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Analysis of the Working Capital Management Efficiency of the Manufacturing Companies in the Islamic Index

İslami Endekste Yer Alan İmalat Sanayi Şirketlerinin Çalışma Sermayesi Yönetimi Etkinlik Analizi

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Analysis of the Working Capital Management Efficiency of the Manufacturing Companies in the Islamic Index[1]*

Abstract

Unlike the traditional finance model, Islamic finance is based on its own principles, outlined by the sharia provisions regarding the management of money in Islamic law. The most important of these principles are profit and loss sharing, risk sharing, interest prohibition, the principle of basing transactions on goods, and the prohibition of investing in extreme uncertainty. In addition to these principles, Islamic law prohibits investing in interest-based financial institutions and some sectors that Islam does not approve of such as alcohol, adult films, pork, etc., and refrains from cooperating with these sectors. The Islamic financial system has been established to take into account social and moral issues as well as acting on religious principles.

Islamic finance has implemented Islamic indices as a guide for those who want to invest in Sharia-compliant stocks. The main purpose of Islamic indices is to inform which company stocks are suitable in terms of sharia. Qualitative and quantitative criteria must be met in order to be included in Islamic indices. Qualitative criteria are related to the fields of activity of companies. However, quantitative criteria consist of financial constraints. One of the financial constraints is the rate of investment in working capital components in total assets. The most important reason for this is that some of the working capital components generate interest income. Working capital is the portion of companies' assets that are expected to be converted into cash within one year. Therefore, the ratio of these assets in total assets is important for companies' risk, profitability, and liquidity. In conclusion, the main research question of this study is how financial restrictions in Islamic indices affect the working capital management of companies.

There are quite a few studies on Islamic indices in the literature. Most of the studies are related to the structural characteristics of these indices. Likewise, there are many publications on the financial performance of these indices. However, studies on working capital management of companies included in Islamic indices are quite limited. In these studies, the relationship between working capital and profitability has been examined. As a result of the literature review, no academic study was found on the working capital management efficiency of companies in Islamic indices. Therefore, this study is the first study done on this subject. In particular, the effect of restrictions on current assets (working capital components) on working capital management has been investigated for the first time.

1 * This study is an extension of the study that was presented as a verbal statement at the International Islamic Insurance and Banking Symposium held between March 25-26, 2021.

Calculation of working capital management efficiency in the study was determined by the index method developed by Bhattacharya (1997). This method consists of calculating three indices. These are performance, utilization, and efficiency indices. Working capital components (cash and equivalents, trade receivables, other trade receivables, inventories, prepaid expenses, and other current assets) and sales of the company are taken into account in the calculation of the three indices. In this study, Participation 30 index companies serving as an Islamic index were selected as the universe of the research. However, not all of the 30 companies that make up this index are included in the analysis. In addition, not all types of companies need working capital management. Working capital management is essential for manufacturing industry companies. Therefore, only manufacturing industry companies were selected in this study. Since there are 17 manufacturing companies in the Participation 30 index, these companies constitute the universe of the study. Financial sector companies supplying the financing of manufacturing industry activities were excluded from the scope of the study. In addition, companies in the retail sector that do not produce commodities are not included in the analysis. In the study, the six-year balance sheet and income statement data of the companies between 2013 and 2018 were used, and these data were obtained from the public disclosure platform.

According to the results obtained from the study, the performance index of 65.69% of the companies, the usage index of 55.89%, and the efficiency index of 67.65% were higher than 1. In other words, these companies have been successful in managing working capital. To sum up, it is concluded that the restrictions imposed by Islamic indices on working capital components do not adversely affect the effectiveness of companies' working capital management.

Keywords: Islamic Law, Islamic Finance, Islamic Indices, Working Capital Management Efficiency, Participation 30 Index

İslami Endekste Yer Alan İmalat Sanayi Şirketlerinin Çalışma Sermayesi Yönetimi Etkinlik Analizi[2*]

Öz

İslami finans, geleneksel finans modelinden farklı olarak İslam hukukunda paranın yönetimi ile ilgili şeri hükümlerin çerçevesini çizdiği, kendine has ilkelere dayanmaktadır. Bu ilkelerden en önemlileri, kar ve zarar paylaşımı, risk paylaşımı, faiz yasağı, işlemleri mala dayandırma ilkesi ve aşırı belirsizlikte yatırım yapma yasağıdır. Bu ilkelere ek olarak, İslam hukuku faize dayalı finans kurumlarına, içki, müstehcen içerikli film, domuz eti vb. gibi İslam'a göre etik olmayan bazı sektörlere yatırım yapılmasını yasaklamakta

[2] * Bu çalışma, 25-26 Mart 2021 tarihleri arasında yapılan Uluslararası İslami Sigortacılık ve Bankacılık Sempozyumunda sözlü bildiri olarak sunulmuş çalışmanın genişletilmiş halidir.

ve bu sektörlerle işbirliği yapmaktan kaçınmaktadır. İslami finans sistemi dini esaslara göre hareket etmesinin yanı sıra sosyal ve ahlaki konulara da dikkate alacak şekilde oluşturulmuştur.

İslami finans şeri açıdan uygun hisse senetlerine yatırım yapmak isteyenlere yol gösterici olarak İslami endeksleri hayata geçirmiştir. İslami endekslerin temel amacı şeri açıdan uygun şirket hisse senetlerinin hangileri olduğunun bilgilendirmesini yapmaktır. İslami endekslerde yer almak için niteliksel ve niceliksel kriterleri yerine getirmek gerekmektedir. Niteliksel kriterler şirketlerin faaliyet alanları ile ilgili iken niceliksel kriterler finansal kısıtlamalardan oluşmaktadır. Finansal kısıtlamalardan bir tanesi toplam varlıklar içerisindeki çalışma sermayesi unsurlarına yapılacak yatırım oranıdır. Bunun en önemli nedeni çalışma sermayesi unsurlarından bazılarının faiz geliri getirme durumudur. Çalışma sermayesi, şirketlerin varlıklarından bir yıl içerisinde nakde dönüşmesi beklenen kısmıdır. Dolayısıyla, bu varlıkların toplam varlıklar içerisindeki oranı şirketlerin riski, karlılığı ve likidite açısından önemlidir. Bu çalışmanın temel araştırma sorusu da İslami endekslerdeki finansal kısıtlamaların şirketlerin çalışma sermayesi yönetimini nasıl etkilediği şeklindedir.

Literatürde İslami endekslerle ilgili oldukça fazla çalışma bulunmaktadır. Çalışmaların büyük kısmı bu endekslerin yapısal özellikleri ile ilgilidir. Yine aynı şekilde bu endekslerin finansal performansı üzerine oldukça yayın vardır. Ancak, İslami endekslerde yer alan şirketlerin çalışma sermayesi yönetimi ile ilgili çalışmalar oldukça sınırlıdır. Bu çalışmalarda da çalışma sermayesi ile karlılık arasındaki ilişki incelenmiştir. Literatür taraması sonucunda İslami endekslerdeki şirketlerin çalışma sermayesi yönetimi etkinliği üzerine akademik çalışmaya rastlanmamıştır. Bu yüzden, makalemiz bu konuda yapılan ilk çalışmadır. Özellikle, şeri kurallara göre çalışma sermayesi unsurlarına yapılan kısıtlamaların çalışma sermayesi yönetimine olan etkisi ilk kez araştırılmıştır.

Çalışmada, çalışma sermayesi yönetimi etkinliğinin hesaplanması, Bhattacharya (1997) tarafından geliştirilen endeks yöntemi ile tespit edilmiştir. Bu yöntem üç endeksin hesaplanmasıyla oluşmaktadır. Bunlar, performans, kullanım ve etkinlik endeksleridir. Üç endeksin hesaplanmasında çalışma sermayesi unsurları (nakit ve benzerleri, ticari alacaklar, diğer ticari alacaklar, stoklar, peşin ödenmiş giderler ve diğer dönen varlıklar) ve şirketin satışları dikkate alınmaktadır. Bu çalışmada da araştırmanın evreni olarak bir İslami endeks olarak hizmet veren Katılım 30 endeksi şirketleri seçilmiştir. Ancak bu endeksi oluşturan 30 şirketin tamamı analize dâhil edilmemiştir. Ayrıca her tür şirketin çalışma sermayesi yönetimine ihtiyacı yoktur. İmalat sanayi şirketleri için çalışma sermayesi yönetimi zaruridir. Dolayısıyla bu çalışma-

da sadece imalat sanayi şirketleri seçilmiştir. Katılım 30 endeksi içerisinde 17 adet imalat şirketi yer aldığı için çalışmanın evrenini bu şirketler oluşturmaktadır. İmalat sanayi faaliyetlerinin finansmanını tedarik eden mali sektör şirketleri, çalışma kapsamından çıkarılmıştır. Ayrıca, ticari mal üretimi yapmayan perakende sektöründeki şirketler de analize dâhil edilmemiştir. Çalışmada şirketlerin 2013-2018 yılları arası altı yıllık bilanço ve gelir gider tablosu verileri kullanılmış olup bu veriler halka açık kamu aydınlatma platformundan temin edilmiştir.

Çalışmadan elde edilen sonuçlara göre şirketlerin 65.69%'nun performans endeksi, 55.89%'nun kullanım endeksi ve 67.65%'nin etkinlik endeksi bir değerinden yüksek çıkmıştır. Diğer bir deyişle, bu şirketler çalışma sermayesinin yönetiminde başarılı olmuşlardır. Özetlersek, İslami endekslerin çalışma sermayesi unsurlarına getirdiği kısıtlamaların şirketlerin çalışma sermayesi yönetiminin etkinliğini olumsuz yönde etkilemediği sonucu çıkmaktadır.

Anahtar Kelimeler: İslam Hukuku, İslami Finans, İslami Endeksler, Çalışma Sermayesi Yönetim Etkinliği, Katılım 30 Endeksi

Introduction

A wide variety of securities are bought and sold in capital markets. The investor does not have to know the features of every security. However, fund managers trading in this market must know all the features of the securities. Usually, investors' savings are managed by portfolio management companies. Therefore, companies compose portfolios of securities according to their customers' targets, preferences, and attitudes to risk. First of all, a fund manager needs to determine the investment conditions that her/his client never wants to invest in. This exclusion may arise from religious beliefs as well as ethical, social, or economic reasons. Also, restrictions may not be due solely to the characteristics of the securities. The investor has the freedom to gather his savings in certain countries or exclude certain sectors[3]. Some investors may only prefer investment tools in their home country. Others may choose markets that allow them to invest correctly in terms of their beliefs. These kinds of investments are possible in the global world. Therefore, every portfolio company manager is expected to offer all kinds of alternatives for the preferences of their customers.

Due to the interest prohibition, the need for stock markets is higher in Islamic finance. And also, stock markets keep investors away from interest. In terms of Islam, these markets are halal since they do not provide interest

[3] Ulrich Derigs - Shehab Marzban, "Review and Analysis of Current Shariah-Compliant Equity Screening Practices", *International Journal of Islamic and Middle Eastern Finance and Management 1/4 (01 Ocak 2008), 285-286.*

income. However, it is not totally halal. Not all traded stocks meet Islamic requirements. This has highlighted the need for ethical financial investment instruments that profit ethically. To meet this need, Islamic indices in accordance with Sharia were created. The main purpose of these indices was to keep them away from forbidden investments according to Sharia. In terms of principles, Islamic indices are similar to ethical or social indices. In both types of indices, there are supervisory boards that advise on companies' compliance. The main difference between them is that the reference for Islamic indices is religion, and the activities of the companies included in these indices are approved by the Sharia boards. The Islamic indices, which started locally, later started to serve globally. Sharia-compliant indices have been introduced to the world by globally trusted index providers such as Standard & Poor's, FTSE Morgan Stanley, and Dow Jones[4]. The main purpose of these global index providers to popularize Islamic indices is to lead the spread of capital from Muslim countries to the world.

Islamic finance is becoming an important factor in the world economy. There are more than 1000 institutions providing Islamic financial services in 75 countries around the world. The Islamic finance sector grew by 28% annually between 2006-2009 (despite the 2007-08 Global Financial Crisis). While the value of the Islamic finance sector was USD 2.4 trillion in 2017, this figure is expected to reach USD 3.8 trillion by 2023[5]. As can be seen, the capital value of Islamic investors in the global sense is constantly increasing. Even financial institutions that have been providing conventional banking services for years have established Islamic banks to get a share from the Islamic finance market6. Thanks to the increasing importance of Islamic finance, Islamic indices have been created in many Muslim and non-Muslim countries.

Chronologically, Islamic indices started to take place in the field of finance for the first time in the late nineties. DMI 150 (Dar al-Mal al-Islami) was first launched in April 1998 by two private banks (Faisal Finance and Bank Vontobel) to monitor the performance of 150 global companies that are publicly traded. In November of the same year, another index SAMI (Socially Aware Muslim Index) was created. The purpose of this index was to measure the performance of 500 Sharia-compliant companies. Following this beginning,

4 Abdelbari El Khamlichiet. al.., "Are Islamic Equity Indices More Efficient Than Their Conventional Counterparts? Evidence From Major Global Index Families", *Journal of Applied Business Research (JABR) 30/4 (30 Haziran 2014), 1137.*

5 Thomsen Reuters, *State of the Global Islamic Economy Report 2018/19 (Dubai: Thomson Reuters, 2018).*

6 Hakan Aslan - Mücahit Özdemir, *"Development of The Islamic Finance in Turkey: A Questionnaire Study" (Kuala Lumpur International Business, Economics and Law Conference 7, Hotel Putra, Kuala Lumpur, Malaysia. I: KLIBEL, 2015), 29-42.*

some financial markets launched their own Islamic indices. Thus, Dow Jones Islamic Market Index (February 1999) and Global Islamic Index Series (October 1999) at the London Stock Exchange were created. Global Benchmark Shariah indices (December 2006) and the global family of Islamic indices (March 2007) were launched by Standard and Poor's and MSCI Barra, respectively. Stoxx limited composed the first Islamic indices in Europe in February 2011. The purpose of these indices is to measure companies that comply with the Sharia in the Stoxx Europe 600 index. In addition, Islamic indices were created locally in other countries (Malaysia, India, Pakistan, Saudi Arabia, Taiwan, Bahrain, Turkey, and Egypt)[7].

An investor who wants to invest in accordance with Islamic rules must comply with a series of laws and rules. These laws and rules are called sharia and consist of the sources of the Qur'an, Hadith, and Ijtihad. There is no single high institution in Islam (such as the Catholic Church) that determines the rules to be followed by all Muslims. The absence of such an institution brings along different views on sharia issues. If there had been a single institution, the situation would be simpler in terms of Islamic finance. The decision of the institution as to whether the security was suitable in terms of sharia would be uniform and there would be no different interpretations. However, due to the absence of such a high institution, Islamic index providers sought to cooperate with Islamic scholars to interpret different sources of Sharia. Scholars have created a series of sharia guidelines that classify securities in terms of halal and haram[8]. Thanks to these guidelines, Islamic indices were offered to investors. Managers of Islamic indices constantly monitor these companies. Companies to be included in these indices must comply with the sharia rules of the index. In addition, companies that were previously included in the index must continue to comply with these rules. Otherwise, they may be excluded from the index.

Companies that are included in Islamic indices have to meet certain criteria determined by Islamic scholars. However, the criteria of all indices are not common. While the criteria of some Islamic indices are common, some criteria may differ. The reason for differentiation is the differences in interpretation of Islamic scholars. Even though there are different interpretations, the criteria of Islamic indices are basically divided into two as qualitative (sectoral) and quantitative (financial) criteria. Quantitative criteria are also grouped under four sub-headings as liquidity, interest income, interest expenses, and unacceptable income criteria. Qualitative criteria are the first step in evaluating

7 El Khamlichi et. al., "Are Islamic Equity Indices More Efficient Than Their Conventional Counterparts?".

8 Derigs - Marzban, "Review and Analysis of Current Shariah-compliant Equity Screening Practices

companies. Even if a company that does not meet these criteria meets the quantitative criteria, they cannot be included in Islamic indices[9].

Qualitative criteria are the criteria by which companies are investigated whether they operate in sectors that are not allowed in terms of sharia. Companies that produce prohibited products such as alcohol and pork, according to Sharia, are generally not included in the Islamic indexes.

Quantitative criteria, which are evaluated according to financial ratios, come after the qualitative criteria. Quantitative criteria are slightly more complex than qualitative criteria. Sharia prohibits the buying and selling of money and riba. However, in today's world economies, no company can completely isolate itself from interest. An Islamic index of companies that have never been involved in interest seems impossible in the current financial system. In such a situation, Islamic indices show flexibility in interest due to some necessity. However, this flexibility also has a limit. Islamic indices examine in-depth to what extent companies are involved in interest. In Islamic indices, the contagion is measured by how much interest-based income the company receives and how much interest the company pays for its debt. Also, since money in Islam itself is not an allowable asset that can be bought and sold for money, the level of a company's cash and cash equivalents must be measured and compared to the maximum allowable threshold. This has necessitated the definition of thresholds that limit the amount of interest acceptable from an Islamic perspective. There is no direct provision in the Qur'an and Hadith for these thresholds. Therefore, scholars have determined the threshold levels for interest-based on ijtihad and sharia practices. These threshold levels should not be exceeded. However, these threshold values do not grant companies complete freedom. In other words, interest earnings up to the threshold level should not be interpreted as permissible. Scholars expressed their views on what to do with non-Sharia earnings. Thus, they underlined the necessity of purifying earnings from interest.

Islamic indices examine companies' publicly disclosed financial statements to measure the extent to which companies are involved in interest. These financial statements are balance sheets and income statements.

The first of the quantitative criteria is the liquidity criterion. The most liquid assets of companies are mainly cash, checks received, banks, securities invested in order to generate short-term returns, and receivables accounts. For traditional financial experts, the more liquid assets of the company, the higher its ability to pay its short-term debts. As long as companies pay their debts, they can continue their continuity. Companies that cannot pay their debts on time are doomed to bankruptcy. However, from the sharia perspe-

9 Derigs - Marzban, "Review and Analysis of Current Shariah-Compliant Equity Screening Practices"

ctive, the earning must be earned from company assets other than cash and cash equivalents. In other words, companies only have to earn from the sale of illiquid assets. Generally, the ratio of liquid assets in the total assets of a company cannot exceed fifty percent in Islamic indices.

The second quantitative criterion is the interest income criterion. Earnings from interest are generally not allowed, according to Sharia rules. However, a threshold has been set for the interest income that companies will receive in cases where they have to work with banks. Permitted interest income is measured in two ways with the determined threshold. The measurement is made either by the amount of interest earned or by the amount of cash and short-term investments that can generate interest income. For example, the amount of interest income of a company cannot exceed five percent of its total income.

The third quantitative criterion is the interest expense criterion. Companies are obliged to pay interest against debts to be obtained from outside. The restriction on interest income is also applied to interest expenses. Accordingly, the amount of debt that will require companies to pay interest cannot exceed a certain threshold level. For example, the amount of debt in a company's total assets is limited to thirty percent.

The last of the quantitative criteria is the income not accepted criterion. This criterion is particularly complementary to the qualitative criterion. Qualitative criteria are the criteria for whether a company produces goods and services in the fields of activity in accordance with Sharia. If a company's main field of activity does not comply with Sharia, it cannot be included in Islamic indices. However, while the main field of activity of the company is following Sharia, its subsidiary fields of activity may not be in accordance with Sharia. In this case, what will be the status of the company in Islamic indices? Will it be included in the index? Islamic scholars have ruled that a company cannot be completely excluded from Islamic indices if its subsidiary fields do not comply with Sharia. However, there is also a threshold value in this criterion. In other words, the ratio of the income obtained from the activities of the company, which is not accepted in Islamic terms, to the total income cannot exceed a certain level. For example, this ratio is determined as five percent in some indices.

There are four Islamic indices in Turkey: Participation 30, Participation 50, Participation Model Portfolio, and Ziraat Portfolio Participation Index. The qualitative criteria of these four indices are the same. Accordingly, since companies of conventional financial services, alcoholic beverages, products of the genre, gambling and games of chance, food containing pork, press, publishing, advertising, tourism, entertainment, gold and silver futures trading deal with interest, they cannot be included in Islamic indices in Turkey[10].

[10] Salih Ülev - Mücahit Özdemir, "Katılım Endeksi ile Piyasa Faiz Oranları Arasındaki Nedensellik İlişkisi" *International Congress on Islamic Economics and Finance*, Sakarya/Turkey: ICISEF,

The quantitative criteria of Participation 30, Participation 50, and Participation Model Portfolio are the same. Accordingly, the ratio of companies' total interest loans to market value has to be less than 30%, the ratio of interest-earning cash and securities to market value has to be less than 30%, and the income obtained from the fields specified in the field of activity criteria (fields of activity prohibited by the Sharia) to the total income has to be less than 5%.

The restrictions imposed on the quantitative criteria of Islamic finance are closely related to working capital management. Working capital management is the management of the company's current assets. Finance literature generally focuses on long-term financial decisions, namely capital budgeting, capital structure, dividends, and company valuation. However, the management of current assets and short-term debt has a significant impact on the firm's risk, liquidity, and profitability. Effective working capital management, which takes a large part of the financial managers' time, plays an important role in company performance[11].

One of the most important issues in business finance is working capital management. Working capital consists of current assets, cash equivalents, short-term investment securities, trade receivables, and stocks accounts. Management of these components is important for many reasons. Investing in excess current assets negatively affects the profitability of the company and causes a low return on investment. However, having less current assets may cause customers not to meet their demands on time. Therefore, an optimum level of investment should be made in every current asset combination. This is essential to keep the activities running smoothly. Effective working capital management eliminates the risk of not meeting the obligations due. It also ensures that decisions are made to prevent overinvestment in these assets. However, an accurate estimate of sufficient working capital is a difficult task for company management. It is difficult because the amount of working capital varies according to the nature of the job, the scale of operation, the production cycle, credit policy, raw material status. Therefore, a substantial amount of funds must be invested permanently in various current assets. For example, although the time between the sale of goods on credit and the collection of receivables is likely to be prolonged, the company must hold a sufficient amount of working capital[12].

2015, 47-54.

11 Keith Smith, "Profitability Versus Liquidity Tradeoffs in Working Capital Management", *Readings on the Management of Working Capital* 42 (1980), 549-562.

12 Harsh Vineet Kaur - Sukhdev Singh, "Managing Working Capital Efficiency in Capital Goods Sector in India", *Global Business Review* 14/2 (June 2013), 344.

The next part of the study will include the literature on working capital management efficiency. Then, the data and method used in the study will be mentioned. The results obtained from the method will be summarized in the findings section. In the conclusion and discussion part, the results will be interpreted and recommendations will be made on issues that need to be considered in future studies.

1. Literature Review

There are many scientific studies on working capital in the finance literature. Since the subject of the study is the working capital management efficiency index, only the relevant studies will be given below in this section. The calculation method of the working capital management index invented by Bhattacharya[13] will be explained in the next section.

Afza and Nazir[14] analyzed the working capital management efficiency of companies operating in the Pakistani cement industry between 1988-2009. Instead of using the classical working capital ratios, which are frequently used in the literature, they used the working capital management efficiency index method created by Bhattacharya.

Ghosh and Maji[15] analyzed the working capital management efficiency of 20 companies operating in the Indian cement industry between 1992-2002. The efficiency index of these companies was greater than one in only four years of the ten years considered.

Kasiran et al.[16] examined the working capital management efficiency of 24 small and medium-sized companies operating in Malaysia between 2010-2013. They found that the selected small and medium-sized companies could not achieve efficiency in working capital management.

Kamua and Basweti[17] investigated the relationship between corporate governance and working capital management efficiency of forty-two companies operating in the Nairobi Stock Exchange between 2006-2012. According to the results of the study, they found that there is no statistically significant

13 [11] Hrishikes Bhattacharya, *Total Management by Ratios* (India: SAGE Publications, 1997).

14 Talat Afza - Mian Sajid Nazir, "Working Capital Management Efficiency of Cement Sector of Pakistan", *Journal of Economics and Behavioral Studies* 2 (May 2011), 223-235.

15 Santanu Kr Ghosh - Santi Gopal Maji, "Working Capital Management Efficiency: A Study On The Indian Cement Industry", *Management Accountant-Calcutta*- 39 (2004), 363-372.

16 Farrah Wahieda Kasiran et al.., , "Working Capital Management Efficiency: A Study on the Small Medium Enterprise in Malaysia", *Procedia Economics and Finance* 35 (January 2016), 297-303.

17 Simon M. Kamau - Kefah A. Basweti, "The Relationship Between Corporate Governance and Working Capital Management Efficiency of Firms Listed at The Nairobi Securities Exchange", *Research Journal of Finance and Accounting* 4/19 (2013), 190-199.

relationship between corporate governance and working capital management efficiency.

Kaur and Singh[18] measured the working capital management efficiency of 14 capital goods-producing companies operating in the Bombay Securities market. Accordingly, they found that 35 to 78 percent of the companies surveyed between 2000 and 2010 managed their working capital effectively.

Prasad and Lakshimi[19] studied the working capital management efficiency of 15 randomly selected companies operating in the Indian pharmaceutical industry. They found that the working capital management efficiency results of enterprises classified as small, medium, and large between 2006 and 2016 were at average levels when compared to the group in which they were included. However, the authors concluded that when companies were considered individually, their efficiency levels were low or high.

Mohanraj[20] examined the relationship between working capital management efficiency and profitability in the period 1997-98 to 2004-05 of a cement company operating in India. Accordingly, there is a positive relationship between working capital efficiency and return on assets. Moreover, empirical findings show that leverage and asset structure have a significant effect on profitability, while the cash conversion cycle has a negative effect.

As can be seen in the literature summary given above, the majority of the studies are on companies operating in India and Far East Asian countries. The most important reason for this is that Bhattacharya, who brought the working capital management efficiency index to the literature, is an Indian academic. The author has many generally accepted scientific publications on business finance. However, there is a limited number of cited publications on the working capital management efficiency index in the Western literature.

This method was first tested by Kandil Göker[21] on companies operating in Borsa Istanbul in Turkey. Kandil Göker determined the working capital management efficiency of 24 food industry companies between 2010 and 2017. She concluded that the companies are effective in working capital management.

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18 Harsh Vineet Kaur - Sukhdev Singh, "Managing Working Capital Efficiency in Capital Goods Sector in India", Global Business Review 14/2 (June 2013), 343-355.

19 R. Siva Rama Prasad - B. Hima Lakshmi, "Working Capital Management Efficiency: a Study on Selected Pharmaceutical Companies in India", *International Journal of Information and Computing Science 5/1 (2018), 40-45.*

20 V. Mohanraj, "Working Capital Efficiency: A Case Study of Associated Cement Company Limited India", *CLEAR International Journal of Research in Commerce & Management* 7/2 (February 2016), 21-23.

21 İlkut Elif Kandil Göker, "Çalışma Sermayesi Yönetiminde Etkinlik Durumunun Tespiti: Bıst Gıda Sektörü Firmaları Üzerine Bir Araştırma", *Uluslararası Yönetim Eğitim ve Ekonomik Perspektifler Dergisi 6/3 (2018), 69-79.*

Güler and Konuk[22] calculated the working capital management efficiency of 21 companies traded in Borsa Istanbul in 2009-2016. The most important feature of the study is that it gives details on how the working capital management efficiency is calculated.

In her second study on working capital management efficiency, Kandil Göker[23] preferred companies included in the sustainability index as the universe of the study. In the study, it was analyzed whether there is a significant difference in the working capital management efficiency results of the companies before the date the sustainability index was started to be calculated and after the index was implemented. As a result of the analysis, it was concluded that there is a statistically significant difference in the working capital management efficiency results of companies before and after the sustainability index.

Sakınç[24] calculated the working capital management efficiency of 15 companies operating in the retailing sector in Turkey between the years 2011-2018. The author found that most companies manage their working capital effectively.

2. Data and Methodology

This study analyzes the working capital management efficiency of manufacturing industry companies included in the Participation 30 index, which is an Islamic index. Within the index, 17 out of 30 companies operate in the manufacturing industry. The reason for choosing manufacturing industry companies is that working capital management is vital for these companies. Financial sector companies that supply the funds needed to finance the economic activities of the manufacturing industry were excluded from the scope of the study. In addition, companies in the retail sector that do not produce commercial goods, only intermediaries in the sales of goods produced by other companies, are not included in the analysis. The study covers a six-year period between 2013-2018. The data of the companies have been collected from secondary sources. These data are obtained from the balance sheet and income statement of the companies' public disclosure.

In the study, attention was paid to choosing companies from Participation 30, which is an Islamic index. The most important reason for this is the

22 Emine Güler - Filiz Konuk, "Çalışma Sermayesi Etkinlik Ölçümünde Alternatif Bir Araç: İndeks Yöntemi", *Muhasebe ve Finansman Dergisi (Ekim 2019), 35-48.*

23 Ilkut Elif Kandil Goker, "An Analysis of Working Capital Efficiency of Companies Listed on Sustainability Index By Index Method", *Journal of Economics Finance and Accounting 7*/2 *(June 2020), 94-102.*

24 Öznur Sakınç, "*İşletme Sermayesinin Etkinliğinin Ölçülmesi ve BİST'de Bir Uygulama", Ulusal, Uluslararası ve Küresel Ölçekte Finans Uygulamaları (Ankara: Gazi Kitapevi, 2021), 411-428.*

limitation of Islamic indices on the current assets of companies. How is working capital management affected by the restrictions imposed on current assets by companies in the Islamic index? This is the main research question of the study. In other words, it is investigated how effectively the company managed its working capital between 2013-2018. Table 1 shows 17 companies whose working capital management efficiency was calculated in the study.

Table 1. Manufacturing Industry Companies in Participation 30 Index Between 2013-2018

Company Codes	Company Full Names
ALKIM	Alkim Alkali Kimya A.Ş
AYGAZ	Aygaz A.Ş
CCOLA	Coca Cola İçecek A.Ş
CEMAS	Çemaş Döküm Sanayi A.Ş
DEVA	Deva Holding A.Ş
EGEEN	Ege Endüstri ve Ticaret A.Ş
EREGL	Ereğli Demir ve Çelik Fabrikaları T.A.Ş
GUBFR	Gübre Fabrikaları T.A.Ş
ISDMR	İskenderun Demir ve Çelik A.Ş
KARTN	Kartonsan Karton Sanayi ve Ticaret A.Ş
KERVT	Kerevitaş Gıda Sanayi ve Ticaret A.Ş
KONYA	Konya Çimento Sanayii A.Ş
OYAKC	Oyak Çimento Fabrikaları A.Ş
RTALB	RTA Laboratuvarları Biyolojik Ürünler İlaç ve Makine Sanayi Ticaret A.Ş
TUKAS	Tukaş Gıda Sanayi ve Ticaret A.Ş
TTRAK	Türk Traktör ve Ziraat Makineleri A.Ş
YATAS	Yataş Yatak ve Yorgan Sanayi ve Ticaret A.Ş

Financial ratios have traditionally been used in publications on working capital in the literature. However, in order to measure the working capital management efficiency, the index method developed by Bhattacharya was preferred in this study. Bhattacharya[25] measures the working capital management efficiency with three index methods developed by him. These indices are; performance index, usage index, and efficiency index.

Performance Index (PI): The performance index shows the average performance of the elements in current assets. If the rate of increase in sales volume in a certain period of time is higher than the increase rate of current asset components, it can be said that the firm manages its working performance effectively. Numerically, a firm's performance index greater than 1 indicates that the firm manages its working capital efficiently.

25 Bhattacharya, *Total Management by Ratios.*

$$Performance\ Index\ (PI) \frac{I_s \sum_{t=1}^{n} \frac{W_{i(t-1)}}{W_{it}}}{N}$$

Is = Sales Index (St/St-1)

Wi= Current Assets Main Account Group Amounts

N= Number of Account Groups in Current Assets

Utilization Index (UI): While the performance index represents the average overall performance in managing the current asset components, the utilization index shows the company's ability to use its current assets as a whole for the purpose of generating sales. If there is an increase in total current assets with the proportional increase in sales, it indicates that the utilization degree of these assets compared to sales has improved. Ultimately, this situation reflects the operating cycle of the company. The shortening of the operating cycle is a factor that increases the profitability of the company. Therefore, increasing the utilization degree can shorten the activity cycle. As a result, a company's usage index value greater than 1 is a sign of improvement.

$$Utilization\ Index\ (UI) = \frac{A_{t-1}}{A_t}$$

A = Current Assets / Sales

Efficiency Index (EI): The efficiency index is a performance scale that measures the combined effect of both the performance index and the utilization index. In other words, this index consists of the product of the performance index and the utilization index and measures the ultimate working capital efficiency index of a company.

$$Utilization\ Index\ (UI) = \frac{A_{t-1}}{A_t}$$

EIwcm = Working Capital Management Efficiency Index

PIwcm = Working Capital Management Performance Index

UIwcm = Working Capital Management Utilization Index

3. Findings

In order to calculate working capital management efficiency, first of all, performance, utilization, and efficiency indices should be calculated. The main factor in the calculation of these three indices is the working capital components. In the study, cash and equivalents, trade receivables, inventories, prepaid expenses, and other current assets accounts were used as working capital components. The findings are summarized in the tables below.

Table 2 contains the six-year (2013-2018) working capital performance index results of the real sector companies included in the Participation 30 index. The fact that the working capital performance index (PI) is greater than one means that the proportional increase in the sales of the companies in that period is more than the average increase in each working capital component. If this ratio (PI) is greater than one, it is an indicator that the company is successful in working capital management. When the performance index results of companies are examined on a yearly basis, the percentage of companies that get greater than one value is 59, 82, 65, 59, 71, 59 in 2013, 2014, 2015, 2016, 2017, and 2018, respectively. When Table 2 is examined on a company basis, the performance index value of KARTN and YATAS companies in all years and ALKIM and GUBFR companies in five years is greater than one. The performance index value of AYGAZ and TTRAK companies is greater than 1 for only two years. The reason why KARTN's performance index value in 2016 was very high (1101.40) is that the value of other current assets of the company decreased significantly in 2016 compared to the previous year.

Table 2: Working Capital Performance Index (PI) of Manufacturing Industry Companies in Participation 30 Index

Companies	2013	2014	2015	2016	2017	2018	Company Basis
ALKIM	1.09	1.26	0.76	2.42	1.67	1.24	5
AYGAZ	0.96	1.53	0.97	0.90	0.86	1.25	2
CCOLA	0.79	1.10	1.07	0.99	1.04	1.23	4
CEMAS	1.11	3.51	0.64	1.77	2.36	1.51	5
DEVA	1.00	1.12	1.23	1.16	0.97	0.91	4
EGEEN	1.66	2.28	1.73	0.70	0.85	8.58	3
EREGL	0.92	1.05	1.10	0.91	1.29	0.96	3
GUBRF	0.64	1.13	1.08	1.34	1.05	1.55	5
ISDMR	7.06	1.23	1.07	0.89	1.49	0.80	4
KARTN	1.50	2.05	1.33	1101.40	1.35	5.45	6
KERVT	0.91	1.28	0.85	1.02	1.23	3.26	4
KONYA	1.36	13.48	0.85	0.56	4.70	0.76	3
OYAKC	0.80	5.22	0.87	1.15	1.93	0.88	3
RTALB	0.98	0.97	1.12	2.11	1.44	0.59	3
TUKAS	1.18	0.87	3.75	1.04	0.68	3.87	4
TTRAK	1.27	0.82	2.97	0.89	0.99	0.99	2
YATAS	1.88	1.30	1.32	1.08	1.16	5.33	6
Year Basis	10	14	11	10	12	10	
Percentage	59%	82%	65%	59%	71%	59%	65.69%

Table 3 shows the working capital utilization index (UI) results of companies. The utility index indicates how well companies benefit from their current assets in order to generate sales income. The fact that the UI value is greater than one indicates that the company's ability to benefit from current assets is high. When the utilization index results of companies are examined on a yearly basis, the percentage of companies that get greater than one value is 71, 41, 41, 76, 47, and 59 in 2013, 2014, 2015, 2016, 2017, and 2018, respectively. When the UI values on a company basis are examined, only KARTN Company has been successful for five years. It has been determined that EREGL company successfully utilized its current assets for only one year.

Table 3: Working Capital Usage Index (UI) of Manufacturing Industry Companies in Participation 30 Index

Companies	2013	2014	2015	2016	2017	2018	Company Basis
ALKIM	1.22	0.82	0.90	1.25	1.04	0.96	3
AYGAZ	1.43	0.63	0.84	1.01	1.11	1.09	4
CCOLA	1.44	0.95	0.89	0.65	1.59	0.96	2
CEMAS	3.18	0.54	1.04	1.33	0.69	1.27	4
DEVA	1.08	1.07	1.26	0.84	0.84	1.02	4
EGEEN	1.11	0.74	0.72	1.01	1.27	1.50	4
EREGL	0.96	0.96	0.71	1.20	0.95	0.95	1
GUBRF	1.15	0.98	1.18	1.02	1.07	0.83	4
ISDMR	0.89	1.04	0.63	1.23	0.88	1.12	3
KARTN	1.47	1.02	1.09	1.12	0.84	1.03	5
KERVT	1.21	0.68	0.88	1.24	1.03	1.21	4
KONYA	0.98	0.93	0.95	1.12	1.09	0.97	2
OYAKC	1.05	0.85	1.01	1.05	0.52	1.38	4
RTALB	0.65	1.19	0.98	1.11	0.66	0.78	2
TUKAS	0.87	1.35	1.09	0.90	1.23	1.26	4
TTRAK	1.03	1.09	0.96	0.97	0.86	1.09	3
YATAS	1.10	1.15	1.30	1.26	0.86	0.94	4
Year Basis	12	7	7	13	8	10	
Percentage	71%	41%	41%	76%	47%	59%	55.88%

Table 4 shows the working capital management efficiency index results of companies. The efficiency index is calculated by multiplying the performance and utility indices. When this ratio is greater than one, it is interpreted that the working capital of the company is managed effectively. When the efficiency index results of companies are examined on a yearly basis, the percentage of companies that get greater than one value is 76, 82, 47, 59, 71, 71 in 2013, 2014, 2015, 2016, 2017, and 2018, respectively. When the EI values on a company basis are examined, KARTN and YATAS Companies have been successful for all years. It is seen that only AYGAZ managed the working capital of the company effectively for only two years.

Table 4: Working Capital Efficiency Index (EI) of Manufacturing Industry Companies in Participation 30 Index

Companies	2013	2014	2015	2016	2017	2018	Company Basis
ALKIM	1.33	1.03	0.69	3.03	1.74	1.18	5
AYGAZ	1.37	0.97	0.82	0.90	0.95	1.36	2
CCOLA	1.13	1.05	0.95	0.64	1.65	1.17	4
CEMAS	3.54	1.89	0.67	2.36	1.62	1.92	5
DEVA	1.08	1.20	1.55	0.98	0.81	0.93	3
EGEEN	1.84	1.70	1.25	0.70	1.08	12.84	5
EREGL	0.88	1.01	0.78	1.09	1.22	0.91	3
GUBRF	0.74	1.10	1.28	1.36	1.13	1.29	5
ISDMR	6.25	1.27	0.67	1.10	1.31	0.89	4
KARTN	2.21	2.09	1.45	1233.75	1.14	5.60	6
KERVT	1.11	0.87	0.75	1.26	1.27	3.93	4
KONYA	1.33	12.56	0.82	0.63	5.12	0.74	3
OYAKC	0.84	4.45	0.88	1.21	1.00	1.21	4
RTALB	0.64	1.16	1.10	2.34	0.95	0.46	3
TUKAS	1.02	1.18	4.08	0.94	0.83	4.87	4
TTRAK	1.30	0.90	2.86	0.86	0.85	1.08	3
YATAS	2.06	1.51	1.71	1.35	1.00	5.00	6
Year Basis	13	14	8	10	12	12	
Percentage	76%	82%	47%	59%	71%	71%	67.65%

Conclusion and Suggestions

Companies included in / to be included in Islamic indices must abide by sharia rules. Some of these rules relate to the nature of companies' assets. The ratio of current assets to total assets cannot exceed the threshold values according to Islamic index rules. Therefore, in this study, the effect of these limitations on working capital management has been examined. For this, seventeen manufacturing companies included in Participation 30 were analyzed.

The six-year average of the manufacturing companies included in the Islamic index according to the working capital performance index is 65.69%. It is seen that approximately two-thirds of the companies have demonstrated successful performance. In other words, the rate of increase in the sales volume of these companies is higher than the increase rate of current asset components. It is clear that this situation will have a positive effect on profitability.

The six-year average of the working capital utilization index value of the manufacturing companies included in the Islamic index is 55.58%. It is observed that more than half of the companies use their working capital effectively. In other words, these companies actively used their current assets as a whole to generate sales.

The working capital efficiency index is calculated by multiplying the working capital performance and utilization index. In other words, it is the process of making two indices into a single index. The six-year average of the efficiency index is 67.65%. According to this result, two out of every three enterprises managed their working capital effectively.

It can be said that the company performances expressed in the percentages above are good for the real sector companies included in the Islamic index. In the first place, it is seen that the restrictions on current assets in Islamic indices do not negatively affect the performance of companies. Thus, it can be concluded that the religious restrictions imposed on current assets by Islamic indices are financially beneficial for companies. However, in order to interpret this situation clearly, it is necessary to calculate the working capital efficiency indices of the manufacturing companies that are not included in the Islamic index. Then, these calculated values should be compared statistically with the companies in the Islamic index. After the comparison, it will be determined objectively which types of companies manage their working capital more effectively. Considering this situation in future studies will make a significant contribution to the literature.

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