explains that in calculating the illegal incomes from the *Shariah* perspective, incomes are collected (interest, illegal sale of goods, etc.) from transactions not included in the company's articles. Such transactions are performed due to exceptional circumstances arising from the company's obligation to continue its existence and activities which do not comply with the principles stipulated by the *fiqh*; the argument of necessity is implied here. The income obtained from the activities above is then divided by the total number of shares, which determines the amount per share. The document further states that there is no difference between whether the company whose shares are purified made a loss or profit for the corresponding period. In this new document, the period of purification should be done at the end of the independently audited six-month financial reporting period. As important additional information, precautionary adjustments are also made in the purchases and sales of stocks made during the financial period. While determining the amount to be purified per share, the data announced at the end of the financial period are the basis. In the calculation, the period of holding the share certificate is divided by the financial period. The resulting ratio is multiplied by the amount adjusted per share remaining in the index during the relevant financial period, which determines the adjustment amount per share for the relevant period. During this process, there is no difference between whether the company distributed dividends. As the following clause underlines, no purification is needed for dividend gains. Lastly, as an important decision, the document points out that interest income should be considered only above the inflation rate; the document approves the application of inflation indexation, a discussable issue in literature (Mansoori, 1998).

Table 1 summarizes the main ideas shared for the purification process in the literature.

Table 1 includes the results of five individual studies on the subject. While two offer direct formulas for calculating purification, the others focus on listing the items requiring purification. In addition, Mohammed et al. (2017) summarize the following methods to make purification:

- Dividend-based purging method (used by S&P (Standard and Poors), MSCI (Morgan Stanley Capital International), and FTSE (Financial Times Stock Exchange))
- AAOIFI purging method on shareholding
- The modified AAOIFI method used by TASIS

Table 2 determines the methods and formulas the listed institutions use regarding purification. While preparing the Table, the related literature shared above is used together with the information gathered directly from the institutions.

2.1. ***Source:*** *prepared by the authors depending on the related literature*

Table 2 includes nine institutions. Regarding who should conduct the purification process, there is a tendency to favor the investor, with companies and platforms representing other options. Developing online platforms to help investors calculate their purification amount would be useful.

Regarding the period of purification, the common approaches are using the latest data, six-month data, dividend basis, and annual basis. TKBB uses six months, which we discuss below.

Concerning the purification process, S&P Dow Jones, MSCI, and AAOIFI follow the dividend approach. TASIS uses an approach similar to AAOIFI with a modification related to the days of holding. FTSE follows an interesting approach that automatically suggests the purification of 5% from dividends[7]; however, a possible injustice for companies whose non-compliant income is much less than 5% is a concern. Azzad (n.d.b) also mentions a similar method, adding that it follows the related guidelines of AAOIFI. ISRA-Bloomberg lists the items on which purification should be done instead of directly showing a calculation; however, a 5% tolerance level regarding the last item can be discussable. TKBB has a clear-cut approach with a debatable twist, i.e., inflation indexation. In addition, Azzad (n.d.b) provides an online purification calculator for investors, which others can follow.

3. Methodology and data

This paper's primary method is quantitative since a formula for calculating purification was developed. In doing this, the related literature in that regard, shared in the previous section, is considered. The discussable points of the existing methods are specifically our concern. A *fiqhi*-based theoretical background is settled first to develop the formula. This paper provides a real-life example of how to calculate purification for both capital gains from stock investment, as suggested by Salleh and Zakaria (2015), Hashim et al. (2017), and Abdul Manan (2019), and impure income received from holding shares of a publicly traded firm. **The formula developed for the capital gains** is as follows:

$$\lambda_{j,t+1} = I_{j,t} * R_t * P_{j,t} * \frac{N}{180} \tag{6}$$

The expressions of Equation (6) are as follows:

- $\lambda_{j,t+1}$ is the amount to be purified from the capital gain obtained from the stock investment for the last semi-annual financial period

[7] The reasons for using 5% and other ratios in indexation process, such as 33% and 30%, can be followed from Orhan and Işıker (2021).

Table 3
Total revenues of the sample firms for two different semi-annual financial periods.

	EREGL	BIMAS	FROTO	ASELS	THYAO	VESBE	ALKIM	OYAKC	AYGAZ	SELEC
Financial Period	**2021/6**	**2021/6**	**2021/6**	**2021/6**	**2021/6**	**2021/6**	**2021/6**	**2021/6**	**2021/6**	**2021/6**
Net Sales	24,797,566	32,664,892	26,786,744	6,974,677	31,485,000	7,344,803	430,168	1,985,896	5,402,214	11,608,992
Other Operating Income	120,921	70,023	601,796	2,965,561	720,000	583,765	28,000	57,413	403,539	522,096
Financial Income	931,836	86,718	1,279,414	434,892	688,000	511,192	8067	91,800	87,329	
Income from Investing Activities	8754	171,660	2464	2150	815,000		1	33,946	14,662	72,601
Total Revenue	25,859,077	32,993,293	28,670,418	10,377,280	33,708,000	8,439,760	466,237	2,169,056	5,907,744	12,203,689
Financial Period	**2020/12**	**2020/12**	**2020/12**	**2020/12**	**2020/12**	**2020/12**	**2020/12**	**2020/12**	**2020/12**	**2020/12**
Net Sales	18,264,871	28,869,249	34,357,492	10,873,796	24,941,000	5,898,907	384,627	1,838,107	5,994,389	10,796,914
Other Operating Income	257,461	71,648	521,702	4,184,544	1,606,000	317,790	17,597	88,214	171,020	454,398
Financial Income	272,159	153,499	590,392	656,568	169,000	259,239	15,315	103,393	129,562	
Income from Investing Activities	158,808	112,042	1377	2624	755,000		−314	44,310	8847	84,243
Total Revenue	18,953,299	29,206,438	35,470,963	15,717,532	27,471,000	6,475,936	417,225	2,074,025	6,303,818	11,335,555

Source: Prepared by the authors by using companies' financial reports; numbers are in thousands.

- $I_{j,t}$ is the amount invested in firm j within the last semi-annual financial period
- $R_{j,t}$ is the rate of return from the investment
- $P_{j,t}$ is the purification ratio[8]
- N is the number of holding days of the shares

Since the purification ratio can be determined after the announcement of the financial reports, the purification payments can be made in the following semi-annual financial period. Furthermore, λ should be a positive number since there is no need to do purification when there is a capital loss.

Equation (7) provides **a formula for purification calculation for the impure income**, which provides the second stage of the study's purification process.

$$\phi_{j,t+1} = TR_{j,t} * P_{j,t} * O_{j,t} * \frac{N}{180} \tag{7}$$

The expressions of Equation (7) are as follows:

- $\phi_{j,t+1}$ is the amount that needs to be purified from the impure income that is obtained from the stock investment for the last semi-annual financial period
- $TR_{j,t}$ is the total revenue of the firm j within the last semi-annual financial period
- $O_{j,t}$ is the ownership rate of the investment

As suggested by TKBB (2022), purification must be conducted for impure income according to the firm's total revenues during the corresponding financial period, even if the firm records a loss. Thus, unlike capital loss, each investment should be purified to expel impure income.

The sample used in the analysis section consists of ten firms in BIST; Table 3 shows the total revenue of these firms. Impure income is calculated by using both total revenue and purification ratio. Since the paper aims to provide an example of how the purification calculation is done, we limit the number of firms to ten. Firm selection is conducted according to the market value rankings for firms from different industries. Additionally, we selected only firms among the constituents of the participation index of BIST during 2021, provided by BMD securities.

[8] This study's purification ratios are obtained by BMD Securities, who provided screening service until the end of 2021 for firms listed in Borsa Istanbul.

4. Analysis

This section includes two sub-sections. The first sub-section addresses the theoretical background of our analysis, and the second sub-section includes the findings related to our calculations about the purification process.

4.1. Theoretical background of the analysis

Theoretical issues concerning purification discussed by different scholars were mentioned in the literature section. Considering these discussions, this sub-section share our ideas regarding the theory of purification. This theoretical background explains the reasoning behind our suggested formulas shown by Equations (6) and (7). Furthermore, the quantitative analysis is constructed upon this theoretical basis.

We can ask why someone would ask for permission for purification; if someone knows that their investment includes an unacceptable gain, they would not be expected to participate. Purification becomes reasonable if the person is unaware of the undesirable part of the investment from a Shariah perspective or is incapable of preventing its illegitimate components. As shown in the previous section, the literature includes two main legitimization reasons for an investor who is aware of the illegitimate aspects of stock and still wants to invest in it: necessity and *maslahah*. Necessity refers to the issue that Muslims who want to invest do not have many options today; thus, they need alternative investment options such as capital markets. In connection with this, *maslahah* refers to the increment in investment options and wealth of the Muslims. In sum, the extant literature uses necessity and *maslahah* to legitimize the process of indexation and purification; however, they are not immune from criticism. For instance, the level of necessity is a subjective issue, and *maslahah* (referring to *maslahah mursalah* in general; whether the rules of *maslahah mursalah* are followed is an issue for future research) can be used arbitrarily. Benchmark ratios are used for indexation to

prevent arbitrariness on *maslahah*; however, the benchmark ratios (33%, 30%, and so on) are decided upon *qiyas* by using *hadith* examples on inheritance whose applicability is discussable (Orhan & Işıker, 2021). Furthermore, some issues should be considered while using the argument of *maslahah*. For instance, an important aspect of *maslahah* is that it should not be against the *Qur'an* and *Sunnah*; however, this paper does not aim to discuss the *fiqh*i standpoints or provide a final verdict on the issue. Thus, this paper's theoretical background starts from the assumption that one can invest in mixed stocks due to necessity and *maslahah* mentioned in the literature with the condition that a legitimate indexation and purification process is followed. We also add that while necessity and tolerance are general arguments, *maslahah* can be acceptable for some specific situations—for instance, when project management falls into undesired hands—which may hinder national *maslahah*.[9]

In sum, under the abovementioned circumstances, several steps are required to conduct an acceptable purification process.

First, it seems there is an agreement among scholars that it does not matter whether purification is done before or after the dividend distribution process; this paper follows that approach.

Second, because the shareholders are capital owners (*rab al mal*) while companies are agents (*mudarib/wakil*), the shareholders own the stocks together with unwanted gains to be purified. Thus, it seems more appropriate for investors to conduct purification since companies are only intermediaries. After distributing the dividends, it becomes the investor's responsibility to conduct the act of purification. In addition, non-Muslims might invest in such stocks; thus, only under the option of making purification by investors can justice be provided (Camgöz, 2017).

The third issue is whether only dividends or some other things should be purified, such as capital gains. We believe both should be purified since "capital gains are always caused by factors such as retained profit, increased credibility (caused by higher borrowing and potential borrowing) and higher performance expectation."[10] In addition, some companies might not distribute dividends but add their profits to capital gains, which are included in the calculation (Camgöz, 2017).

Fourth, the issue of tax addition against the interest tax shield exists, as mentioned by Mulcahy (2014). Such an additional calculation seems suitable for sensitivities; however, it might not be necessary since interest expenses are gone or lost. Thus, it seems inappropriate to add it back; however, for investors that are too sensitive, one can also calculate the formula by adding the tax shield.

Another issue is the timing of the purification, which remains unsettled among scholars; since balance sheets are announced quarterly, it is not certainly known at precisely

Table 4
Purification scheme under scenario #1.

	EREGL	BIMAS	FROTO	ASELS	THYAO	VESBE	ALKIM	OYAKC	AYGAZ	SELEC
Investment Amount (I)	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000
Shares Owned	63.428	16.812	6.276	68.587	74.571	201.207	68.399	147.710	76.278	126.263
Total Number of Outstanding Shares	₺3.500.000.000	₺607.200.000	₺305.910.000	₺2.280.000.000	₺1.380.000.000	₺1.600.000.000	₺150.000.000	₺1.159.793.441	₺300.000.000	₺621.000.000
Ownership Rate (O)	0,0018%	0,0028%	0,0021%	0,0030%	0,0054%	0,0126%	0,0456%	0,0127%	0,0254%	0,0203%
Initial Price	₺15,77	₺59,48	₺159,34	₺14,58	₺13,41	₺4,97	₺14,62	₺6,77	₺13,11	₺7,92
Last Price	₺24,71	₺60,20	₺228,31	₺20,88	₺20,02	₺7,53	₺16,30	₺7,90	₺22,07	₺11,35
Rate of Return (R)	56,71%	1,21%	43,28%	43,21%	49,29%	51,51%	11,49%	16,69%	68,34%	43,31%
Return in TL	₺567.057	₺12.105	₺432.848	₺432.099	₺492.916	₺515.091	₺114.911	₺166.913	₺683.448	₺433.081
Purification Ratio (P)	2,1%	0,1%	1,4%	1,0%	4,6%	3,1%	0,7%	3,7%	3,4%	0,7%
Purification Amount for the Capital Gain (λ)	₺11.908	₺12	₺6.060	₺4.321	₺22.674	₺15.968	₺804	₺6.176	₺23.237	₺3.032
Purification Amount for the impure income (φ)	₺9.841	₺914	₺8.235	₺3.122	₺83.788	₺32.901	₺1.488	₺10.221	₺51.071	₺17.369
Total Purification Amount (λ+ φ)	**₺21.749**	**₺926**	**₺14.294**	**₺7.443**	**₺106.462**	**₺48.869**	**₺2.293**	**₺16.397**	**₺74.308**	**₺20.400**
Net Rate of Return	54,53%	1,12%	41,86%	42,47%	38,65%	46,62%	11,26%	15,05%	60,91%	41,27%

Source: Prepared by the authors by using companies' financial reports.

[9] We thank Prof. Monzer Kahf for this argument, which he shared with us in response to our e-mail query.

[10] Thanks to Prof. Monzer Kahf who shared his opinon with us via e-mail.

which period a firm whose stock is concerned goes over the limits. A related issue is that since purification is done in specific periods, only the gains in the hands of the investors holding the stocks are purified, while the others are unaffected. Thus, whether the gain is attained or not, purification methods proportional to the holding period are started to be used (Camgöz, 2017).

4.2. Findings

This section provides a unique calculation method for the purification process for ten firms in BIST. Purification is applied for capital gain and impure income, and the calculations are based on three different scenarios. To simplify the calculations, the number of holding days is selected as 180, 45, and 60, respectively. The three scenarios are as follows.

1 . The first scenario assumes that the investor owns the shares from 1st July to December 31, 2021, the semi-annual financial period. In this case, the purification can be done within the first quarter of 2022 since financial reports for 2021 were announced in February 2022; the TKBB report suggests a period of 180 days or 6 months.
2 . In the second scenario, the period for holding the shares is from 2nd August to September 16, 2021. Here August is selected randomly, and the first trading day of the month is day 2. In this case, the investor holds the shares for 45 days, indicating that the amount to be purified should be divided by 4.
3 . Finally, to provide a more realistic scenario, the last example covers the period from two semi-annual periods (i.e., 1st June–31st July 2021), complicating the calculation process. The holding period for this case is 60 days, where half of the total days belong to the previous financial period. For this reason, the purification must be done separately for two periods.

Tables 4–6 summarize this paper's empirical findings according to the abovementioned scenarios. In the first scenario, since the rate of return is positive for the whole sample, purification is applied for both capital gain and impure income. The results in Table 4 show that the purification amount can be severe for firms with a higher purification ratio. For instance, although the actual rate of return for THYAO (the share of Turkish Airlines) is 49%, due to the purification applied for capital gain and impure income, it drops to 38%. Thus, as Hutchinson et al. (2018) suggested, the cost of faith for the investment is high compared to other firms.

Table 5 represents the results for the second scenario, where the holding period is applied only for 45 days. This scenario means that the purification amount is divided by four since the holding period is the quarter of the semi-annual financial year. Unlike the previous scenario, the rate of return for five cases is negative. When this happens, there is no need to conduct purification for capital gain; however, according to the guide published by TKBB in 2022, purification should still be conducted for impure income. Thus, investors

Table 5
Purification scheme under scenario #2.

	EREGL	BIMAS	FROTO	ASELS	THYAO	VESBE	ALKIM	OYAKC	AYGAZ	SELEC
Investment Amount (I)	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000
Shares Owned	56.883	16.586	6.127	64.893	78.247	185.529	68.918	154.321	69.493	123.609
Total Number of Outstanding Shares	₺3.500.000.000	₺607.200.000	₺305.910.000	₺2.280.000.000	₺1.380.000.000	₺1.600.000.000	₺150.000.000	₺1.159.793.441	₺300.000.000	₺621.000.000
Ownership Rate (O)	0,0016%	0,0027%	0,0020%	0,0028%	0,0057%	0,0116%	0,0459%	0,0133%	0,0232%	0,0199%
Initial Price	₺17,58	₺60,29	₺163,21	₺15,41	₺12,78	₺5,39	₺14,51	₺6,48	₺14,39	₺8,09
Last Price	₺15,01	₺65,01	₺157,74	₺14,57	₺12,47	₺5,57	₺14,19	₺6,50	₺15,02	₺8,41
Rate of Return (R)	−14,62%	7,83%	−3,35%	−5,45%	−2,43%	3,34%	−2,21%	0,31%	4,38%	3,96%
Return in TL	-₺146.189	₺78.288	-₺33.515	-₺54.510	-₺24.257	₺33.395	-₺22.054	₺3.086	₺43.780	₺39.555
Purification Ratio (P)	2,1%	0,1%	1,4%	1,0%	4,6%	3,1%	0,7%	3,7%	3,4%	0,7%
Purification Amount for the Capital Gain (λ)	None	₺20	None	None	None	₺259	None	₺29	₺372	₺69
Purification Amount for the impure income (φ)	₺2.206	₺225	₺2.010	₺738	₺21.980	₺7.584	₺375	₺2.670	₺11.632	₺4.251
Total Purification Amount (λ+ φ)	**₺2.206**	**₺245**	**₺2.010**	**₺738**	**₺21.980**	**₺7.843**	**₺375**	**₺2.698**	**₺12.004**	**₺4.320**
Net Rate of Return	−14,84%	7,80%	−3,55%	−5,52%	−4,62%	2,56%	−2,24%	0,04%	3,18%	3,52%

Source: Prepared by the authors by using companies' financial reports.

Table 6
Purification scheme under scenario #3.

	EREGL	BIMAS	FROTO	ASELS	THYAO	VESBE	ALKIM	OYAKC	AYGAZ	SELEC
Investment Amount (I)	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000	₺1.000.000
Shares Owned	59.137	16.404	6.092	67.340	75.188	184.502	66.094	137.174	71.942	115.473
Total Number of Outstanding Shares	₺3.500.000.000	₺607.200.000	₺305.910.000	₺2.280.000.000	₺1.380.000.000	₺1.600.000.000	₺150.000.000	₺1.159.793.441	₺300.000.000	₺621.000.000
Ownership Rate (O)	0,0017%	0,0027%	0,0020%	0,0030%	0,0054%	0,0115%	0,0441%	0,0118%	0,0240%	0,0186%
Initial Price #1	₺16,91	₺60,96	₺164,15	₺14,85	₺13,30	₺5,42	₺15,13	₺7,29	₺13,90	₺8,66
Last Price #1	₺15,79	₺59,20	₺160,47	₺14,58	₺13,37	₺4,97	₺14,68	₺6,77	₺13,09	₺7,90
Initial Price #2	₺15,79	₺59,20	₺160,47	₺14,58	₺13,37	₺4,97	₺14,68	₺6,77	₺13,09	₺7,90
Last Price #2	₺17,55	₺60,39	₺162,92	₺15,36	₺12,73	₺5,27	₺14,46	₺6,44	₺14,29	₺8,09
Rate of Return (R) #1	−6,62%	−2,89%	−2,24%	−1,82%	0,53%	−8,30%	−2,97%	−7,13%	−5,83%	−8,78%
Return in TL #1	-₺66.233	-₺28.871	-₺22.419	-₺18.182	₺5.263	-₺83.026	-₺29.742	-₺71.331	-₺58.273	-₺87.760
Rate of Return (R) #2	11,15%	2,01%	1,53%	5,35%	−4,79%	6,04%	−1,50%	−4,87%	9,17%	2,41%
Return in TL #2	₺104.080	₺19.521	₺14.925	₺52.525	-₺48.120	₺55.351	-₺14.541	-₺45.267	₺86.331	₺21.940
Purification Ratio (P) #1	2,1%	0,1%	1,4%	1,0%	4,6%	3,1%	0,7%	3,7%	3,4%	0,7%
Purification Ratio (P) #2	2,3%	0,1%	0,9%	0,9%	4,7%	3,6%	1,1%	3,8%	1,2%	0,8%
Purification Amount for the Capital Gain (λ) #1	None	None	None	None	₺40	None	None	None	None	None
Purification Amount for the impure income (φ) #1	₺1.121	₺132	₺1.648	₺774	₺11.475	₺3.858	₺214	₺1.513	₺8.566	₺2.459
Total Purification Amount (λ + φ) #1	₺1.121	₺132	₺1.648	₺774	₺11.515	₺3.858	₺214	₺1.513	₺8.566	₺2.459
Purification Amount for the Capital Gain (λ) #2	₺399	₺3	₺22	₺79	None	₺332	None	None	₺173	₺29
Purification Amount for the impure income (φ) #2	₺1.675	₺149	₺856	₺460	₺14.386	₺5.839	₺377	₺1.625	₺2.833	₺3.026
Total Purification Amount (λ + φ) #2	₺2.074	₺152	₺879	₺539	₺14.386	₺6.171	₺377	₺1.625	₺3.006	₺3.055
Total Purification Amount Combined (#1 + #2)	**₺3.195**	**₺283**	**₺2.527**	**₺1.312**	**₺25.902**	**₺10.030**	**₺591**	**₺3.137**	**₺11.572**	**₺5.514**
Net Rate of Return	3,47%	−0,96%	−1,00%	3,30%	−6,88%	−3,77%	−4,49%	−11,97%	1,65%	−7,13%

Source: Prepared by the authors by using companies' financial reports.

with negative returns should also purify the firm's impure income according to their ownership rate.

Finally, Table 6 shows the results of the third scenario, considered the most complicated scenario. Since the holding period of shares consists of 30 days from two different semi-annual financial periods each, there are two different purification ratios; thus, purification must be done separately for each period. Here, we assume that the investors use a terminal date to hypothetically sell their shares at the end of the financial period (i.e., June 30, 2021) and repurchase them when the new financial period starts (i.e., July 1, 2021). The closing price of June 30, 2021 is used for closing and opening the position. Since there is no actual transaction, the aim is to provide the amount that should be purified, enabling investors to obtain more accurate figures to purify their investments.

5. Conclusion

Investing in Islamically approved stocks taking place under Islamic indices is an important aspect of worldwide Islamic finance today. While indexation is essential to that investment process, purification—meaning purifying the stocks from unacceptable gains from an Islamic perspective—is another crucial part. Despite its importance, purification does not occur so often in the related literature for several reasons, among which the difficulty of the calculations is one of the leading ones.

This paper aims to develop a purification methodology for those investors who own shares of the firms listed in BIST. To achieve this goal, we critically reviewed the literature on individual studies and institutional applications to construct our theoretical background. The *Shariah* concerns are also considered at this stage. Second, a group of ten Shariah-compliant firms is selected for 2021. The study provides practical applications of purification calculations for stock exchange investment using real-life examples. It is hard to understand the amount of purification, especially for investors who hold shares for short periods, such as 30 or 45 days. The equations developed in this study enable both short- and long-term investors to determine the amount that must be purified from the capital gain and impure income that occurs while holding the shares of publicly listed firms.

In the analysis context, three scenarios are applied, suggesting holding shares for different periods (180, 45, and 60 days). Findings indicate that investors are obliged to purify non-compliant income even when the rate of return on their investment is negative. Second, the cost of purification can be severe when the investment firm has a high purification ratio. On the other hand, investors should also purify their investments when there is a capital gain. Thus, in some cases, two different purification methods are applied: capital gain and impure income. Lastly, although we conduct three scenarios for three periods, we believe that purification conducted for three months is preferable since the balance sheets are announced quarterly; however, TKBB's suggestion for 180 days is also reasonable.

The following can be listed regarding the differences between this paper's suggested model and those suggested by the institutions summarized in Table 2. First, all the institutions except ISRA suggest a model in which only impure income is purified, not capital gain; this paper suggests both. Second, unlike ISRA, a direct formula is provided separately for both purification items in this paper. Third, this paper does not mention a purification threshold as done by FTSE and ISRA. These institutions suggest a 5% threshold. Like other institutions except for FTSE and ISRA, we believe that any impure income should be cleansed, whether high or low. Lastly, we suggest that three-month basis calculations are optimal.

6. Implications and further studies

The model developed by this paper applies to BIST and other firms listed under Islamic indices worldwide. Therefore, Muslim investors or investors who have Islamically-oriented sensitivities due to several reasons can efficiently purify their Islamic stock investments by themselves. Another implication of the paper is that BIST index provider, and TKBB, can use this paper's standard purification model (and practical examples), which also reflects the purification models worldwide.

For future studies, we aim to develop an automated system that can provide the amount for purification when an investor states the price level of the opening and closing positions and the investment's holding period. Moreover, developing a purification model for portfolios that includes multiple stocks is also on the agenda. Comparison among the suggested formulas and their applications for purification calculation can be another research area. Lastly, developing an online purification calculator under the umbrella of Bors Istanbul can also be a good future project.

References

AAOIFI. (2015). *Sharīʿah standards No. 21, 3/4/1-5, accounting and auditing organisation for islamic financial institutions* (Bahrain).

Abdul Manan, F. N. (2019). Dividend purification process adopted by investors in mixed company. *International Journal of Muamalat, 3*(1), 2590–4337.

Akgündüz, A. (2018). *Karşılaştırmalı mecelle-i ahkam-ı adliye*. OSAV.

Azzad. Purification calculator helps investors avoid unethical profits https://www.prnewswire.com/news-releases/purification-calculator-helps-investors-avoid-unethical-profits-271123921.html.

Azzad (n.d. b). Purification Calculator, https://azzadasset.com/purification-calculator/.

Bandukda, F. Y., and Aijaz, I. A. (n.d.). Dividend purification for Shariah compliance of investments in joint stock companies, Available at: https://www.alhilalsa.com/advisory/dividend_model.pdf.

Bayındır, S. (2015). *Fıkhi ve İktisadi açıdan i?slami Finans 2 (Para ve Sermaye Piyasaları), İstanbul*. Süleymaniye Vakfı Yayınları.

Camgöz, M. (2017). *İslami hisse senedi yatırımı ve İslami endekslerin performansının değerlendirilmesi. [Doctoral disseration, Istanbul University]*.

FTSE (n.d.). FTSE Shariah research: Targeting lower volatility through ethical and quantitative screening Minimum volatility Shariah index, https://research.ftserussell.com/products/downloads/ftse_shariah_whitepaper.pdf.

Gamaleldin, F. (2015). *Shariah-compliant stock screening and purification, MSc in international accounting and finance*. University of Liverpool.

Hashim, A. M.d., Habib, F., & Isaacs, Z. (2017). ISRA-bloomberg Shariah stock screening and income cleansing methodologies: A conceptial paper. *ISRA International Journal of Islamic Finance, 9*(1), 27–42.

Hutchinson, M. C., Mulcahy, M., & Brien, B. (2018). What is the cost of faith? An empirical investigation of islamic purification. *Pacific-Basin Finance Journal, 52*, 134–143.

IFSB. (2021). *Islamic finance Stability report*. Islamic Financial Services Board. Available at: https://www.ifsb.org/download.php?id=6571&lang=English&pg=/index.php.

Kahf, M. (2019). *Fatawa shares, stock, futures, bonds*. Options 2000-2019 http://monzer.kahf.com/fatawa/FATAWA_SHARES_STOCKS_DERIVATIVES.pdf.

Mansoori, M. T. (1998). Indexation of loans: A Shariah perspective. *Islamic Studies, 37*(1), 103–116.

Mckenzie, R. J. (2022). *S&P global Shariah&Dow Jones islamic market: Success in action*. Trade Financial Global. https://www.tradefinanceglobal.com/posts/sp-global-shariah-dow-jones-islamic-market/.

Meezan (n.d.). Shariah Methodology, https://www.almeezangroup.com/investor-education/shariah-methodology/.

Mohammed, W. S., Barkatulla, M. A. K., Khatkhatay, M. H., & Abbas, Z. (2017). Purging of impure income: A comparative study of the existing purging methodologies. *ISRA International Journal of Islamic Finance, 9*(1), 62–80.

MSCI. (2015). Consultation on enhancements to the MSCI islamic index series. https://www.msci.com/documents/1296102/1626811/Islamic_Index_Enhancements_Consultation.pdf/58965862-4475-454b-9e7c-451689a2b019.

Mulcahy, M. B. (2014). Purifying islamic equities: The interest tax shield. *International Journal of Islamic and Middle Eastern Finance and Management, 7*(4), 473–484.

Orhan, Z. H., & Işıker, M. (2021). Developing a ranking methodology for Sharīʿah indices: The case of Borsa Istanbul. *ISRA International Journal of Islamic Finance, 13*(3), 302–331. https://doi.org/10.1108/IJIF-08-2019-0113

S&P Dow Jones Indices, Dow Jones Islamic Market Indices Methodology, https://www.spglobal.com/spdji/en/documents/methodologies/methodology-dj-islamic-market-indices.pdf.

Salleh, A. Z., & Zakaria, M. Z. (2015). Purification of islamic unit trust funds: A Shariah analysis on Malaysian approach. *Al-Qanatir International Journal of Islamic Studies, 2*(2), 13–22.

TASIS (n.d.). Interest purification, http://www.tasis.in/userfiles/files/Note%20on_Interest_Purification.pdf.

TKBB. (2020). *Pay Senedi i?hracı ve alım-Satımı, Katılım Finansı Standartları No. 1*. https://tkbbdanismakurulu.org.tr/uploads/standartlar/15b3a6ab7a9c402b52ec6b7b52722e3a.pdf.

TKBB. (2022). *Katılım Finans i?lkelerine uygun Faaliyet Gösteren Şirketlerin Pay Senetlerine ait mahzurlu Kazançları arındırmaya i?lişkin uygulama Rehberi*. https://tkbbdanismakurulu.org.tr/uploads/rehberler/EK-PAY-SENEDI-ARINDIRMA-REHBERI.pdf.