

İSTANBUL BUSINESS RESEARCH

Cilt Volume 51 Sayı Number 2 E-ISSN 2630-5488



İSTANBUL
ÜNİVERSİTESİ
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Emerging Sources Citation Index (ESCI) - Web of Science

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ISTANBUL BUSINESS RESEARCH
Volume: 51 • Number: 2 • November 2022
E-ISSN: 2630-5488 • DOI: 10.26650/ibr

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PUBLISHER

Istanbul University Press

Istanbul University Central Campus, 34452 Beyazıt, Fatih / Istanbul, Türkiye

Phone: +90 (212) 440 00 00

Authors bear responsibility for the content of their published articles.

The publication language of the journal is English.

This is a scholarly, international, peer-reviewed and open-access journal published biannually in May and November.

Publication Type
Periodical

ISTANBUL BUSINESS RESEARCH

Volume: 51 • Number: 2 • November 2022

E-ISSN: 2630-5488 • DOI: 10.26650/ibr

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Mehmet Nasih Tağ



Istanbul Business Research

Submitted: 22.01.2021

Revision Requested: 04.04.2021

Last Revision Received: 03.02.2022

Accepted: 04.02.2022

Published Online: 22.03.2022

RESEARCH ARTICLE

Bitcoin Mining in Turkey as an Example of Speculative Entrepreneurship

Ali Osman Uymaz¹ , Ali Rıza Esmen² 

Abstract

The main purpose of this study is to determine the dimensions of speculative entrepreneurship for Turkish Bitcoin miners and to determine the motivational factors for becoming entrepreneurs in this area. The study was designed as a qualitative study where data was collected from a sample of 13 Bitcoin miners. The collected data was analyzed and coded through thematic analysis. After determining each participant's profile, a narrative analysis was conducted to ensure the integrity of the research. Some of the key common characteristics determined were awareness, arbitrage, and high-profit expectations, whereas the self-manipulation feature was determined to be low. The key motivation for Participants for investing in Bitcoin was the absence of central management, the beginning of a new financial structure outside the existing system, the opportunity for absolute privacy, and the excessive interest of society, which would serve as a leverage for arbitrage, with high profit expectation. With their increased level of awareness and knowledge, Bitcoin miners saw the opportunity for arbitrage. As speculative entrepreneurs, Bitcoin miners were aware of the extreme nature of the risk of investing in Bitcoin to gain highly desirable and expected profit by using the arbitrage opportunity in the existing system.

Keywords

Entrepreneurship, Speculative Entrepreneurship, Arbitrage, Cryptocurrency, Bitcoin Mining

Introduction

Today, entrepreneurship is considered an important source of development, competitive advantage, and efficiency (Kritikos, 2014). Due to these underlying reasons, it has found an important place in the objectives and programs of governments, companies, and universities (Estrin, Korosteleva, & Mickiewicz, 2013), and therefore projects related to this entrepreneurship have been supported by these organizations and governments alike in recent years (Oylumlu, 2019). Classes are offered in schools to develop entrepreneurship thanks to support given by the Government (Olssen & Peters, 2005), and unconscious encouraging signals from different sources in daily life also contribute to the development and strengthening of

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To cite this article: Uymaz, A. O., & Esmen, A. R. (2022). Bitcoin mining in Turkey as an example of speculative entrepreneurship. *Istanbul Business Research*, 51(2), 375-397. <http://doi.org/10.26650/ibr.2022.51.866397>



individuals' innovative and entrepreneurial aspects (Eken, 2018; Zhang & Acs, 2019). We have witnessed through time that new products and services are emerging as a result of the entrepreneurship that has been changing the ecosystem and our daily and business life. Today, the ecosystem of cryptocurrencies, called Bitcoin, is a prominent example of the innovative products and services that have attracted the attention of governments, organizations, and individuals. Bitcoin has become the center of attention due to its global infrastructure supported by internet technologies, the privacy and convenience it provides to users, and its rising and fluctuating price in a short period (Arı, Yelgen, & Uçak, 2022).

Fluctuations in Bitcoin value cannot be explained by existing theories and models (Öztürk, Arslan, Kayhan, & Uysal, 2018) because of its speculative character. In this unstable ecosystem of cryptocurrencies, an actor is performing important functions, including the production and infrastructure services of Bitcoin, which does not have a central management, production, and registration system. To become a Bitcoin miner, one must make an investment in the establishment of the coin production system. A miner can only produce and provide services after having the required tools and infrastructure.

It is determined that today's educated young entrepreneurs aspire to make more money in a short period (Lechner et.al., 2018), and therefore they are especially interested in high-tech jobs that offer a high income (Fassin & Drover, 2017). In conversations with Bitcoin miners before the research, it was noted that Bitcoin miners are motivated to earn more money in a short period in an ecosystem of crises and high fluctuations, rather than establishing a stable business in the conventional environment. These entrepreneurs are aware that a new ecosystem has been formed outside of the existing system, which is speculative and very risky but offers a high return probability. Although Bitcoin mining is not the primary business of miners, they have been considered entrepreneurs because of the investment they make, the service they provide, and the profit they earn in return.

Literature Review

Speculative Entrepreneurship

Entrepreneurship can be defined as a willingness and ability to gather necessary resources for the production of goods or services to sell with the inherent risks of loss to make a profit (Stenberg & Wennekers, 2005); the entrepreneur can be defined as the person who designs, plans and manages this entrepreneurship process and sees it as his or her job. Common characteristics of entrepreneurs are the ability to assess the needs in the market, the acceptance of the risk of profit or loss as a result of their undertakings, and the motivation of self-interest and benefit (Bacq, Hartog, & Hoogendoorn, 2016). It is natural to have more than one kind of the same product or service or its equivalent in the free market economy. Another important

phenomenon of the market economy is arbitrage. Selling the same product at different prices in different markets can be a source of profit. Kirzner (1979) defines those who invest by using the arbitrage opportunity in the market as “speculative entrepreneurs.”

Within the scope of speculative entrepreneurship, arbitrage refers to many sources in a broad sense beyond being an economic term. The entrepreneur with a greater level of awareness can predict the present and the future simultaneously (Harper, 2003) and thus can invest according to the assessment. Realizing the awareness of a phenomenon with leverage and the arbitrage opportunities it provides, the entrepreneur collects and invests the necessary resources, even in a risky market (Douhan, Eliasson, & Henrekson, 2007).

Some of the key characteristics of the basis of arbitrage are the presence of a new or differentiated product, service, production process, organizational structure, or religious, national, political, or social situation. The speculative entrepreneur can thus provide arbitrage opportunities by redefining and differentiating the product or service, even if similar products and services are available in the market. The speculative entrepreneur uses leverage as an opportunity for arbitrage throughout the entrepreneurship process (Keyhani, 2019).

To be able to determine the *features that distinguish speculative entrepreneurship from other entrepreneurs*, we must first start by defining the characteristics of entrepreneurship. Wales and colleagues (2016) examined 128 articles on entrepreneurship, and according to the result of the study; they determined that out of 128 articles, 98s discuss characteristics such as innovation, proactivity, and risk-taking, which were common features of entrepreneurship. Awareness, arbitrage, self-manipulation, and aiming for high profit are additional dimensions of speculative entrepreneurship (Kirzner, 1973; Kirzner, 1979; Kirzner, 2001; Uymaz, 2020).

Bitcoin Mining

During the 2008 global financial crisis, Bitcoin was launched as a cryptocurrency by Satoshi Nakamoto as a new tool to eliminate financial intermediaries in all types of commerce and payment systems and to avoid inflation caused by the printing of unbacked money by governments. Nakamoto (2008) states in his Bitcoin Manifesto that an electronic payment system is needed which is based on cryptographic evidence instead of a trust-based exchange in e-commerce, providing fast, cost-free money transfer and trade security between the counterparts without the need for validation by a third party. Bitcoin has been created to simplify the trading process, reduce costs, and enable the transfer of money easily between parties anywhere in the world.

If we look at the history of Bitcoin, “Bitcoin.org” was established on August 18, 2008. The Bitcoin Genesis Block was published on January 3, 2009, and the mining system was opened so that 21 million Bitcoin could be produced from January 9, 2009 to 2040. Although

the amount of Bitcoin (cryptocurrency) produced depends on certain rules, it is not produced in a particular center and is not managed centrally. This initiated the creation of the worldwide Bitcoin community (Baumann, Fabian, Lischke, 2014).

On October 5, 2009, the first Bitcoin/US Dollar exchange rate was created by New Liberty Standard (2019) and announced as 1309.03 Bitcoin = 1 USD. The currency calculation was based on the electricity usage cost for the production of Bitcoin.

There are two actors in the Bitcoin market. The first is Bitcoin miners who make the necessary investments with their resources and create Bitcoin blocks with blockchain technology, thus producing Bitcoin and keeping the registration system safe. The other is users who buy Bitcoin with other currencies and use Bitcoin in payment and money transfer transactions. The infrastructure, with no central production, management, and registration system, is needed to produce Bitcoin, and the service of keeping transaction records is provided by Bitcoin miners. A Bitcoin miner is an entrepreneur who invests in the Bitcoin production system. To be in the Bitcoin system, miners are required to provide high-capacity computers, internet access, a cooling system for keeping the temperature at a certain level, and uninterrupted electrical infrastructure. For high production capacity, they can have a high capacity system or cooperate with other miners to establish a production network.

When the profile of miners who play a vital role in the Bitcoin system worldwide are examined, a common profile emerges of their general characteristics: they have a high level of education, work in white-collar jobs, do not see Bitcoin mining as a full-time job (as shown in Table 1), and are considered to be a low-risk group by financial institutions. Bitcoin miners can be active doctors, teachers, writers, engineers, judges, lawyers, officers, police officers, businessmen, or students. Although these people work full-time in different jobs, they can also operate as Bitcoin mining entrepreneurs.

Bitcoin production cost varies by country after Bitcoin miners establish the infrastructure required for production (Sapkota, & Grobys, 2020). It is observed that the low price of electricity, which is the most important factor in production costs, causes mining concentration in some countries, and Bitcoin mining has started to use more energy than some countries (O'Dwyer & Malone, 2014). On the other hand, the income that miners make with their investments in Bitcoin, which they earn every four years in return for uninterrupted and error-free service, is 25 Bitcoin initially and decreases year by year (Baur, Hong, & Lee, 2018).

Bitcoin miners have invested in such a system that they cannot control anything other than being in the system or leaving completely, and they have to adapt to the changing conditions. They are actor entrepreneurs who play the defined role. The internet can provide individuals with real and virtual opportunities to live more than one identity and life simultaneously. Before the research was carried out, it was observed that expectations of high income expectations always come to the forefront in interviews conducted with Bitcoin miners.

Research questions such as “*How can white-collar professionals also become entrepreneurs?*” and “*How can individuals in the low-risk category invest in a high-risk area?*” have emerged based on impressions from previous interviews and readings about Bitcoin. Therefore, the purpose of this study is to determine the factors that motivate people to invest in becoming Bitcoin miners and what kinds of entrepreneurs they are. It has been observed that the collected data matches up with the speculative entrepreneurial characteristics (Kirzner, 2001) that have not been studied much in the literature. This study was designed to examine the decisions and behaviors of Turkish Bitcoin miners in terms of speculative entrepreneurship. “*What are the variables that turn white-collar workers into entrepreneurs?*” and “*What dimensions of speculative entrepreneurship stand out in these investors?*” were determined to be the research questions.

Research Methodology

Method

Even though Bitcoin mining is a full-time service, the low number of Bitcoin miners makes it difficult to reach them because they do not use their real names for Bitcoin mining and they are not registered or identifiable in any way. Therefore, this study was designed as a qualitative study to obtain in-depth data from a small number of people.

Kvale and Brinkmann (2009) emphasize that the most important reality is what people perceive. Therefore, the phenomenological approach was adopted in the study. The phenomenological approach is the method adopted to describe the approaches, perceptions, and meanings participants have attributed to a phenomenon. The phenomenological approach primarily tries to define, understand, and explain the situation experienced by the participants to discover the common meanings underlying the phenomenon (Kocabiyyik, 2016).

In order to understand the thoughts and experiences of Bitcoin miners from their perspectives, this study probed why they invest in Bitcoin mining, how Bitcoin affects the economic and social structure, and their predictions and expectations. Follow-up questions on the Bitcoin manifesto, technical infrastructure, and ecosystem, and the factors that motivate miners were asked to deepen the issue. This data collection method provides the flexibility for new and unpredictable data. The aim was to compile detailed thoughts about Bitcoin mining. Interviews with the participants were conducted face to face or by phone. Since participants were geographically spread out, did not want to allocate time for the interview, or did not want to be recognized as a Bitcoin miner, data was collected with the most appropriate method possible. During the interviews, notes were taken by the researchers to record the interviews. The interviews took a minimum of twenty minutes to a maximum of ninety minutes. A fair copy of the notes was made immediately after each meeting to avoid the loss of data, and a total of 96 pages of data were collected from 13 Bitcoin miners.

Research Sample

Bitcoin miners who are producing Bitcoin and maintaining the system with their investments were chosen as the main population of this study. Participants were selected by the typical case sampling method as the aim was to understand the typical, general, and average status of Bitcoin miners (Patton, 2015). Firstly, the purpose and scope of the study were explained to the Bitcoin miners and those who agreed to participate were included in the study. Other Bitcoin miners were reached through references from participants, which is a snowball sampling technique. Research data were collected in 2019.

Demographic Characteristics of the Participants

A total of 13 Bitcoin miners, one of whom was female, participated in the study. In terms of the academic degrees of the miners, eight of them were undergraduates, while the other five were graduates, two of whom have doctoral degrees. Twelve participants already had a full-time job, whereas one of the participants was looking for a job. All the Bitcoin miners had covered the investment capital fully from their savings. One of them is investing to maintain a regular income, while others are aiming to earn high profits in the medium term.

Table 1

Characteristics of Bitcoin Miners

	Gender	Age	Academic Degree	Currently Working or Not?	White-Collar or Blue Collar Work	Full Time or Part Time Employee	Source of Investment
M1	Male	28	Undergraduate	Yes	White Collar	Full Time	Own Savings
M2	Male	29	Graduate	Yes	White Collar	Full Time	Own Savings
M3	Male	27	Undergraduate	Looking for a job	White Collar	Full Time	Own Savings
M4	Male	32	Undergraduate	Yes	White Collar	Full Time	Own Savings
M5	Male	31	Undergraduate	Yes	White Collar	Full Time	Own Savings
M6	Male	26	Undergraduate	Yes	White Collar	Full Time	Own Savings
M7	Male	40	Undergraduate	Yes	White Collar	Full Time	Own Savings
M8	Male	29	Undergraduate	Yes	White Collar	Full Time	Own Savings
M9	Female	29	Graduate	Yes	White Collar	Full Time	Own Savings
M10	Male	36	Undergraduate	Yes	White Collar	Full Time	Own Savings
M11	Male	31	Graduate	Yes	White Collar	Full Time	Own Savings
M12	Male	35	Graduate	Yes	White Collar	Full Time	Own Savings
M13	Male	37	Graduate	Yes	White Collar	Full Time	Own Savings

Data Analysis

Firstly, thematic and narrative analysis was carried out on the data obtained from the interviews with the participants. For thematic analysis, inter-coder consistency (Miles & Huberman, 1994), peer assessment (Lincoln & Guba, 1986), and participant assessment (Creswell & Miller, 2000) were applied to ensure the credibility of the study in terms of validity and

reliability (Auerbach & Silverstein, 2003). Speculative entrepreneurship themes were defined according to the literature. Thematic analysis is an analysis method wherein themes in the data collected from each participant are analyzed (Carvalho, Costa, Lykke, & Torres, 2018). Although the names of the participants were not shared in the research, Bitcoin miners were each given a code (M1, M2, M3, ...) to share which data, attitude, or behavior came from which participant. As a result of the thematic analysis, the personal profile of each miner shared in Annex 1 was also created. Thematic analysis of the data collected from the participants was carried out in five stages:

1. *Creating a coding table* following speculative entrepreneurship themes, including awareness, arbitrage, self-manipulation, and high-profit expectation. Afterward, the table was assessed by two academicians who have researched entrepreneurship and qualitative analysis and took part in the content-coding for expert review. Corrections were made according to their feedback.

2. *Coding the data in line with the themes* (Yıldırım & Simsek, 2016). In addition to the researchers, the coding process was carried out by four academicians who have knowledge of or who work on Bitcoin, one of whom has a Ph.D. in financial economics and three of whom have Ph.Ds. in business administration. Before coding, the coders were informed about the speculative entrepreneurship themes (awareness, arbitrage, self-manipulation, and high-profit expectation). The consistency of coding (i.e. the extent to which different researchers or analysts agree on how to code the same content) was found to be 85%. This result shows a degree of neutrality or the extent to which the findings of a study are shaped by the respondents and not researcher bias, motivation, or interest.

3. *Digitizing*. Then the data was digitized by giving a value for each determination under the themes, and their frequencies were determined. Frequencies were converted to a percentage. Each finding was placed under a theme and the miner profiles were constructed. As a result of the analysis, the average Bitcoin miner profile (Figure 1) and individual Bitcoin miner profiles (see in Appendix 1) were constructed according to the themes.

4. *Narrative analysis*. Thematic analysis at the individual level is not sufficient to ensure the integrity of the study as qualitative analysis (Braun & Clarke, 2006). After the thematic analysis, narrative analysis was conducted with a holistic approach. Carrying out a narrative analysis is defining and interpreting the findings according to themes (Patton, 2015). While narrative analysis ensures the integrity of the subject, it also allows researchers to see individual differences, utilizing the quotations from the participants in the explanation of the themes (Carvalho, Costa, Lykke, & Torres, 2018). The purpose of the narrative analysis is to be able to describe the big picture. Afterward, the participants evaluated the analysis of the data collected and the comments made, and necessary edits and arrangements were conducted based on their feedback. Finally, the analysis was sent to an external academician who studies

entrepreneurship and qualitative analysis for assessment again and necessary adjustments were made according to his feedback.

Findings

The profile of each participant given in Annex 1 was obtained and then a general Bitcoin miner profile emerged, as seen in Figure 1. Following this, narrative analysis was carried out according to the themes, which consisted of speculative entrepreneurship sub-dimensions.

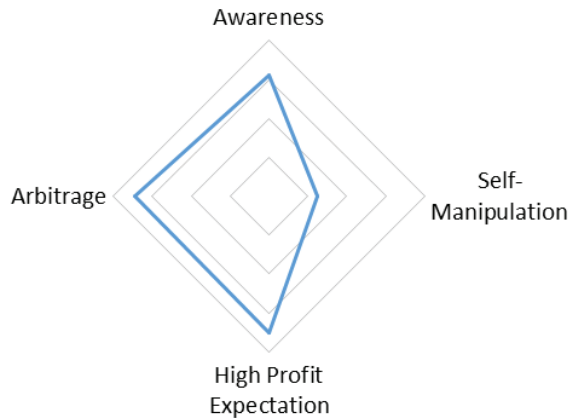


Figure 1. Average bitcoin miner profile.

Awareness: Kirzner (1999) defines awareness as the basis of the entrepreneurship process. Awareness is the situation arising from the knowledge the entrepreneur possesses, which forms the basis of entrepreneurship and allows the entrepreneurship process to be created. Based on the fact that 9 of the 11 miners who read the Bitcoin manifesto are effective in investing in Bitcoin mining, we can say that knowledge creates awareness, and this awareness leads them to become entrepreneurs.

As can be seen from Table 2, only two miners have not read the Bitcoin manifesto, while all the other participants have read it. The Bitcoin manifesto was effective in motivating 9 of the investor readers to become Bitcoin miners. Based on this result, knowledge creates awareness, and this awareness leads them to become entrepreneurs.

It was determined that miners who did not read the Bitcoin manifesto had knowledge about Bitcoin, and one of the participants had advanced knowledge in the field of economics and finance. Again, the participants had a significant level of knowledge about Bitcoin before investing, this knowledge created awareness, and this awareness led them to become entrepreneurs.

The content of the knowledge that creates awareness is made up of the determination of gaps, errors, and imbalances in the market (Kirzner, 1999). Bitcoin miners also determined the inadequacy and gaps of the current financial system. M6 stated that the current system cannot meet the needs and there are gaps: *“The current system’s tools and institutions are inadequate, especially in the face of economic and financial crises and change. Searching for alternatives outside the current system, whether legal or not, strengthens Bitcoin or other cryptocurrencies. Some people want to transfer large amounts of money, and to act flexibly outside the system. This has been so for years. The manipulation of some causes the strengthening of such instruments, not a dark web but a living, visible formation. As long as global financial crises occur, there will be a demand for any instrument that protects wealth, provides privacy, and also provides unlimited, easy, and fast transfer of value. There is no doubt that it would be reasonable to invest in this.”* These determinations are indicators of the knowledge and awareness that the miner has. M7 was also aware that there are gaps in the existing system and the need for a new system is, naturally, quickly accepted: *“Bitcoin is an alternative to all printed money. The high interest and demand boom is an indicator of the need for a new system beyond money.”*

Table 2

Knowledge Levels of Bitcoin Miners

	Bitcoin Manifesto	Bitcoin Ecosystem Knowledge	Technical Knowledge of Production System	Determination of Production System Specifications	Bitcoin Blog Writer / Follower Status	Bitcoin Mining Purpose
M1	Read	Advanced	Advanced	Own decision	Daily Follower	Invest.
M2	Read	Advanced	Advanced	Own decision	Daily Follower	Payment + Invest.
M3	Read	Advanced	Advanced	Own decision	Daily Follower	Payment + Invest.
M4	Read	Advanced	Advanced	Own decision	Weekly Follower	Invest.
M5	Not read	Basic	Basic	Ready system	Weekly Follower	Invest.
M6	Read	Advanced	Basic	Ready system	Irregular Writer/ Daily Follower	Payment + Invest.
M7	Read	Basic	Basic	Own decision	N/A	Invest.
M8	Read	Advanced	Advanced	Own decision	Irregular writer/ Daily Follower	Payment + Invest.
M9	Read	Advanced	Basic	Ready system	Irregular writer/ Daily Follower	Invest.
M10	Read	Advanced	Advanced	Ready system	Irregular writer/ Daily Follower	Payment + Invest.

	Bitcoin Manifesto	Bitcoin Ecosystem Knowledge	<i>Technical Knowledge of Production System</i>	Determination of Production System Specifications	Bitcoin Blog Writer / Follower Status	Bitcoin Mining Purpose
M11	Read	Advanced	Basic	Ready system	Daily Follower	Payment + Invest.
M12	Not read	Advanced	Basic	Ready system	Daily Follower	Invest.
M13	Read	Intermediate	Intermediate	Ready system	Irregular Follower	Payment + Invest.

M12 had determined the gaps and deficiencies of the current system and was aware of the advantages provided by Bitcoin: *“Financial freedom and liquidity protect the value of money in economic crises. The traditional financial system is managed by the state or banks, which have absolute power. This is a new system in which no authority can block, and the power in the system is distributed equally to everyone. Its popularity, the expansion potential of its areas of use, especially the protection of wealth, and its ability to transfer quickly are extraordinary advantages.”* These determinations and interpretations are indicative of the miners’ high awareness.

Although other people may have the same knowledge, they do not have the awareness, which is the source of entrepreneurship, because they interpret the given information differently. Shane and Venkataraman (2000) consider individuals who know but are not aware to be unsuccessful in terms of entrepreneurship. Entrepreneurship that emerges through awareness is a result of the creative aspect of the individual and a situation where other individuals fail. According to M9, *“News about Bitcoin attracts society’s attention.”* The general public is aware of Bitcoin because of its high price and the fluctuation of its price over time. However, many people do not invest in becoming a miner. Although M7 has read the Bitcoin manifesto, his knowledge of the ecosystem is at a basic level. But the source of his interest in becoming a Bitcoin miner was the news. Due to the effect of the news, Bitcoin attracted his attention and he realized that something was changing. *“I am mining both to wonder and ‘carpe diem,’ and so as not to say ‘I wish I had...’ in the future,”* he said. Organizations’ attitudes towards and behaviors regarding Bitcoin support the change in the market. For example, in October 2010, The Financial Action Task Force (FATF), which is an anti-money laundering and sanctions expert working group under OECD, published a report on cryptocurrencies. In this report (2010), FATF announced to all authorities that Bitcoin is a new entity that can completely change the global financial structure, making it impossible to control or manage the flow of money. This report caused a wave of interest in Bitcoin. In June 2011, the value of 1 Bitcoin was 31.91 USD (Yahoo Finance, 2020). Bitcoin miners are aware of this development. M5’s statements confirm this situation: *“Bitcoin is considered as an alternative that can be an alternative even to central banks. However, an unlimited opportunity for liquidity provides serious wealth accumulation and transfer.”* M6 said, *“It is not Bitcoin itself but the block-*

chain technology, so even if Bitcoin fails, another similar instrument will succeed.” Although a gap is detected in the system, it is emphasized that a similar instrument will be successful even if Bitcoin fails. Miners are aware that a new formation has begun and this formation has opportunities for investors.

Awareness is a subjective phenomenon (Uymaz, 2020). Even if the information is open to everyone and can be known by others, its interpretation, explanation, and formation are subjective. In this case, it is not expected that everyone with the same knowledge will have the same level of awareness and that everyone will become an entrepreneur. What is the result of awareness is the result of the entrepreneur’s subjective and creative aspect. An entrepreneur describes a speculative thing as reality with entrepreneurial awareness (Murray, 2018). M7 sees Bitcoin as an agent of another system that occurs outside the existing system: *“The footsteps of a different structure or system can be seen as its representative.”* Bitcoin miners who invest with awareness ensure the existence and expansion of the system. Bitcoin miners transform Bitcoin from being speculative to a real instrument. It is the speculative realism that turns an individual into an entrepreneur (de Monthoux, 2015).

Awareness is a situation that is active at all stages of the entrepreneurship journey and its content is constantly updated. As knowledge changes, awareness, and then entrepreneurship change too. According to M12, *“As the interest of institutional investors increases, balance will be achieved, but individuals’ impulsive behavior towards being rich and the regulations made by governments cause price fluctuations.”* M3 has important information about the attitudes and behaviors of the actors in the Bitcoin ecosystem: *“The investors and especially long-term investors with the ‘hold’ strategy strengthen the possibility of arbitrage. Especially long-term investors’ long-term keeping strategy, which is the ‘hold strategy,’ raises the possibility of arbitrage. Whale Anon Larp and Asuka Chan’s monthly price estimates were right. They estimated January, April, and July 2019 prices correctly. One cannot help thinking that the strings are in someone’s hands. I know it’s both easy and also hard to believe.”*

It is seen as an advantage that the Bitcoin trading and production system is not central and under the control of the states. However, the differing attitudes of governments towards Bitcoin and miners create discomfort. According to M3, *“For example, the Turkish government’s approach may change. The wind can reverse direction, and governments may agree and say, ‘Come on, guys, let’s finish these crypto players.’ Can they say this? Why not?”* These observations also showed that he was aware of the risk. He thought that using his real name may cause trouble in the future, so he trades under a pseudonym. Along with the opportunity of Bitcoin mining, miners are aware that it contains risks arising from the ambiguous attitude of the governments, including Turkey’s (Çakraccioğlu, 2016).

The miners decide on the entrepreneurial initiative to start, continue, and even terminate based on their awareness (Uymaz, 2020). M4 confirms this fact: *“Stock market manipulative*

ons and Bitcoin news in the media have a significant impact on community psychology. Someone wants to become rich in a short time. All these cause the Bitcoin price to rise. It affects not only Bitcoin but also interest in other cryptocurrencies. The perception as an alternative to gold and foreign currency increases. Naturally, there is the possibility of falling as much as the price increases. Big players do not use Bitcoin as a hedging instrument. I think when they use it, there will be no such fluctuations. But some people certainly have huge amounts.” Miners do not just focus on features and product usage. They are also knowledgeable about their impact on the ecosystem. If the arbitrage possibility is high, the probability of profit disappears, or the attitude of the state changes, most miners stated that they do not want to continue mining.

Bitcoin miners have invested in a structure that does not have interventions and controls, and are aware that the system they serve also has a high risk and return probability. Miners can generally produce and do transactions without using their real names and credentials, and even prefer this because Bitcoin mining is prohibited in some countries, in some places resulting in prison sentences.

Arbitrage: Arbitrage is defined as the existence of different equilibrium prices in different markets related to any security. Arbitrage is the purchase of securities from the market where it is cheaper and selling them in the market where it is more expensive to obtain profit (Dubil, 2009). Kirzner (1979) discussed the concept of arbitrage in a broader sense, rather than approaching it from its narrow meaning in finance. The entrepreneur, who offers similar services and has the awareness to differentiate and decompose can redefine a product or service, differentiate the equivalent product, and reposition it in the market. This repositioning can be the source of arbitrage that means a high level of profit. The source of arbitrage is the openness and imbalance in many areas in the market, especially the price (Kirzner, 1973). These imbalances, some of which are already present and some of which are artificially created by speculative entrepreneurs, create an opportunity for arbitrage and high profits.

The source of arbitrage can be a new product, production, or service system, or it can be because of the use of an economic, religious, national, political, or social phenomenon as leverage (Uymaz, 2020). The primary arbitrage opportunity for Bitcoin miners is that Bitcoin is not managed by any government or central authority. Miners other than M5 and M8 consider the fact that Bitcoin is not under a centralized system or state control a great advantage. M1 defines a factor for arbitrage by saying, *“the absence of a central government such as a Central Bank in the case of Bitcoin can make it open to speculative movements and manipulation.”* Even though states have attempted to restrict, that caused the price to increase. On July 11, 2010, a commentator with the pseudonym Kdawson (2019) wrote an article titled *“Money outside the intervention of the governments”* on the blog *“slashdot.org.”* This article helped Bitcoin become the center of attention and following its publication, Bitcoin gained 10 times value against the US Dollar within 24 hours.

The second arbitrage opportunity for Bitcoin is the formation of a structure outside the current system. One of the most important things about modern society is the management of money accumulated as wealth or capital. Bitcoin, on the other hand, is a tool or a structure that cannot be controlled with the tools of the current system. As M1 emphasizes, *“The biggest advantage of money transfer is that it can be made easily, without intermediaries, without restrictions and confidentially at the global level.”* Similarly, M2 says, *“Some governments don’t want to allow it. I think it looks like a sharing of power. The purpose of protecting the value of money in economic crises and the decreasing trust in banks in the crises leads people to Bitcoin.”* M13, on the other hand, defines Bitcoin as *“an instrument that is not affected by the macro policies and failures of the countries.”* Miners also define the emergence of Bitcoin naturally and inevitably. According to M9, *“Maybe this is natural or this is what should be natural. And, such a new system must be formed. Yes, some situations are overlooked by governments. But they are highly controllable by the system. Governments want to get a share from everything, they behave like the mafia. Bitcoin is an entirely global entity, free from governments’ intervention.”* These words reveal that although they are white collar professionals, Bitcoin miners have an anarchist characteristic.

M9 states that organizations other than the governments have also started to show interest in Bitcoin: *“For the end of fluctuation, corporate actors must be players in the market. At the same time, if corporate actors use it as a hedging tool, its price will also increase as the amount of circulating Bitcoin in the market, such as gold, will decrease.”* Organizations have made decisions that support this prediction. While the world’s largest futures exchanges, such as the CME Group and CBOE in Chicago, listed Bitcoin, companies such as Microsoft, PWC and Overstock recognized Bitcoin.

M4 emphasized that, *“The fact is that the new system threatens the current system and instruments. It is not only in terms of the government and organizations, but society also has the same perception.”* M4 also said that *“Bitcoin is perceived as an alternative to the banks.”* According to M5, *“It is seen as an alternative to central banks.”* The participants anticipate that this formation will create an important arbitrage opportunity for them in the medium and long term. M10 expressed his expectations: *“We will benefit from this situation. Not millions, but a hundred will suffice.”* According to Kirzner (1999), the fact that speculative entrepreneurs make high profits based on a phenomenon with leverage strengthens the gap in the market and ensures that the market will balance.

The third arbitrage offered by Bitcoin is the privacy opportunity. In April 2012, the FBI (2019) published the Bitcoin Report. The report begins by stating that Bitcoin is not managed by anyone; miners and users who are producers are completely anonymous, and it is impossible to identify and monitor all of them simultaneously. Since the money can be transferred completely from one account to another, and the records of users are not in the government

or any institution's registration system, it was emphasized that the current instruments and methods used for managing and controlling are insufficient, so there is a great potential for money laundering and informality and it would draw great interest. M5 and M12 explain that *"Bitcoin provides unlimited liquidity opportunity, easy and secret wealth accumulation, protection and fast transfer,"* while M13 says *"It is portable with a username and password."* In the months following the FBI report, Bitcoin became 266 USD on April 10, 2013 and 500 USD on November 17, 2013, and two days later it exceeded 1000 USD. The average daily trading volume reached 1.3 billion USD and exceeded 2.15 Billion USD on May 6, 2019 (Yahoo Finance, 2020).

The FBI report findings regarding privacy and money transfer are justified. Today, 44% of Bitcoin is used for black market transactions including illegal goods and services payments and money laundering, and 38% of existing accounts are opened for illegal transactions (Foley, Karlsen, & Putnins, 2018). M4 states that it is quite normal to use Bitcoin for money laundering, illegal payments, and the dark web, as it provides a very high level of privacy and ease of transfer.

Since the Bitcoin system is also seen as an instrument of identification, there are already miners who are happy to be a part of this system. M7 explains his satisfaction this way: *"Bitcoin is attractive, just like having a desired identity in the virtual world."* Bitcoin mining is seen as an alternative, a means of transition, and being included in a secret habitat.

Another arbitrage opportunity is the interest of a society that is against Bitcoin. M4 emphasizes that stock market speculations in the media and the news on fluctuations in Bitcoin price have a great influence on the attitude of society towards Bitcoin. M9 confirms this: *"The news about the price of Bitcoin in social media, newspaper or television is overwhelming for people; the high earning probability and expectation caused by the news fuels the enthusiasm of investment for many people."* M1 emphasizes that this situation is reinforced by celebrities (such as Elon Musk): *"Worldwide celebrities that act as sponsors, even if they are not official, provide position as a global digital gold."* M4 sees this as the effect of perception in society: *"Many people want to get rich in a short time. These cause the Bitcoin price to rise. This ensures that it is perceived as an alternative instrument to gold and foreign currency."* M5 emphasizes that this situation will not end in the short term: *"Being open to manipulation, and the speculative movements that are already taking place cause price fluctuation. I don't think this fluctuation will become balanced soon."* M8 emphasizes that Bitcoin fluctuations will not end, that it will be on society's agenda, and that some people will exhibit opportunistic behavior: *"Global transfer of money is effective in increasing the price of Bitcoin. This can also be black money. One group is opportunistic making money from fluctuations, while another group is clueless and dreams of becoming rich. The Bitcoin market already offers arbitrage opportunities; I don't think this will end soon."*

Self-manipulation: A rationalization process may be required to accept conflict between religious, national, and social values, uncertainty, and risk. An attitude change and rationalization process may be required to make the necessary decisions, to act, and accept the results to realize the vision it has built. Thus, operating in a high-risk environment with many uncontrollable factors may not be considered rational at all.

The entrepreneur intends to achieve her/his goals. The absence of serious measures preventing the individual, who is motivated by his/her goals, also strengthens self-manipulation. The speculative entrepreneur may need to develop new attitudes and behaviors to achieve her/his goals and accept the results. Self-manipulation is the rationalization of new behaviors, attitudes, and outcomes that will be required for achieving the vision (Mallin, & Serviere-Munoz, 2013). In the rationalization process, new attitudes are formed to support the decisions and behaviors necessary for the goals. At this stage, the entrepreneur is motivated by the effect of the benefit and will make a profit when her/his enterprise is successful. According to the “finder-creator-keeper” (Kirzner, 1973) principle, the speculative entrepreneur sees a reward as his/her right, because the entrepreneur has achieved what someone else did not think of or dare.

Skyles and Matza (1957) define this neutralization process as a childhood dilemma. It is the process of neutralizing and rationalizing behaviors and outcomes. Denial of responsibility, denial of loss, denial of the sufferer, condemnation of condemners, and appeal to higher loyalties are 5 methods of neutralization (Polding, 2017).

Three of the miners stated that they did not know that Bitcoin was used for illegal purposes; just one of them said that they knew and were not happy with this. M4 stated that money laundering, illegal payments, and using Bitcoin on the dark web are perfectly normal; this does not bother him, and he does not have any concerns that his work is wrong or serves the wrong business. He also condemned those who condemn Bitcoin miners: “*If Bitcoin does not exist, will the illegal activities be over? The answer is ‘no’, of course.*” They believe that even if Bitcoin did not exist, other instruments could sustain illegal activity. M1 explains: “*If there is potential, it will be used.*” Even though M13 stated that he was disturbed, he said the following: “*Do I know that almost 50% of Bitcoin transfers are being conducted in the payments of illegal activity? Does it bother me? I don’t know. This situation partially bothers me. But, according to my research, illegal money transfers in Bitcoin are less than illegal money transfers in USD.*”

M5 stated that Bitcoin is already used in illegal activities, and knows that it will be used more intensively. Investing in Bitcoin is not about supporting a wrong cause, but rather it is a good investment for him. After asking, “*Which should be preferred: social benefit or personal benefit?*” he states that he sees his values as a priority through the idiom “*charity begins at home.*”

M6 chooses condemnation and denial of responsibility in the rationalization process: “*We are producing in a network. I am not the only one.*” He is highly aware that the ecosystem already offers arbitrage opportunities. He stated that Bitcoin is used for illegal activities, but he does not have any idea of the amount. He emphasized that this situation did not disturb him and that it did not affect his decisions. M6 also sees personal value and benefit as a priority.

M8 knows that Bitcoin is used for illegal work in high volume, but reported that he is not happy with this use. However, he stated that this volume will decrease with the increase in the number of cryptocurrencies, and the other fiat currencies such as USD or Euro are also used in illegal activities even they are more popular. Since a person does not want to change his/her behavior, he/she changes his/her attitude and rationalizes it through self-manipulation.

M12 sees this situation as follows: “*Although I am not very knowledgeable about illegal use, Bitcoin does have a role in breaking the dominance of USD.*” He stated that, although using Bitcoin for illegal activities creates discomfort, there is no situation in which he would give up mining. He sees his values as more important and states that he wants to end the domination of the USD. He practices self-manipulation by prioritizing his values.

M13 stated that Bitcoin is used in many fields, so naturally, it can be used in the black market. This usage is not as much as the USD, therefore he does not create any potential harm to society and he is not uncomfortable with this. He emphasizes that Bitcoin mining does not cause suffering and does not lead to a loss.

A similar rationalization is also seen in people. It has been determined that people have decided to commit crimes as a result of rational choice with cost-benefit analysis (Çalı & Tombul, 2014). There is no need for a crime to emerge in speculative entrepreneurship. The rationalization process takes place in the conflicts caused by the decisions and behaviors of speculative entrepreneurs and their results. Although this rationalization process is not mentioned by the entrepreneur, the entrepreneur can disclose this through his decisions and behaviors (Kirzner, 1999).

High-Profit Expectation: The speculative entrepreneur has a high-profit expectation in return for his awareness and his risk-taking endeavor. If entrepreneurship is successful, the result is the realization of profit and benefits for the entrepreneur. Kirzner (1979) emphasizes that the market renews itself through the decisions and behaviors of entrepreneurs, and the entrepreneur will try to maximize profit in this process. Bitcoin miners also predict high returns by evaluating the possibility of profit and loss by being part of the system.

M3 states that the Bitcoin price may drop to completely zero, while miners generally predict that the lowest average price could be 5,000 USD. The highest estimate is anticipated by M5, M9, and M10, who say that a Bitcoin could be worth 1,000,000 USD. Generally, miners predict that the highest price will be 100,000 USD. M3 stated that “*Bitcoin can exceed*

100,000 USD, while the bottom line maybe 1 USD. ROI looks great. But if it is 1 USD...?” and added, “The biggest risk I took is losing my investment.”

In December 2013, Bitcoin lost 20% of its value in one day after the Chinese Central Bank announced that it did not recognize Bitcoin as a currency. In the following years, 1 Bitcoin increased to 20,000 USD in December 2017 and decreased to 3,000 USD in December 2018 (Yahoo Finance, 2020). Short and medium-term Bitcoin price fluctuations are expected to continue because estimates of possible prices vary so widely. Experts’ estimate for the highest price Bitcoin may reach in the future is that 1 Bitcoin will be 700,000 USD (Cuthbertson, 2018). The Winklevoss brothers, who took part in the creation of Facebook, predicted in an interview with CNBC in February 2018 that then current price would increase 40 times and the Bitcoin market would reach a size of 5 trillion USD (Kharpal & Gamble, 2018).

Mises (2012) said that managers can make high-risk decisions in capital utilization. Like executives, the speculative entrepreneur can make high-risk decisions that endanger both capital and other stakeholders. The reason for taking a high risk is primarily the expectation of higher earnings. Although it seems to be the responsible assumption, the high profit to be earned in return for the great risk is seen by speculative entrepreneurs as a reward for their awareness and the risk they take (Kirzner, 2001). The Bitcoin ecosystem, price fluctuations, and high price predictions serve as an incubator that allows the emergence and strengthening of the speculative entrepreneurship of Bitcoin miners.

Discussion

It is found that Bitcoin miners have an outstanding awareness stemming from their knowledge. Even though many others have the same level of knowledge, it would not be incorrect to propose that the reason these miners are investing in Bitcoin mining is because of their ability to interpret information very differently than others. Awareness formation for entrepreneurship is contingent. According to our observations, decisions made by Bitcoin miners are not the results of momentary observations. It is understood that Bitcoin miners do not make their investment decisions quickly, but that their investment decisions are based on forecasts, with multiple different factors derived from different sources. It is also observed that in addition to Bitcoin mining, these entrepreneurs also have substantial knowledge of finance, economics, psychology, and political science, as well as awareness stemming from these areas of expertise.

From the sample of thirteen miners, two have basic, one has intermediate, and ten have advanced knowledge about Bitcoin and its ecosystem. Their forecasts regarding arbitrage, namely the factors causing increases in prices, result from their knowledge and awareness of different sectors. It is evident that their awareness, resulting from knowledge gathered

from other sectors, strengthens their entrepreneurship abilities and motivates them to invest in Bitcoin mining. In terms of entrepreneurship, it is reinforced by awareness resulting from knowledge gathered in other sectors. Awareness about other sectors made these miners realize the arbitrage opportunity in Bitcoin, but instead of becoming Bitcoin investors, it led them to develop a higher awareness and become Bitcoin miners.

It can be proposed that arbitrage opportunity is the most significant factor for speculative entrepreneurship. The reason for this is that what motivates an entrepreneur is the identification of factors that might lead to achieving the defined objectives. Bitcoin miners expect that Bitcoin prices will increase since it is perceived as digital gold, and because of its ability to move outside the existing system by offering flexibility, ease, and privacy. Even though all miners state them differently, many leverages providing high profits have been identified though the economy and social transformation provide arbitrage opportunities in Bitcoin.

Arbitrage opportunities provide higher profits to risk-taking investors. In general, Bitcoin miners aim to earn high profits in the middle and long term. In the course of reaching these goals, they might experience self-manipulation concerning the contradictory situations they live in. Even though they provide services 24/7, 365 days a year, they do not work in physical terms and they do not have to make frequent decisions that facilitate self-manipulation. Miners' awareness that money laundering is not only a result of Bitcoin eases self-manipulation. They believe that even if Bitcoin did not exist, other instruments would sustain illegal activity. Also, many attempts conducted by speculative entrepreneurs might be observed in the market. Many companies with business models that are strengthened by religious and national values, promising high returns and employment opportunities, have collected money from investors through membership and invested in different business lines. Even though some succeeded and even if entrepreneurs made themselves financially successful, they made their members miserable. Just like in the past and present, many speculative activities can and will continue in the future.

It is observed that though Bitcoin miners have powerful traits, like being innovative and proactive, they have a low tendency to take risks because they pay the costs of investment from their own resources. The designated risk of their income is not sufficient to meet their investment costs; not being able to make a profit is an acceptable risk to take. The second important risk is the uncertainty in the policy of state institutions regarding cryptocurrencies. M11, M10, and M7 shared their opinion that even though, unlike other countries, in Turkey Bitcoin is not prohibited by law and there is no risk of imprisonment, generally, inconsistency in state institutions poses uncertainty for the future. The stance taken by states against Bitcoin is different. Some states, like China, prohibited commercial activities fulfilled with Bitcoin; some other states like Venezuela impose penalties, including imprisonment. Other states, like Japan and Australia allow all cryptocurrency transactions, invest in this technology, and study

and incentivize projects financially. Some miners prefer not to use their names due to this uncertainty. Bitcoin miners, as entrepreneurs, aim at benefiting from arbitrage opportunities, accept the risks with a high level of awareness, and make investments to gain high profits. Though individuals are expected to comply with the values and norms of the organizations they are part of, in entrepreneurship, it is evident that personal objectives and expectations are in charge. Today, young and educated entrepreneurs are pursuing large profits, especially in high-tech businesses, and it is the same for the Bitcoin miners. Thanks to Bitcoin mining, white-collar workers have become entrepreneurs as well as becoming alchemists, since printed money is the state's alchemy, and cryptocurrency is the individual's alchemy.

An example of a white-collar entrepreneur is Mr. Anderson (Wachowski, & Wachowski, 1999), who works in a software company as a software expert by day and works with a hidden identity at night coding computer viruses, ready to follow the white rabbit. In the coming years, there will be an increase in the entrepreneurship of white-collar workers. This is because on one side, there is an ecosystem putting forward entrepreneurship together with crises that are becoming permanent, and on the other side there is the desire for an immediate increase in income instead of a sustainable income enabling a chance to become rich in a short period of time. These factors will increase the number of entrepreneurs who seek an arbitrage opportunity.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

Author Contributions: Conception/Design of study: A.O.U., A.R.E.; Data Acquisition: A.O.U., A.R.E.; Data Analysis/Interpretation: A.O.U., A.R.E.; Drafting Manuscript: A.O.U., A.R.E.; Critical Revision of Manuscript: A.O.U., A.R.E.; Final Approval and Accountability: A.O.U., A.R.E.

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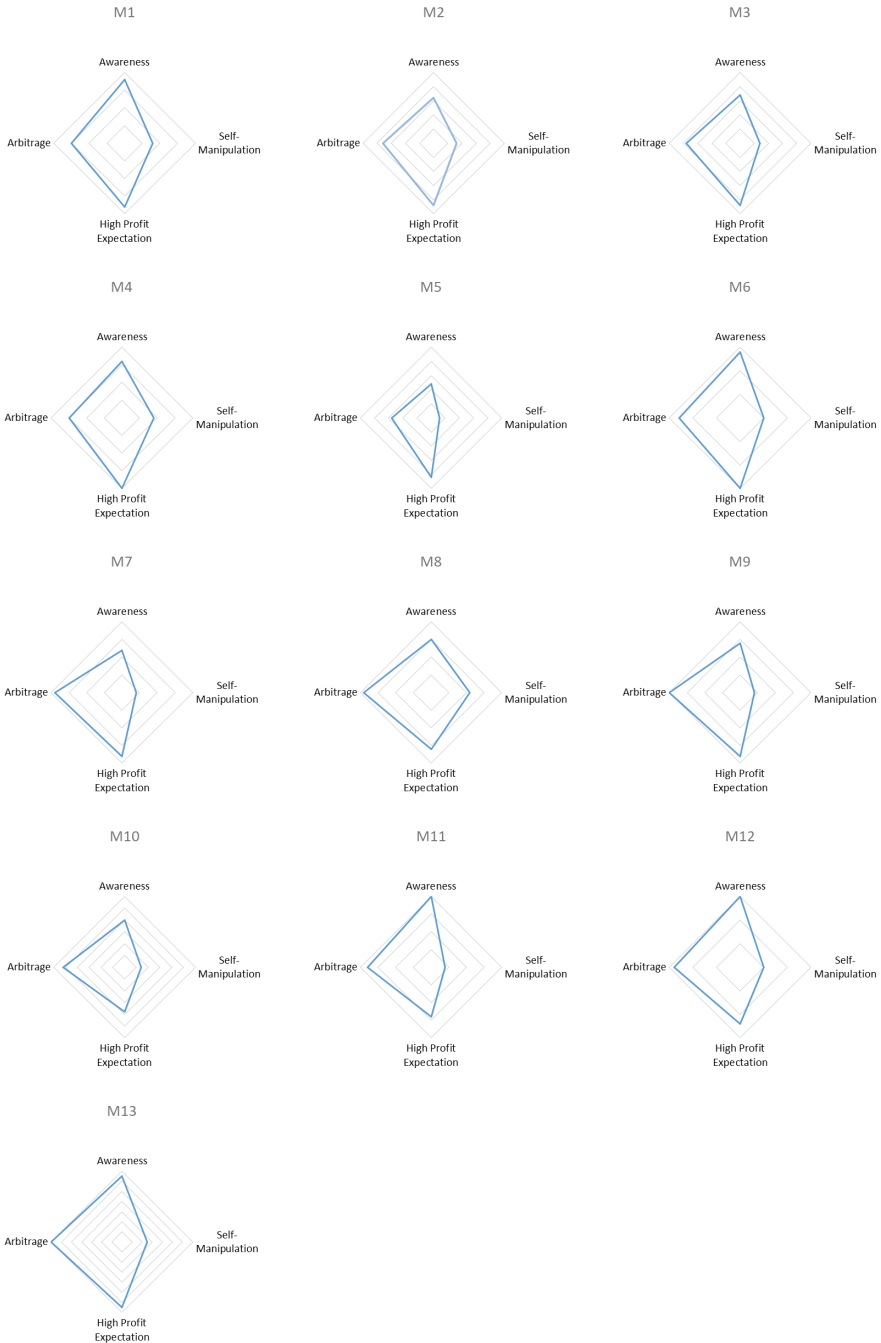
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Appendix 1. Bitcoin Miner Profiles





Comparison of the Companies on the BIST Sustainability Index with Other Listed Companies in the Context of Earnings Manipulation

Asuman Atik¹ , Iva Kovacevic² 

Abstract

The concept of sustainability has been gaining importance all over the world. Concerns of consumers, investors, fund providers and governmental organizations about sustainability motivate companies to take action for a more sustainable world. Stock exchanges have also created sustainability related indices. The starting point of this study is the assumption that companies in the sustainability index are more respectful to the environment, society and economy and therefore, they are also more trustworthy when presenting their earnings. Earnings manipulation was detected by using the Beneish Model (1999). The M-scores of BIST non-financial firms were calculated for the years 2017 (262 firms) and 2018 (261 firms). The results showed that nearly half of the sample firms were possibly manipulators in both years. Additionally, nearly 40 percent of the firms on the sustainability index were manipulators. Although the percentage of manipulating firms in the sustainability index is lower compared to the percentage of manipulators in all firms, according to the results of statistical tests, there is no significant difference between the earnings manipulation behaviours of companies in the sustainability index and those not in the index.

Keywords

Sustainability, Sustainability index, BIST, Earnings manipulation, Beneish model

Introduction

Financial reports are the means for communicating the financial success or the failure of companies and are very important in investment decisions. Having correct financial reports that do not include manipulated information is crucial for external parties to make better decisions. However, for reasons such as increasing stock prices, decreasing borrowing costs, decreasing taxes payable, and increasing management bonuses, accounting information providers have some motivation to make manipulations.

There have been many corporate accounting scandals in the last decades and these have led researchers to develop models to detect earnings manipulation. One of the most famous

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To cite this article: Atik, A., & Kovacevic, I. (2022). Comparison of the companies on the BIST sustainability index with other listed companies in the context of earnings manipulation. *Istanbul Business Research*, 51(2), 399-416. <http://doi.org/10.26650/ibr.2022.51.868826>



models belongs to Beneish (1999). It is based on ratio analysis and finding anomalies. There have been lots of studies conducted in different markets that have proved the success of the Beneish model when detecting earnings manipulation.

Socially responsible investment funds actually highlight the companies that are engaged in social and environmental responsibility. Some examples for the motivations behind companies adapting and internalizing sustainability practices are having access to green funds, which means cheaper credit sources, the risk of losing customers who care about social and environmental sustainability, and the possibility of fines for pollution.

It is assumed that the population of the whole planet will increase to 9 billion people by 2050. Non-renewable resources are rare and definitely not cheap to acquire. Therefore, companies, governmental representatives and organizations need to focus on sustainability as their main priority. Clear and more widely-adopted indexes and dimensions in order to calculate the level of social performance of a company are necessary (Henaio et al., 2018). A sustainability index represents a level to which companies are engaged in social and environmental responsibility according to criteria determined by stock exchanges. These emerged in the 1990s, with the Domini 400 Social Index, and in 1999, the New York Stock Exchange introduced the Dow Jones Sustainability Index (Orsato et al., 2015).

Companies listed on the Sustainability-index are the main focus of this study. Because these companies claim that they care about society, the environment and the economy, we assume that they are also respectful to society while providing their financial information, that they present correct and true financial amounts and do not manipulate their earnings. In order to detect earnings manipulation, we used the Beneish model and calculated the M-scores of BIST companies for 2017 and 2018 and then compared the companies in the sustainability index with those not in the sustainability index. Part 2 summarises the related literature. In part 3, hypotheses and samples of the current study, the results of the statistical analyses and the findings are presented. Concluding remarks and the limitations of the study are presented in parts 4 and 5.

Literature Review

Sustainability and Firm Performance

In the related literature, studies generally show a positive relationship between sustainability practices and firm profitability. Based on a sample of US companies from the food and beverage sector, Jackson et al. (2015) found that companies having high scores in environmental rankings do better financially than lower ranked ones. Moreover, financial performance and size can be drivers of an improvement in sustainable reporting. Profitability is a

driver for engagement in corporate environmental sustainability (CSR) initiatives (Mohd et al., 2015). Based on a sample of 348 manufacturing companies in Italy, Cantele et al. (2018) found a positive effect of social, economic and formal sustainability aspects on competitiveness as a key to financial performance success. Also, customer satisfaction, organizational commitment and corporate reputation positively influence firm performance.

The primary motivations for retailers to engage in corporate environmental sustainability (CES) actions are anticipated economic benefits such as cost savings that come from reduced resource usage. Additionally, internal and external stakeholder pressure influences the producers of retail products in the entire value chain. Many retailers focus on CES strategies to enhance resource usage and environmental performance (Naidoo et al., 2018).

When a company internalizes sustainability, thereby improving economic performance, managers should focus on maintaining good relationships with suppliers. Managers should try to get suppliers involved in environmentally-oriented products by providing them knowledge, policies and initiatives (Ferri et al., 2018). Interestingly, Luzzini et al. (2015) found that although the inter-firm collaborative capabilities which come from sustainability involvement improve company performance, intra-firm collaborative capabilities do not have a positive influence on performance.

One of the main motivations of companies is to create a reputational value, so they make a lot of effort to be listed in the sustainability index. According to Orsato et al (2015), being in the sustainability index brings reputational gain, ease of fundraising, knowledge about social and environmental issues and competitive advantage. The relationship between social responsibility and the stakeholder-focus approach is very strong and positive. The stakeholder-focus approach stresses social and environmental issues and so it improves the customer-brand relationship which eventually turns into better financial performance (Mena et al., 2019). A study on 155 automotive firms from 20 different countries between 2010-2018 showed that there is a positive significant relationship between firm size and sustainability reporting and a negative significant relationship between financial leverage and sustainability reporting in the automotive industry (Kaya and Akbulut, 2019).

By analysing the financial information of 162 companies listed on the Frankfurt Stock Exchange between 2007-2016, Przychodzen et al. (2018) found that firms with green information technology have higher return on assets ratios and market-to-book values. Alexopoulos et al. (2018) found that there is a strong and positive relationship between corporate environmental performance and financial performance.

However, there are also some studies which didn't find evidence to support a positive relationship between sustainability and firm performance. For example, Santis et al. (2016) proposed that the economic and financial performance of a company depends on sectoral

classification rather than investing in sustainable initiatives. Based on the German stock market, Oberndorfer et al. (2013) found that sustainability index inclusion is not rewarded by the market.

Sustainability and Earnings Manipulation

In the related literature, there are also many studies that search for earnings manipulation in the companies listed on sustainability indices or the companies that prepare corporate social responsibility (CSR) reports. The study of Mohd et al. (2015) showed that sustainability reporting practices of Islamic product suppliers in Malaysia resulted in improved financial performance. They found an insignificant relationship between earnings management and sustainability reporting quality. Additionally, sustainability reporting is not used to manipulate earnings.

Hand-collected data of 580 non-financial firms that make voluntary disclosures showed that earnings quality influences publishing non-financial disclosures. Also, companies with better earnings quality and lower proprietary costs deliver more non-financial disclosures. There is a two-way association between non-financial disclosure and sustainability performance (Rezaee and Tuo, 2019).

Generally, earnings management is accepted as unethical because it is misleading of stakeholders. When a company is involved in socially responsible actions, it shows its concern for social well-being rather than making profit (Mohd et al., 2015). Hong et al. (2011) showed that socially responsible companies have higher accrual quality and less earnings management.

Companies with positive corporate social responsibility engagement are not aggressive in financial reporting and have a more transparent approach. On the contrary, companies that are socially irresponsible have a more aggressive approach in financial reporting and are less transparent (Chepurko et al., 2018). Governments should encourage businesses to enact sustainability practices and reduce earnings management activity. Alexopoulos et al., (2018) stated that actions of both government and corporations are required to bring sustainable corporate performance in the long run. Governments should take actions to motivate managers to focus on non-financial targets.

Earnings response coefficient (ERC) is useful in measuring the relationship between unexpected stock returns and unexpected earnings. There have been many studies analysing the relationship between sustainability and ERC. Halbrook (2013) researched the relationship between ERC and CSR where the CSR score was divided in two groups: CSR strengths and CSR concerns. The results showed that CSR concerns were negatively related to ERC, and CSR strengths were statistically insignificant. Also, Kim et al. (2018) analysed Korean companies in the early stages of sustainability development from 2010 to 2014. The authors

found a negative association between ERC and CSR. CSR reporting can be very aggressive and managers can overestimate the potential benefits of CSR expenditures.

Manchiraju and Rajgopal (2017) analysed a sample consisting of Indian companies. According to a new rule enforced by the government in 2013, companies have to spend at least 2% of their net incomes on CSR. Despite investing in CSR, these companies saw a drop in their stock prices. The authors concluded that companies need to independently decide on the optimal level of CSR spending in order to maximize their value.

Chen et al. (2019) argued that the income smoothing behaviour of socially responsible companies depends on how supply chain partners react to sustainability. Results showed that companies which have higher levels of CSR performances and greatly depend on the supplier-buyer relationships engage in income smoothing less frequently. Companies do not make their CSR budget unless their supply chain partners pay enough attention to CSR. Gras-Gil et al. (2016) studied Spanish firms and found a negative relationship between CSR activities and earnings management. Chih et al. (2008) also found that companies with better CSR performances engage in income smoothing less frequently.

Contrary to the findings of most researchers, Gargouri et al. (2010) found a positive association between corporate social performance and earnings management. They argued that because the process of sustainability engagement causes additional costs, it causes a decline in financial performance and an increase in the incentives of managers to manage earnings. Prior et al. (2008) stated that managers are sometimes involved in CSR just in order to have a favourable image, respect from the community and less scrutiny from investors and employees. Guerard (1997) did not find a big and significant difference between the performances of socially responsible investments and those which were not socially responsible.

The Results of Empirical Studies using Beneish Model

A large number of empirical studies have been conducted all over the world and most of them have proved the Beneish Model's reliability in detecting earnings manipulation. One of them belongs to Özcan (2018). He conducted a study in Turkey and used a sample of 174 companies to test the usefulness of the Beneish model. 87 companies, which prepared fraudulent financial statements and were determined to have committed fraud by the Capital Markets Board, were matched with 87 non-fraudulent companies based on the asset size and sector. 85.63% of all cases were classified accurately by the model.

Another study, using the Beneish Model and analysing the firms traded in Borsa İstanbul, belongs to Erdoğan and Erdoğan (2020). Their sample was composed of 40 firms listed in the BIST-50 index and covered the period between 2015-2017. According to M-scores, the number of manipulating firms were 9 in 2015, 3 in 2016 and 1 in 2017. Cikrikci and Ozye-

sil (2018) investigated the earnings manipulation behaviour of 41 firms making seasoned equity offerings between 2010 and 2015. According to some criteria, such as being punished or warned by the Capital Markets Board or BIST, 20 of those 41 firms were classified as manipulators. The results of the study showed that the firms were manipulating earnings before SEOs and most of the manipulation tools used were income increasing. Kara, et al. (2015) researched 132 BIST firms operating in the Manufacturing Industry in the period of 2010-2012, and 66 firms were classified as manipulators. Güner and Kurnaz (2020), using the financial statement data of 24 companies listed in the BIST chemical, petroleum and plastic sector, found that 3 of them may be doing accounting manipulation, 6 of them have significant evidence of accounting manipulation and 8 of them have very significant evidence of accounting manipulation. Toplu et al. (2021), based on the analysis of 104 BIST companies, concluded that 94% of the companies manipulate financial information.

Tarjo (2015) analysed the companies that committed fraud according to the Database of Sanctions of Issuer Cases Public Companies released by the Financial Services Authorities from 2001 to 2014. The results showed that the Beneish model is a successful tool in the discovery of fraud. The Beneish model was successful in detecting fraud in 77. 1%, or in 27 out of 35 companies that engaged in fraud. Additionally, from companies that were not involved in fraud, it accurately found 28 out of 35 non-manipulation companies, or 80% of them. Kamal et al., (2016) researched 17 public-listed companies that were prosecuted by the Security Commission Malaysia for fraud commitment from 1996 to 2014. The Beneish model successfully detected 14 out of 17 companies, or 82% of them. These results strongly support the reliability of the Beneish model.

Warshavsky (2012) analysed the Enron fraud scandal that happened in 2001. Enron was seventh on the Fortune 500 list. Prior to its downfall announcement, there were some warning signs of its bankruptcy, such as its poor earnings quality. Using the Beneish model on Enron's financial statements, the study showed that Enron started manipulation in 1997. Ofori (2016) made a similar study and argued that Enron's financial fraud could be identified in 1998.

Franceschetti and Koschtial (2012) established bankrupt and non-bankrupt groups and tested 30 small and medium-sized companies. The results showed that in the year prior to default, managers, who were employed in bankrupt companies, tended to make income-decreasing accounting changes. The bankrupt sample showed that those companies were prone to inflate revenues. Dimitrijevic et al. (2018) analysed 42 companies in Serbia. The risk of fraud was not high; however, manufacturing companies and financial institutions tend to have a higher risk of fraud compared to trade and service companies.

Talab et al. (2018) researched the earnings manipulation of banks listed on the Iraqi stock exchange in the years 2014 and 2015. The results showed that 15 banks out of 23 (65. 2%) distorted earnings quality by manipulating earnings.

Kokić et al. (2018) researched 13 Super League sport clubs in Serbia and checked whether they engaged in earnings manipulation or not. Results revealed that there was a significant number of clubs that disclosed some misstatements. Repousis (2016) used a dataset of 25,468 companies from Greece in 2011-2012. Results showed that 8,486 companies, or 33 percent of the sample, obtained M-scores greater than -2.2, proving companies' likelihood of being manipulators.

One interesting study which researched the strength of the Beneish model in determining manipulator firms belongs to Lotfi and Chadegani (2017). Their study included 137 firms listed on the Tehran Stock Exchange between 2005 and 2015. The results showed that 20.67% of fraudulent financial reporting was detected accurately by the Beneish model. Therefore, they concluded that the Beneish model is not appropriate for the evaluation of Iranian firms.

The Current Study

The Purpose of the Current Study

The purpose of this study is to calculate Beneish M-scores of non-financial companies listed on Borsa Istanbul and compare the M-scores of companies listed in the sustainability-index (SI) with companies that are not listed in SI. Because firms which care about the sustainability of the economy, environment and society are included in the sustainability index, we expect them to be more respectful to financial information users and present higher quality financial reports.

Hypothesis Development

In light of related literature and findings of previous studies, we assume that the companies listed on the SI, while implementing sustainability into their businesses and while satisfying the decision criteria to be listed on the index, provide more reliable and correct financial information. We expect that those companies have a higher level of earnings quality and lower level of manipulation in their financial statements than other companies have. Therefore, we propose that they do not manipulate their earnings or they manipulate them less.

H₁: There is a difference between earnings manipulation scores (M-scores) of the companies listed on the BIST Sustainability-index and the companies not in the Sustainability-index.

In addition to that main hypothesis, we also developed some other hypotheses in order to compare manipulating firms of the sustainability-index with other manipulators, non-manipulating firms of the sustainability-index with other non-manipulators and all manipulator firms and all non-manipulator firms.

While developing the second hypothesis, we assume that although both groups are classified as manipulators, the M-scores of the companies in the sustainability index may be signi-

ificantly lower than the M-scores of manipulators not in the sustainability index. For the non-manipulators, we expect that the M-scores of the non-manipulators in the SI may be better than M-scores of other non-manipulators. In order to check the significance level of the difference between all manipulators and all non-manipulators, we developed the fourth hypothesis.

H₂: There is a difference between the M-scores of manipulator firms on the sustainability-index and other manipulators.

H₃: There is a difference between the M-scores of non-manipulator firms on the sustainability-index and other non-manipulators.

H₄: There is a difference between M-scores of all manipulator firms and all non-manipulator firms.

The Model Used

As explained in the literature review, the Beneish Model has been used by many researchers all over the world and provided good results in the detection of earnings manipulation. Özcan (2018) performed the Beneish model on a sample of Turkish firms and tested the reliability of the Beneish model. He found that the total accuracy of the Beneish model in detecting manipulators is 85.63%. The model accurately classifies 82.97% of manipulators and 88.75% of non-manipulators. Because Özcan's study proved that the model is also a good tool and a valid model for the investigation of Turkish firms, we decided to employ it in the current study.

Messod D. Beneish (1999) analysed 74 companies that manipulated earnings in the period of 1982-1992. The companies with manipulated reporting were subject to the SEC's accounting enforcement actions or the media represented them as manipulators. The author detected the model of earnings manipulation from the sample of manipulators and industry-matched companies. A WESML probit and unweighted probit estimations were used. A two-year period of data is enough to find the manipulation. Therefore, SEC, investors and auditors can use it to screen potential manipulators. The Beneish model is also a tool for forensic accountants to examine financial statements.

There are 7 indices and one ratio in the Beneish model and they are explained in the following part:

Days' Sales in Receivables Index (DSRI)

$$\frac{Receivables(t)/Sales(t)}{Receivables(t-1)/Sales(t-1)}$$

Disproportionate increase in receivables relative to sales may mean a change in credit policy and application of longer terms in account receivables or the companies persuade their regular customers to purchase earlier. Thus, Beneish assumes that a higher DSRI is related to the likelihood of overstated revenues and earnings.

Gross Margin Index (GMI)

$$\frac{(Sales(t-1) - Costs\ of\ goods\ sold(t-1))/Sales(t-1)}{(Sales(t) - Costs\ of\ goods\ sold(t))/Sales(t)}$$

GMI is found by dividing gross margin in year t-1 to the gross margin in year t. So, if the ratio is less than 1, this means that the company is in a better position and its gross margin is higher in the current year compared to its previous year. A ratio more than 1 indicates bad prospects of a company and so it will have more motivation to manage and distort the quality of earnings.

Asset Quality Index (AQI)

$$\frac{[1 - (Current\ assets(t) + PPE(t))/Total\ assets(t)]}{[1 - (Current\ assets(t-1) + PPE(t-1))/Total\ assets(t-1)]}$$

It is calculated by dividing noncurrent assets other than property, plant and equipment (PPE) to total assets. Non-current assets include goodwill, long-term receivables and long-term investments. This area is more open to manipulation. Therefore, if the ratio is more than 1, then the manipulation area is higher than the previous year, the subjective evaluation area is bigger and it might indicate manipulation.

Sales Growth Index (SGI)

$$\frac{Sales(t)}{Sales(t-1)}$$

This ratio compares the sales in year t to sales in year t-1. Beneish states that growth itself does not need to imply manipulation but growing companies are willing to commit fraud in financial statements. If the ratio is more than 1, manipulation might happen as growing companies are more likely to participate in it.

Depreciation Index (DEPI)

$$\frac{Depreciation(t-1)/(Depreciation(t-1) + PPE(t-1))}{Depreciation(t)/(Depreciation(t) + PPE(t))}$$

This ratio is calculated by dividing depreciation in year t-1 to the depreciation in year t. Change in the depreciation amount may happen because of a method change or new fixed assets. Higher depreciation to fixed assets indicates more expenses. A ratio of more than 1 indicates that depreciation expenses have decreased from year t-1 to year t and less depreciation expenses cause an increase in net income, so it is accepted as a sign of manipulation.

Sales, General, and Administrative Expenses Index (SGAI)

$$\frac{\text{Sales, general and administrative expenses}(t)/\text{Sales}(t)}{\text{Sales, general and administrative expenses}(t-1)/\text{Sales}(t-1)}$$

There is an assumption that an increase in SGA expenses, for example by 10 %, leads to a 10 % increase in sales. If the index is more than 1, it indicates manipulation because sales, general, and administrative expenses increase disproportionately by the sale in year t compared to the same ratio in the previous year. So, an index higher than 1 should be interpreted as a negative sign.

Leverage Index (LVGI)

$$\frac{(\text{LTD}(t) + \text{Current liabilities}(t))/\text{Total assets}(t)}{(\text{LTD}(t-1) + \text{Current liabilities}(t-1))/\text{Total assets}(t-1)}$$

The index higher than 1 indicates that the company has more debt and it is weaker financially. Therefore it might be more motivated to manipulate earnings.

Total accruals to total assets (TATA)

$$\frac{\Delta\text{Current assetst} - \Delta\text{Cash}t - \Delta\text{Current liabilities}t - \Delta\text{Current maturities of LTD}t - \Delta\text{Income tax payable}t - \text{Depreciation and Amortization}t}{\text{Total assets}}$$

Beneish suggests the computation of total accruals as the change in working capital accounts (other than cash) less depreciation relative to total assets. A higher share of non-cash items is an indicator of a high manipulation risk. If the current year's accruals are bigger than the previous year's accruals then the calculation of this variable gives a positive result. This shows that the company has a bigger area for manipulation in the current year and so, there is a higher possibility of earnings manipulation.

By using manipulator and non-manipulator groups, which were determined according to the SEC's actions and by using above indices, Beneish created a probabilistic model which detects companies that probably manipulated earnings. The model is as follows:

$$\text{M-Score} = -4.84 + 0.92 \times \text{DSRI} + 0.528 \times \text{GMI} + 0.404 \times \text{AQI} + 0.892 \times \text{SGI} + 0.115 \times \text{DEPI} - 0.172 \times \text{SGAI} + 4.679 \times \text{TATA} - 0.327 \times \text{LVGI}$$

The eight indicators of every single company are put in the regression of Beneish and the M-scores of each company were calculated. The benchmark is -2.22, a greater value than that identifies a company as a manipulator.

The Beneish model successfully detected 76% of earnings manipulation companies that were subject to accounting enforcement by the United States Securities and Exchange Commission. This analysis needs the financial statements' data of at least two periods, however; in order to identify the trend, it needs the data for five years.

One difference in the current study's model from the Beneish model is the calculation of the TATA ratio. Because of the data collection problems and because we think that there is a better measure for the total accruals in the literature [Tucker and Zarowin (2006), Ngo and Varela, (2012), Khalil and Simon, (2014), Gao and Zhang (2015), Petrik (2016), Al-Baidhani et al., (2017), Barua et al., (2019)], we decided to use the following formula to calculate Total Accruals.

$$\text{Total Accruals} = \text{Net Income} - \text{Cash Flow from Operations}$$

Additionally, some researchers who used the Beneish model in their studies such as Christiano and Budiharta (2011), and Petrik (2016), preferred to change TATA as follows:

$$\frac{(\text{Net Income}(t) - \text{Cash flow from operations}(t))}{\text{Total assets}(t)}$$

Therefore, we also decided to use the above formula to calculate TATA because we agree that it is a better measure for total accruals, and the data of net income and cash flows from operations is available.

The Sample of the Study and Method of Data Collection

The BIST Sustainability index was first established in November 2014 and included just 15 firms. The index included 44 companies in 2017, and 50 companies in 2018. Because the number of the firms in the index was very limited before 2017, this study focused on the years 2017 and 2018. Additionally, the model is more appropriate for non-financial firms and therefore financial institutions were eliminated from the study. Finally, the sample of the study included 35 sustainability-index companies in 2017 and 39 in 2018.

In order to calculate the M-scores of the sample firms for those two years, we needed to collect data of Net Sales, Cost of Goods Sold, Net Receivables, Total Current Assets, Net Pro-

perty, Plant and Equipment, Depreciation, Depletion and Amortization, Total Assets, Selling, General and Administrative Expenses, Net Income, Cash Flow from Operating Activities, Total Current Liabilities, and Long-term Debt.

In order to calculate the M-scores, the model requires the starting amounts of the variables. Therefore, we collected the data from year-end financial statements of 2016, 2017 and 2018. Initially, the data was extracted from Thompson Reuters for 386 firms. After extracting the data from Thompson Reuters, some missing values were manually collected from the Public Disclosure Platform in order to have a complete dataset. The second step was screening to check if all the necessary data were obtained for each company. After eliminating companies with missing values, we ended up with 265 companies. However, there were some companies from which we were only able to collect data for one year's M-score calculation, so the number of the sample firms was 262 for 2017 and 261 for 2018. For some variables, the result was zero, which could cause a problem when calculating indexes. In such situations, we followed Beneish's methods and rather than deleting those companies, we put the value at 1 while making calculations.

Findings

First of all, the M-scores of all companies were calculated in Excel and manipulator and non-manipulator firms were determined. The following table shows the industries of the sample firms and number of manipulators and non-manipulators in 2017 and 2018.

Table 1

Industry Distribution of Sample Firms

Industries	Total number of companies	Companies on Sustainability-index	Manipulator companies (2018)	Manipulator companies (2017)
Alternative energy	1	0	1	0
Automobiles and parts	13	2	5	7
Beverages	6	2	2	1
Chemicals	16	5	7	11
Construction and Materials	32	3	12	17
Electricity	8	3	5	6
Electronic and Electrical Equipment	7	0	2	5
FixedLineTelecommunications	1	1	0	1
Food and Drug Retailers	6	1	5	2
FoodProducers	25	2	14	11
Forestry and Paper	2	0	2	2
Gas, Water and Multiutilities	1	1	0	1
General Industrials	13	2	7	8
General Retailers	6	1	0	3
Healthcare Equipment and Services	4	0	3	2
Household Goods and Home Construction	12	1	6	9

Industries	Total number of companies	Companies on Sustainability-index	Manipulator companies (2018)	Manipulator companies (2017)
Industrial Engineering	14	2	6	9
Industrial Metals and Mining	13	1	7	7
Industrial Transportation	6	1	3	2
Leisure Goods	2	2	0	1
Media	5	0	1	1
Mining	1	0	1	1
Mobile Telecommunications	1	1	0	0
Oil and Gas Producers	3	2	2	3
Personal Goods	28	0	12	14
Pharmaceuticals and Biotechnology	3	0	3	2
Software and Computer Services	3	1	2	1
Support Services	7	1	4	4
Technology Hardware and Equipment	9	2	4	6
Travel and Leisure	15	2	11	6
Unclassified	2	0	-	2
Total	265	39	127	145

Nearly half of the sample firms were determined as manipulators in both years, and nearly 40% of the companies listed on the SI were determined as manipulators. As expected, the percentage of manipulators in the SI was lower but it was not significantly different. The following table gives information about the number of manipulator and non-manipulator firms from each group for 2017 and 2018.

Table 2

Classification of Firms into manipulators and non-manipulators

All firms in 2018 (261 Firms)			
Non-manipulators (134 Firms) (51%)		Manipulators (127 Firms) (49%)	
Firms listed on Sustainability-Index (39 Firms)		Other firms (222 Firms)	
SI-non-manipulator firms (23) (59%)	SI -manipulator firms (16) (41%)	Other-non-manipulator firms (111) (50%)	Other-manipulator firms (111) (50%)
All firms in 2017 (262 Firms)			
Non-manipulators (133 Firms) (51%)		Manipulators (129 Firms) (49%)	
Firms listed on SI (35 Firms)		Other firms (227 Firms)	
SI-non-manipulator firms (21) (60%)	SI -manipulator firms (14) (40%)	Other-non-manipulator firms (112) (49%)	Other-manipulator firms (115) (51%)

Using SPSS, first we tested the normality of our data and the Kolmogorov-Smirnov and Shapiro-Wilk test showed that our data was not normally distributed. Therefore, we couldn't perform an Independent Sample T-test but rather the Mann Whitney U test, which is a non-parametric test used to compare samples which are not normally distributed. The tests were repeated to compare M-Scores of different matches for the two years. The following table shows the compared groups and significance levels.

Table 3

Results of the comparisons of M-scores

YEAR 2018 – M-Scores Comparison		Asymp Sig. (2-tailed)
Sustainability-index (SI) firms (39)	Others (222)	0.818
SI Firms-Manipulators (16)	Others-Manipulators (111)	0.581
SI Firms-Non-Manipulators (23)	Others-Non-Manipulators (111)	0.212
All Manipulators (127)	All Non-manipulators (134)	0.000
YEAR 2017 – M-Scores Comparison		
Sustainability-index (SI) firms (35)	Others (227)	0.579
SI Firms-Manipulators (14)	Others-Manipulators (115)	0.655
SI Firms-Non-Manipulators (21)	Others-Non-Manipulators (112)	0.121
All Manipulators (129)	All Non-manipulators (133)	0.000

The results of the tests showed that there was a significant difference between the M-scores of Manipulators and Non-manipulators in 2018 and 2017. Therefore, only the fourth hypothesis was accepted and the first three hypotheses were rejected. Although the percentage of manipulator firms in the sustainability-index was lower compared to the other group, we couldn't find a significant difference.

We also repeated the tests for all indices, other than M-scores. There were only significant differences again between Manipulators and Non-manipulator firms. The following table shows the results of the comparisons of all indices of Manipulators and Non-manipulators.

Table 4

Test statistics of manipulators and non-manipulators for 2018 and 2017

Test statistics	m-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	LEVI	TATA
2018									
Sig	0.000	0.000	0.218	0.000	0.000	0.034	0.001	0.077	0.000
2017									
Sig	0.000	0.000	0.000	0.000	0.165	0.340	0.156	0.161	0.000

Conclusion

The concept of sustainability has been gaining importance all over the world. Companies are more and more concerned about green products, a healthier environment, climate change,

social welfare and the quality of human life. Societies, consumers, investors and fund raisers also apply an invisible pressure on companies to take action and practice sustainable activities. Being listed on the sustainability indices of stock exchanges improves a company's image and increases the opportunity to reach cheaper funds. Therefore, companies are eager to show how much they respect environmental, social and economic sustainability.

The starting point of this study is that if the firms listed on the SI are respectful to society, they should also be trustworthy when providing their financial information and should not manipulate their earnings. In order to detect earnings manipulation, we used the Beneish model. We calculated M-scores and compared firms listed on the SI and other non-financial BIST firms by using statistical tests.

Results of the study showed that nearly 50% of all companies and 40% of companies listed in the SI are classified as manipulators by the Beneish model in 2017 and 2018. The statistical tests didn't show any significant difference between companies listed on SI and other companies. The only significant difference was between all manipulators and all non-manipulators.

Our literature review showed that most of the studies using the Beneish model either tried to understand the likelihood of manipulation in financial information or focused on the exploratory power of the model. There have also been a large number of studies including corporate social responsibility concepts; however, the studies connecting sustainability and earnings manipulation are very rare. Our study contributes to the literature by integrating the concept of sustainability and evaluating manipulative behaviour from another perspective.

Limitations of the Study and Suggestions for the Further Research

The BIST Sustainability Index is a newly established index and does not include a large number of firms. Having a small sample restricted the statistical tests that can be conducted. Additionally, we want to state again that the Beneish model is a probabilistic model which means it cannot detect earnings manipulation in 100% of cases. Beneish's research (1999) showed that the model accurately identifies manipulators in 76% of cases and inaccurately identifies non-manipulators in 17.5% cases. Therefore, this fact should be kept in mind while evaluating the results of the study.

Future studies may have larger samples and may include firms other than BIST Companies, such as small and medium enterprises. Industry-wide comparisons might be made and some other variables might be included, such as sustainability report quality.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

Author Contributions: Conception/Design of study: A.A., I.K.; Data Acquisition: I.K.; Data Analysis/Interpretation: A.A., I.K.; Drafting Manuscript: A.A., I.K.; Critical Revision of Manuscript: A.A.; Final Approval and Accountability: A.A., I.K.

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A Meta Analysis of the Relationship between Organizational Justice and Job Satisfaction: The Case of Turkey

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Abstract

The aim of this study is to examine the relationship between organizational justice and job satisfaction using meta-analysis. In this context, the Gazi University Library data base was used to identify the research which was to be included in the analysis. In the first stage, the research items which were published in the period 2010.01-2017.10 and which included samples inside the borders of Turkey were reviewed. In the second stage, studies based on appropriate criteria were identified among a total of 53 studies. The results obtained using the correlations of 19 appropriate studies showed that the correlation between organizational justice and job satisfaction was 0.605. The sub-dimensions of both variables were positively correlated and statistically significant. It was concluded that the distributional justice from organizational justice dimension was the most important dimension in job satisfaction.

Keywords

Organizational behavior, Organizational Justice, Job Satisfaction, Meta-Analysis, Sub-dimensions

Introduction

Understanding the perception of job satisfaction of employees and determining the impacting factors, has been researched for many years. Organizational justice perception is also one of the important factors affecting job satisfaction. It is a general finding that when the perception of organizational justice is high, the perceived job satisfaction of the employees increases.

Organizational justice is generally analyzed in the literature in three subgroups: distributional justice, procedural justice, and interactive justice. Interactional justice (transactional analysis) is also examined in two subgroups: interpersonal justice and informational justice. When we look at studies in the literature examining the relationship between organizational

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To cite this article: Yalçın, H., & Yalçın, Y. (2021). A meta analysis of the relationship between organizational justice and job satisfaction: the case of Turkey. *Istanbul Business Research*, 51(2), 417-432. <http://doi.org/10.26650/ibr.2022.51.894298>



justice and job satisfaction, it can be seen that the effects of subgroups on job satisfaction are also investigated. It was also found that the sub dimensions of organizational justice were positively related to job satisfaction. Although organizational justice has an important effect on job satisfaction, there is no consensus as to which organizational justice dimension is more effective on job satisfaction based on results from the studies carried out. The reason for this is that each study has been analysed with different samples and each sample represents its own stack.

Meta-analysis is a method that integrates the magnitudes of the effects obtained by using the results of several independent studies in which a certain hypothesis and statistical method are applied (Petitti, 2000). In this method the results obtained from each sample are used as data and a general result is obtained from these results. Although meta-analysis has great importance in social sciences, there are not many studies on job satisfaction and its dimensions. There are two studies on investigating job satisfaction using Meta-analysis which are Cohen-Charash and Spector and Colquitt. According to their meta-analysis results, distributive and procedural justice influenced job satisfaction.

This study makes several contributions to the literature. The main contribution is that, unlike other studies in the literature, the relationship between organizational justice and job satisfaction perception will be examined by meta-analysis. Since the existing literature are survey studies and the relationship was investigated for different samples, each study found different correlations. With this study we can estimate the overall correlation between organizational justice and job satisfaction for Turkey.

In the literature, there are many studies on both the relationship between organizational justice and job satisfaction and the relationship between their components. Despite the fact that organizational justice has an important effect on job satisfaction, there is no consensus as to which organizational justice dimension is more effective on job satisfaction as a result of the studies carried out. We make a second contribution to the existing literature by clarifying this question.

Third, this study contributes to Turkish literature by conducting meta-analysis on the relationship between organizational justice and job satisfaction. The Turkish labor market is important for studying organizational justice and job satisfaction for certain reasons. According to IMF World Economic Outlook (2018), Turkey is the 18th largest economy in the world. In 2017, the unemployment rate in Turkey was approximately 11.4 percent. Also, in 2017-2018, Turkey is the 53rd most competitive country in the world out of 137 countries (Global Competitiveness Report, 2018).

In the later part of the study, organizational justice, job satisfaction and the relationship between these two variables are explained theoretically. Then the method of study is explained, and the findings obtained are presented. The study concludes with the conclusion and discussion part.

Theory

The concept of organizational justice extends to the Adams (1965) equation theory and is defined as the sense of objective justice that employees perceive and develop in response to situations that arise during organizational work activities. In the literature there is no consensus on the dimensions of organizational justice and employees' perceptions also relate to two, three or four dimensions. In the early studies, organizational justice was examined in two dimensions - distributed and operational justice (Greenberg, 1996; Folger and Cropanzano, 1998). In some studies, it has been suggested that organizational justice has a high degree of relationship with distributive and procedural justice, and that this distinction is actually very difficult (Sweeny and Mc Farlin, 1997; Welbourne et al., 1995). Later on, the dimension of interactive justice was added to these two dimensions. In the Greenberg (1993) study, the dimension of interactive justice is divided into two dimensions - personal justice and information justice. However, Colquitt (2001) analyzed the organizational justice in four dimensions by factor analysis. These were distributed justice, procedural (procedural or process) justice, interpersonal justice and information justice.

Distributive justice is defined as the perceptions of workers on the objective and fair methods of distributing the outcomes or gain. Distributive justice is based on Adams' Equation Theory. According to this scheme, employees receive awards such as salary or promotion in a fair way according to their work training and experience (Folger and Greenberg, 1985). *Procedural Justice* realized that distributive justice was insufficient to be the determinant of organizational justice and that the perceived fairness of the process was also an important determinant (Lind and Tyler, 1988). Procedural justice is the concept of process justice and fairness used in the taking of management decisions in an organization, setting out gains (Thibaut and Walker, 1975). It means that the process and systems in the distribution of outputs or gains are fair. The third dimension of organizational justice is *interactional justice*. Bies and Moag (1986) showed that interpersonal interaction also affected decisions. Interactional justice deals with organizational decision makers who are managers' interactions with employees (Bies and Moag, 1986). In this dimension, the attitudes and behaviors of the working activities are taken into consideration while the employees' perceptions of organizational justice are determined (Taşkıran, 2011). In the Greenberg (1993) study, the dimension of interactional justice is divided into two dimensions - *interpersonal justice* and *informational justice*. The limits of respect for the behavior and attitudes towards persons working in an organization are set forth with individual justice. In other words, interpersonal justice deals with the perception of justice between workers and managers (Greenberg, 1993).

Informational justice is concerned with how the decisions taken for individuals in the organization, such as wage, promotion, performance, and working hours are received alongside their accessibility. On issues related to informational justice, managers provide regular information to employees (Greenberg, 1993).

Job satisfaction is a function of the perceived relationship between what someone wants from his work and how he perceives it (Locke, 1969). An attitude towards their activities and positive evaluations has been defined as the job satisfaction of the employee (Brayfield and Rothe, 1951). An employee's job satisfaction is closely related to issues such as working conditions, material conditions, working life, relationships with colleagues, managers, and performance rewards. In this context, three factors affect job satisfaction: the employee-manager relationship, and the work colleague relationship (Biyik and Sokmen, 2016). In general, there are two dimensions of job satisfaction in the literature. These are internal job satisfaction and external job satisfaction (Lee and Wilbur, 1985). *Internal job satisfaction* relates to an employee's intrinsic job elements and internal motivations like feeling of achievement, prestige, and talent during job activities. *External job satisfaction* incorporates external factors like wage, promotion, interpersonal connections, status, etc. away from job activities.

Methods

Literature Search

In order to identify relevant studies for meta-analysis we made three restrictions. First, computer-based searches were conducted using both national and international databases, such as *ULAKBIM*, *EBSCO*, *ECONLIT*, *Humanities and Social Sciences Index Retrospective*, *Scopus*, *Taylor and Francis*, *Web of Science*. Second, those pieces of research which were published in the period 2010.01-2017.10 and included samples within the borders of Turkey were reviewed. Third, three key words were used: "organizational justice" "job satisfaction" and "Turkey" in both English and Turkish. These keywords were searched in titles, abstracts and anywhere in published articles. In the preliminary results, 53 studies were found.

Inclusion and Exclusion Criteria of Studies

The most important step in meta-analysis is determining which studies will be included in the analysis. For this reason, the criteria to be used in selecting the study are important. Of the 53 studies, some of them investigated the relationship between organizational justice and job satisfaction without survey studies. Some of them used regression or/and correlation analysis and reported estimated coefficients or/and their p-values. Several of them did not report correlation or/and sample size. Therefore, those studies which met the following criteria were included in the meta-analysis: a) the article had to include a survey study b) this relationship had to be investigated by Pearson correlation c) in order to calculate effect size, the article had to report statistical measures with sample size and Pearson correlation coefficient d) the sample had to be in the borders of Turkey e) the study had to be published in Turkish and English during the period 2010.01-2017.10 f) the article had to be published.

As a result of using these criteria, it was decided that 19 of the previous 53 studies were appropriate articles and were therefore used in the meta-analysis.

Coding, Reliability

In this study, for coding, variable components were created. 19 studies investigated the relationship for both two main variables and their components. There are two main variables, organizational justice and job satisfaction. The organizational justice variable has three components, distributive justice, procedural justice, and interactional justice. Also, interactional justice has two components, interpersonal justice, and informational justice. Moreover, job satisfaction has two main components, internal job satisfaction and external job satisfaction. Therefore, 1 main correlation and correlations of 11 independent subgroups were examined. The descriptive statistics for these components are given in Table 1.

Table 1
Descriptive Statistics of Variables

Relationship	k	Total Sample size	Mean of r	Weighted mean of r	Min r	Max r
Overall Job Satisfaction-Organizational Justice	5	2503	0.5826	0.5992	0.512	0.691
Job Satisfaction-Distributive Justice	12	2681	0.4776	0.4681	0.267	0.711
Job Satisfaction-Procedural Justice	11	2411	0.4678	0.4530	0.250	0.834
Job Satisfaction-Interactional Justice	7	1872	0.4750	0.5260	0.200	0.858
Job Satisfaction-Interpersonal Justice	2	784	0.3265	0.3466	0.230	0.423
Job Satisfaction-Informational Justice	2	784	0.3735	0.4014	0.240	0.507
Internal Job Satisfaction-Distributive Justice	5	823	0.5344	0.5220	0.417	0.811
Internal Job Satisfaction-Procedural Justice	5	823	0.5180	0.5412	0.343	0.748
Internal Job Satisfaction-Interactional Justice	5	823	0.5448	0.5925	0.247	0.844
External Job Satisfaction-Distributive Justice	5	823	0.5864	0.6035	0.467	0.838
External Job Satisfaction-Procedural Justice	5	823	0.5738	0.5927	0.414	0.775
External Job Satisfaction-Interactional Justice	5	823	0.5740	0.6301	0.275	0.847

k is the number of studies, r is the Pearson correlation coefficient.

The coding form was created separately by both authors and both coding forms were used as the encoder form ¹. The Cohen's Kappa² reliability coefficient was obtained for the reliability of the coding made. Cohen's Kappa was 0.94 so the agreement between the two coders was 94%.

1 3 Codes are general correlation (Job Satisfaction "1"-Organizational Justice "2"), Internal Job Satisfaction "11", external Job Satisfaction "12", Distributive Justice "21", Procedural Justice "22", Interactional Justice "23", Interpersonal Justice "231", Informational Justice "232"

2 Cohen(1960)

Meta-Analysis

Meta-analysis is a method that integrates the magnitudes of the effects obtained by using the results of several independent studies in which a certain hypothesis and statistical method are applied (Petitti, 2000). There are three meta-analysis approaches: the Hedges and Olkin (HO) Techniques (Hedges and Olkin, 1985), Rosenthal and Rubin (RR) Technique (Rosenthal and Rubin, 1978, 1988; Rosenthal, 1991) and Hunter and Schmidt (HS) Techniques (Hunter and Schmidt, 1990). Johnson et al. (1995) compared these approaches and they showed that the HO and RR approaches tended to produce reasonable and convergent results opposite to HS. Moreover, the HS approach tended to violate conventional expectations.

In this study in order to investigate the relationship between organizational justice and job satisfaction and also their components with meta-analysis, the Pearson correlation coefficients and sample size were used as an indicator of effect size. For calculating Hedges' g effect sizes and pooled mean effect sizes, the Comprehensive Meta-analysis (CMA) V2.0 computer program developed by Borenstein et al. (2000) was used. This analysis has two steps. In the first step, the heterogeneity of the samples was determined using Cohen's Q test. The fixed effect model means that the common effect is zero and the random effect models means that the common effect is not zero.

Findings

Overall Job Satisfaction and Organizational Justice

In order to determine heterogeneity of samples, Cohen's Q test was used, and its results are given in Table 2.

Table 2
Cohen Test Results for Overall Job Satisfaction And Organizational Justice

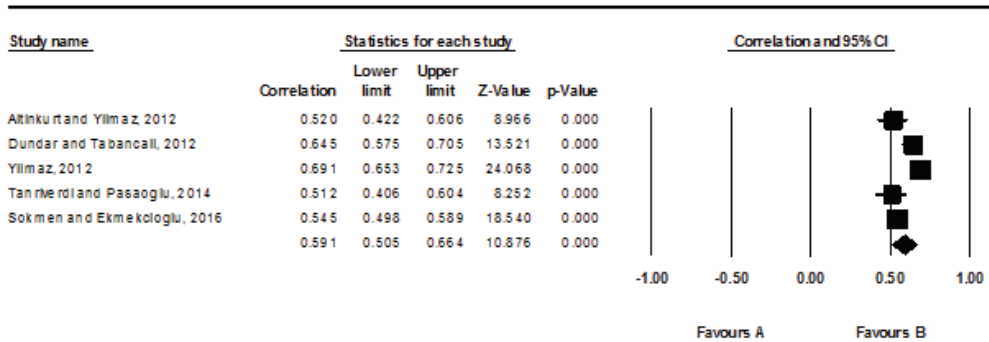
Model	Number of studies	Effect size	95% CI	Q-stat	I-squared	Tau-squared
Fixed effect	5	0.605	0.579-0.629	34.201		
Random effect	5	0.591	0.505-0.664	(0.000)	88.305	0.017

p-value in parenthesis

According to Q stat, the null hypothesis that the model is fixed effect is rejected at the 5% level. Our samples were determined as heterogeneous. This means that the true effect size could change from study to study. Error term in the random effect model is combined by variations originating from both within and between study variability (Cooper and Hedges, 1994). Moreover, I-squared, the proportion of variability across the studies, was 88 and the heterogeneity was high level³. Tau-squared, the between study variance, is used for modifying weights used for calculating the mean effect sizes. Using the random effects model, the mean effect size was calculated and the results are reported in Table 3.

3 According to Higgins et al., (2003), the levels of heterogeneity are low, moderate, and high to I-squared values of 25%, 50%, and 75%.

Table 3
Random Effects Model Results Based On Overall Job Satisfaction And Organizational Justice



Meta Analysis

The relationship between job satisfaction and organizational justice was positive statistically significant and the coefficient was 0.591. Since the random effect model assumes that the studies come from populations with different effect sizes, this coefficient can be generally applicable.

Subgroup Analyses

Table 4 shows the Cohen Test results for subgroup relationships. The test statistics of heterogeneity of variance are significant and the I-squared statistics for all groups reveals that more than 90%, on average, of the total variance results from variance between studies. Therefore, both Q statistics and I-squared support the random effects model.

Table 4
Cohen Test Results for Subgroup Relationships.

	Model	k	Effect size	95% CI	Q-stat	I-squared	Tau-squared
Job Satisfaction-Distributive Justice	Fixed effect	12	0.490	0.461-0.519	163.66	93.279	0.064
	Random effect		0.503	0.384-0.606	(0.000)		
Job Satisfaction-Procedural Justice	Fixed effect	11	0.483	0.452-0.514	200.504	95.013	0.090
	Random effect		0.504	0.355-0.627	(0.000)		
Job Satisfaction-Interactional Justice	Fixed effect	7	0.570	0.528-0.609	129.01	95.349	0.135
	Random effect		0.561	0.341-0.723	(0.000)		
Job Satisfaction-Interpersonal Justice	Fixed effect	2	0.350	0.287-0.410	8.764	88.590	0.021
	Random effect		0.332	0.132-0.507	(0.0003)		
Job Satisfaction-Informational Justice	Fixed effect	2	0.409	0.349-0.466	18.314	95.540	0.047
	Random effect		0.383	0.096-0.611	(0.000)		

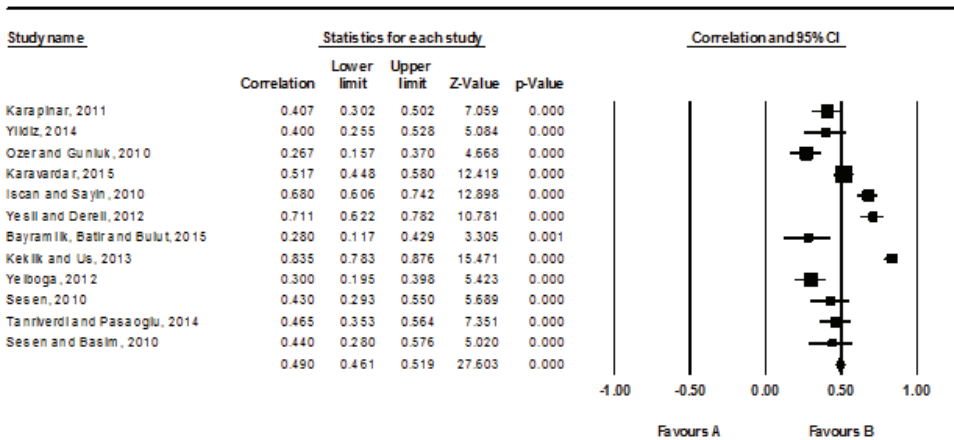
	Model	k	Effect size	95% CI	Q-stat	I-squared	Tau-squared
Internal Job Satisfaction-Distributive Justice	Fixed effect	5	0.547	0.497-0.594	55.649	92.812	0.086
	Random effect		0.561	0.342-0.722	(0.000)		
Internal Job Satisfaction-Procedural Justice	Fixed effect	5	1.258	1.093-1.423	24.219	85.775	0.037
	Random effect		1.334	0.887-1.781	(0.000)		
Internal Job Satisfaction-Interactional Justice	Fixed effect	5	1.411	1.238-1.585	45.886	93.384	0.094
	Random effect		1.555	0.911-2.199	(0.000)		
External Job Satisfaction-Distributive Justice	Fixed effect	5	1.457	1.282-1.631	42.424	92.643	0.084
	Random effect		1.607	0.984-2.229	(0.000)		
External Job Satisfaction-Procedural Justice	Fixed effect	5	1.436	1.263-1.609	31.103	88.046	0.049
	Random effect		1.526	0.998-2.054	(0.000)		
External Job Satisfaction-Interactional Justice	Fixed effect	5	1.560	1.380-1.741	52.836	93.448	0.095
	Random effect		1.678	0.965-2.391	(0.000)		

p-value in parenthesis

Using the random effects model, the mean effect size was calculated and the results are reported in Table 5, Table 6 and Table 7. The tables represent the list of studies, their statistical properties and the distribution of effect sizes. Table 5A and 5B include five results for job satisfaction and organizational justice components. Table 6 includes three results for internal job satisfaction and organizational justice components. Table 7 includes three results for external job satisfaction and organizational justice components.

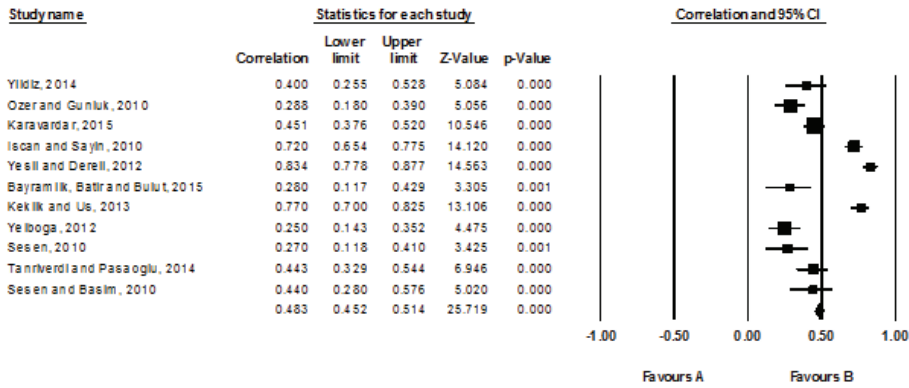
Table 5A

Random Effects Model Results Based on Job Satisfaction and Organizational Justice Subgroups
Job Satisfaction-Distributive Justice



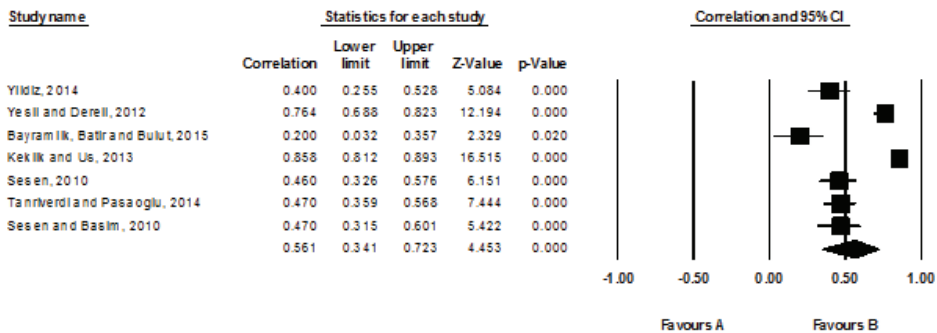
Meta Analysis

Job Satisfaction-Procedural Justice



Meta Analysis

Job Satisfaction-Interactional Justice

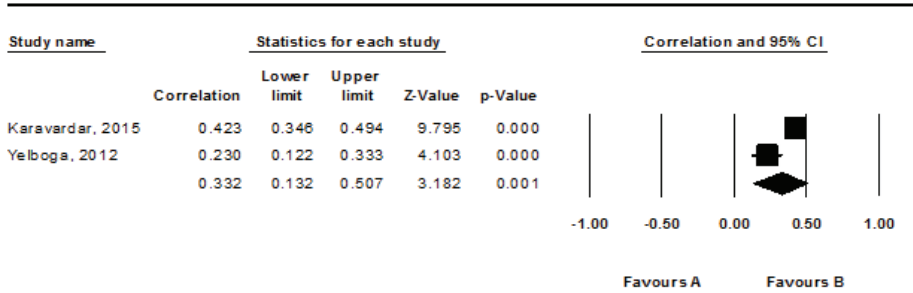


Meta Analysis

According to the meta-analyses results, there is a positive relationship between the job satisfaction and organizational justice components. The overall correlations between the job satisfaction and distributive, procedural and interactional justices are 0.490, 0.483 and 0.561, respectively, and they are statistically significant at the 5% level. Job satisfaction has the biggest and most positive correlation with interactional justice.

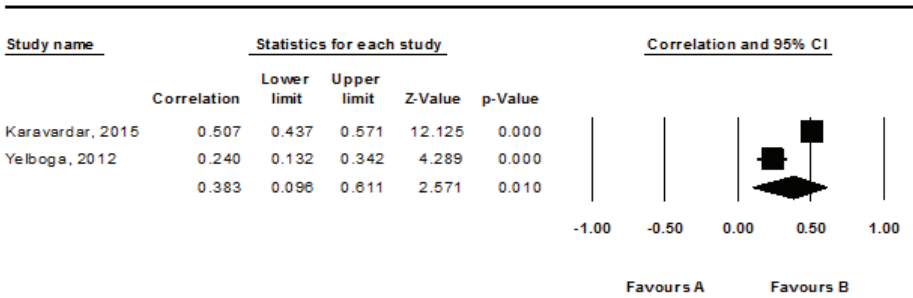
As seen in Table 5B, interpersonal justice and informational justice are similarly related to job satisfaction. These overall correlations are 0.332 and 0.383, respectively and they are statistically significant at the 5% level. Also, the distributions of the effect size of these two relationships are similar.

Table 5B
Random Effects Model Results Based on Job Satisfaction and Organizational Justice Subgroups (Continued)
Job Satisfaction-Interpersonal Justice



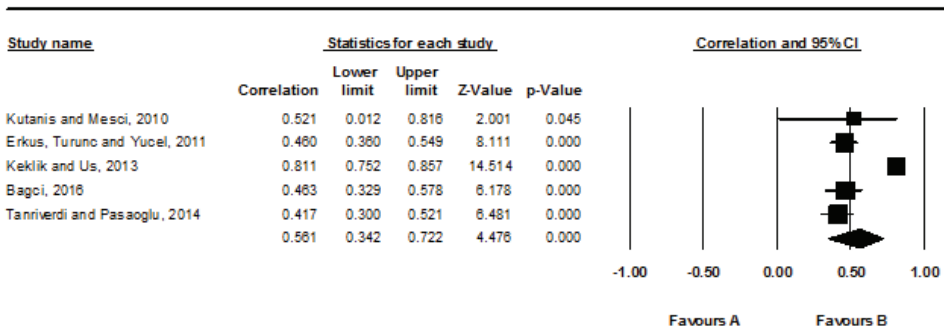
Meta Analysis

Job Satisfaction-Informational Justice



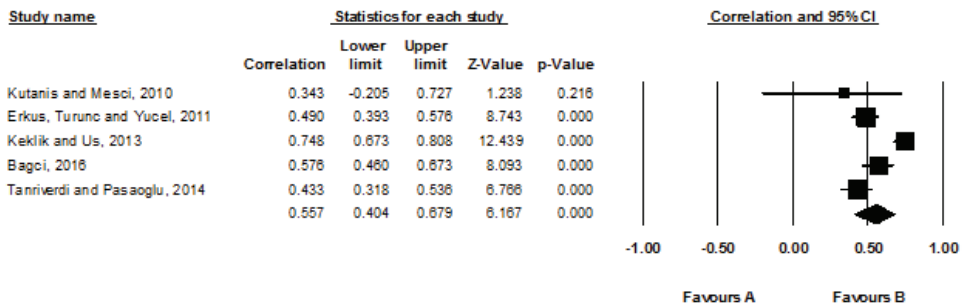
Meta Analysis

Table 6
Random Effects Model Results Based on Internal Job Satisfaction and Organizational Justice Subgroups
Internal Job Satisfaction-Distributive Justice



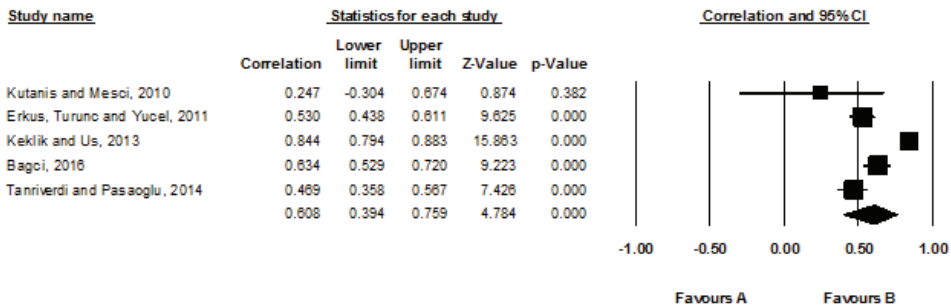
Meta Analysis

Internal Job Satisfaction-Procedural Justice



Meta Analysis

Internal Job Satisfaction-Interactional Justice

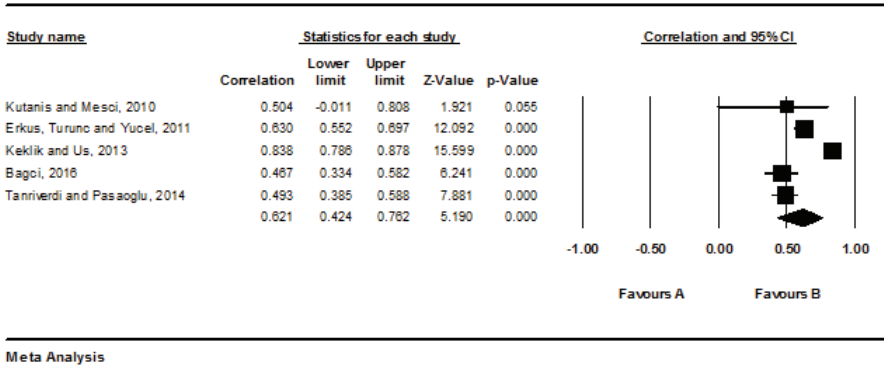


Meta Analysis

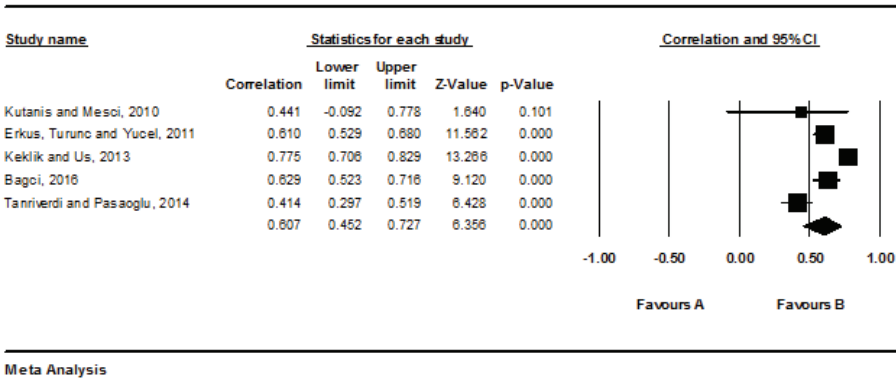
Tables 6 represents the results concerning the internal job satisfaction and organizational justice components. According to the estimation results of the random effects model, overall, the relationships are positive and significant. The mean effect sizes are 0.561, 0.557 and 0.608. Internal job satisfaction has the biggest relationship with interactional justice. Moreover, in their study, Kutanis and Mesci (2010), did not find a statistically significant effect for the three relationships.

Table 7 reports the meta-analysis results for the other category of job satisfaction and organizational justice components. The estimation results show that the external job satisfaction has a positive correlation with distributive, procedural and interactional justice. The overall correlation coefficients are 0.621, 0.607 and 0.638 and they are statistically significant at the 5% level. Although external job satisfaction is mainly related to interactional justice, these correlations are similar.

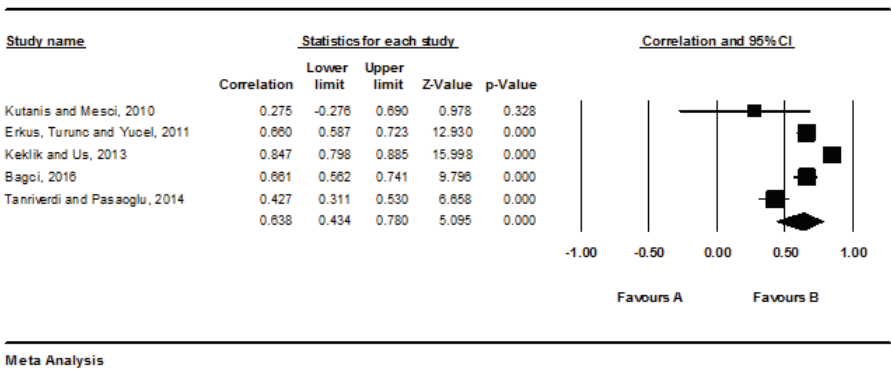
Table 7
Random Effects Model Results Based on External Job Satisfaction And Organizational Justice Subgroups
External Job Satisfaction-Distributive Justice



External Job Satisfaction-Procedural Justice



External Job Satisfaction-Interactional Justice



Conclusion and Discussion

One of the most important factors in the perception of employees' job satisfaction is perception of organizational justice. The number of studies on these two variables in the national and international literature is fairly high. However, there is no consensus on which organizational justice dimension is more effective in job satisfaction. At the same time, as the sample size changes in each study done, the relationship degree and sometimes also the direction is different. To this end, a general conclusion was drawn for the relationship between the two variables and their sub-dimensions using Meta-analysis, which is considered as the test of the test. Meta-analysis was applied in this study using the Gazi University Library database and studies published after 2010. According to the findings obtained, organizational justice and job satisfaction are generally positively related. In other words, if employees feel that administrative and organizational justice is provided, job satisfaction perceptions also increase. It is also positively related to the sub-dimensions of organizational justice and the sub-dimensions of job satisfaction. The answer to the question concerning which job satisfaction correlates more with the organizational justice dimension can be said to be distributed justice. This result coincides with the meta-analysis of Cohen et al. (2001). On the other hand, interactional justice has the highest correlation with internal job satisfaction. In other words, the success of employees in each other's processes affects the positive direction. It is also noteworthy that external job satisfaction correlates more with the organizational justice sub-dimensions than internal job satisfaction.

Peer-review: Externally peer-reviewed.

Author Contributions: Conception/Design of study: Y.Y., H.Y.; Data Acquisition: H.Y.; Data Analysis/Interpretation: Y.Y., H.Y.; Drafting Manuscript: Y.Y., H.Y.; Critical Revision of Manuscript: Y.Y., H.Y.; Final Approval and Accountability: Y.Y.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

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Istanbul Business Research

Submitted: 17.05.2021

Revision Requested: 12.09.2021

Last Revision Received: 03.12.2021

Accepted: 11.12.2021

Published Online: 22.09.2022

RESEARCH ARTICLE

Content Analysis of Audit Reports in Stock Indices EURONEXT 100 vs BIST 100

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Abstract

The purpose of this study is to comparatively investigate the content analysis of the audit reports of the Turkish BIST 100 index and the EURONEXT 100 companies, one of the European stock indexes. In this context, the independent audit reports of the companies included in the EURONEXT 100 and BIST 100 indexes between 2016-2019 were analyzed by content analysis method in terms of selected variables.

The increase in audit report pages with the effect of new regulations; Shorter report LAG time in BIST 100; shortening of LAG times over time in both indices; the existence of a large audit firm preference; insufficient representation of female supervisors in both indices; while audit firm rotation is more common in BIST, auditor change is more preferred in EURONEXT, and finally, the similarity in the reported number of KAMs and their subjects can be counted among the research results.

In this context, according to the results of the research; first of all, it showed that the audit reports largely comply with the new regulations and that efforts to create a common language for auditing standards are underway. It has been observed that the audit reports compared under six headings show a great deal of similarity, but there are some differences due to legal reasons such as the validity dates of the standards in countries. And, it is hoped that the study will contribute to our national literature within the scope of comparative samples and to draw attention to BIST in the international literature.

Keywords

Big4, Audit trend, Audit report lag, Auditor rotation, Key Audit Matters

Introduction

Experiences regarding financial scandals have still become the source of motivation for studies on independent audit activities despite nearly twenty years having passed since. Independent audit provides insight into the accuracy of public companies for stakeholders such as investors. Moreover, independent audit contributes to the regular operation of markets, increasing the confidence in the integrity of financial statements as well as helps to reduce financing costs.

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To cite this article: Yalcin, N. (2022). Content analysis of audit reports in stock indices EURONEXT 100 vs BIST 100. *Istanbul Business Research*, 51(2), 433-458. <http://doi.org/10.26650/ibr.2022.51.938151>



Scandals such as Parmalat, Ahold, Vivendi that were experienced in Europe caused SOX-like precautions to become the current issues. Regulations about the audit field in the EU have come up for discussion as from 2006. Audit reform was started by the European Commission Advisory Report called ‘‘Audit Policy: Lessons from Crisis’’ in 2010 (Yalçın, 2019, 2). 2006/43/EC numbered Audit Directive (8th Directive) has been updated after nearly three years of negotiations. The 2014/56/EU numbered Audit Directive including a series of amendments and newly added provisions for the regulation of all legal audits carried out in the EU was published in the official gazette in 2014 with its new version. Member countries were given time till 17,6,2016 to comply with directives and regulations published within the scope of this reform. After the financial crisis, the chief goal of those regulations is to strengthen the confidence in the integrity of reported financial statements and also improve the audit quality (Willekens, Leuven, Dekeyser&Ines,2019, 16). Related regulations have brought innovations to issues such as increasing audit quality, transparency, mandatory audit firm rotation, prohibition of non-audit services, supervision of audit, compliance with international audit standards, quality assurance system, investigations, and sanctions (Doğan, 2016, 6-16).

Regarding independent audits in Turkey, there were regulations of the Capital Markets Board of Turkey (CMB) between the years of 1987-2011. The Public Oversight Accounting and Auditing Standards Authority that was established in parallel with developments in the USA and EU was authorized for regulations about the independent audit in 2011. The history of auditing in Turkey can be thought of as new when it is compared with the EU and USA. However, this is normal if it is evaluated based on the issues such as the number of public companies, the status of publicly traded companies, and also the depth of financial markets.

On the other hand, Turkey has not fallen behind in developing countries regarding legislation. EU directives and legislative changes and practices in the USA are closely followed by Turkey. Either the Turkish Commercial Code (TCC) or establishing Public Oversight Authority (POA) were actualized at dates stipulated by EU legislation (Çalıyurt and Kesimli, 2015).

Both the new regulations introduced by the directive in the EU and the rules adopted by the POA in Turkey mainly concern the following companies, especially the publicly traded companies, which are called the Public Interest Entities (PIE): Banks, insurance, reinsurance, and pension companies, factoring companies, financing companies, financial leasing companies, asset management companies, pension funds, issuers, and capital market institutions with Establishments considered within this scope by the Authority as they are of considerable concern to the public based on their fields of activity, transaction volumes, the number of employees they employ, and similar criteria (Decree-Law No. 660, Art.2). As seen above, similar legal regulations and practices affecting EU and Turkish companies traded on the stock exchange make it meaningful to work on the contents of the independent audit reports of companies included in the stock market indices of these two important parties.

On the other hand, studies have reviewed the effects of independent audit reports on stock values of companies in the stock market while the reverse side of this effect has not been researched enough. Within this scope, there is also a need for researching the effects of independent audit reports on the creation of audit reports for companies traded on the stock exchange.

The content analysis or context of tendency in the audit market concept is one of the most remarkable issues in the international audit market. Moreover, such reports that provide information for investors and researchers are prepared and submitted to the public free of charge or for a fee. Audit report analysis research includes in terms of the issues such as audit firm type, gender of auditor, audit fees, auditor change, audit firm change, audit opinion type, audit report page count, audit report lag, Going Concern Opinion (GCO) and the number of key audit matters (KAM) (Audit Analytics, 2019, 2). Much as audit opinion is crucial, the audit report should provide more transparency regarding how the actions undertaken by the statutory auditor in an audit process reach the results. Therefore, there are studies conducted on audit reports in order to measure the early effects of the new regulations in audits (e.g. Sekizsu and Ertaş, 2018, Fülöp, 2018). Many of the studies carried out by researchers in the field of audit in recent years have aimed to measure the reporting quality in audit in terms of benefits provided to users as a result of audit activities. Audit report content studies are expected to contribute to research on audit quality. According to Porter (2008), the structure of the audit market is an important competition factor for audit companies. That is to say, the literature defines the quality of information as ‘the essence of strong markets’ (Fülöp, 2018, 250). Trend research is expected to contribute to identifying factors affecting the quality of financial statements for both regulators and implementers, and also to improve the quality of the published report. As mentioned above, such studies have been conducted in the USA and the EU, and so far no Turkish sample has been encountered in the studies¹.

In this regard, this study firstly reviewed companies included in BIST 100, one of Turkey’s important indices, and on the EURONEXT 100, one of Europe’s important indices to examine the independent audit market, which is surrounded by regulations concerning especially public companies. The audit market is one of the markets with high efficiency and competition. It is accepted that currently over 60 percent of the market is controlled by major audit firms (Velte, 2012, 150, IESBA, 2015, 15). However, having information about how the market is shaped in terms of both the type of audit firm and other variables will provide more transparent and secure information to all stakeholders.

Just as any scientific research, this research has some limitations. First of all, the European sample is limited to an index on the EURONEXT stock exchange. The results obtained from the companies listed in the index between 2016-2019 may not represent the whole of

¹ These reports are generally available for a fee. The researcher had the opportunity to examine only the publicly published reports.

Europe of course. On the other hand, although the index representing the 100 companies with the highest volume in Turkey was preferred, the independent audit market in Turkey is not just this index. The second limitation is the audit fees. Declaring the audit fees in the time series² when the research is done is not mandatory in a legal manner in Turkey. Therefore, there could not be evaluated the audit fees, which is an important element. The third important limitation is the determination of reports containing the auditor's opinion and GCO, which are important audit elements. Since the chosen indices include the companies with the highest volume of the stock exchanges on which they are listed, providing opinions other than positive opinions and GCO reporting to these companies are not common. Qualified opinions were determined in ten companies, mainly in finance companies in BIST 100 while such opinions were detected in EURONEXT 100 in both cases. Therefore, a comparative evaluation could not be made in terms of these two elements.

In this respect, it is hoped that the study will contribute to our national literature within the scope of comparative samples and to draw attention to BIST in the international literature.

As is explained in the literature part, there are many studies on independent audit, however, the number of comparative independent audit studies with international samples to see the audit reports' content is not sufficient. Literature research about independent audit trends can be seen in the following chapter. The findings of the companies in both indices in terms of variables selected for auditing reports' research are included in the next chapter. Finally, this paper finishes with a conclusion and evaluation.

Literature Research

Rules that auditors need to follow have increased due to financial scandals and legislative regulations arising from related scandals. Therefore, regenerating financial reporting and audit reports is a must to restore trust. Scrutinizing audit reports in terms of only the auditor's opinion causes reports with more information to be gone unnoticed (Fülop, 2018: 252). In 2014, the 8th Directive entered into force in the EU to increase the communication value and transparency of audit reports. Member countries had time till 2016 to comply with related regulations. Turkey, on the other hand, has complied with regulations such as the quality control in independent audit, audit firm and auditor rotation, Public Oversight Institution (POI), matters highlighted in the audit, expressing opinion on the sustainability of a company after completing the establishment of POI and starting its activities in 2011. Most of these regulations have come into force in line with the EU especially since 2016.

2 According to the regulation published in the Official Gazette dated 30.03.2021 and numbered 31439, in accordance with the 18th article of the European Union (EU) Accounting Directive 2013/34; public interest entities (PIEs) and large companies, from fiscal periods beginning on or after 1.1.2021, are obliged to explain independent audit fee for the reporting period and other assurance services provided by the independent auditor or independent audit firm, fees for tax advisory services and other non-independent audit services in their footnotes of financial statements.

Many studies in the audit field over the last two decades have aimed to measure the reporting quality in terms of benefits for users at the end of audit tasks. Moreover, researchers analyze the audit report so as to include some information on the auditee that can help during the decision-making process of users. So, national and international literature has innumerable studies regarding independent audit reports.

Studies that reveal the audit tendencies and audit reports content of countries, especially comparatively, were examined in the literature research conducted in accordance with the subject of this study. So, there also are studies that were conducted in terms of variables such as auditor opinion, gender of auditor, audit firm type, reported KAM (i.e: Yaşar, 2015, Sağlam & Orhan, 2018, Uzay and Köylü, 2018, Tušek, & Ježovita 2018, Pitto and Morais, 2018, Çiğer, Vardar and Kınay 2019, Levanti, 2019, Shao, 2020). FTSE 100, CAC 40, and AEX 25 samples and Turkey, Romania, Poland, and the Czech Republic samples were respectively used in studies belonging to Pitto and Morais (2018) and Çiğer, Vardar and Kınay (2019).

On the other hand, some studies have a title of ‘‘analysis of independent audit reports’’ and also examine the characteristics of independent audit reports through a sample in terms of (e.g. Uyar and Çelik, 2009, Sekizsu and Ertaş, 2018, Smith, 2019). The common trait of these studies is that they reveal the differences in audit reports only in a single country sample in terms of a single dependent variable.

Although not comparative, Fülöp (2018) conducted a research in Belgium using two-year data of 23 companies operating only on the Brussels Stock Exchange to measure the impact of the new audit regulations. He reviewed audit reports in terms of variables such as the number of pages in the report, type of audit firm, auditor change, KAM, and audit opinion. According to study results, new regulations have increased the number of pages in reports, audit firm preference has still been with Big_4, there is a relative decrease in presenting audit opinions except for positive opinions.

As mentioned before, the analysis of the independent audit reports of companies from various sectors in a single country sample and in a single stock market from different perspectives has been widely covered in previous studies. Since the aim of this study is to reveal the contents of the audit reports according to the indexes, it is considered sufficient to briefly mention the other studies above.

Method and Data

Both qualitative and quantitative research methods can be used in scientific research . This study utilized content analysis from qualitative research methods. Content analysis is widely used in social sciences as a method that can be qualitatively or quantitatively utilized

to systematically analyze written, verbal or visual documentation (e.g. White & Marsh, 2006, Dahl, 2001, Du, Stein & Martin, 2008, Wilson, 2011, Neuendorf & Kumar, 2016, Gül & Maksudunov, 2019). There is a unique methodology in qualitative methods, similar to quantitative research. Such that research structure and research questions are prepared at first, and then data source of the research is defined. The data that is capable of answering research questions are collected from the most valid source. The content consisting of related data is analyzed dividing into conceptual parts (sectional and/or time series). The classification (coding) framework is determined in order to make the variables understandable by determining the analysis unit and sample. Then, textual inferences are made and the results of the research are presented by interpreting these inferences as a result of the data analysis, coding, classification, or naming processes (Wilson, 2011, Çilingir, 2017).

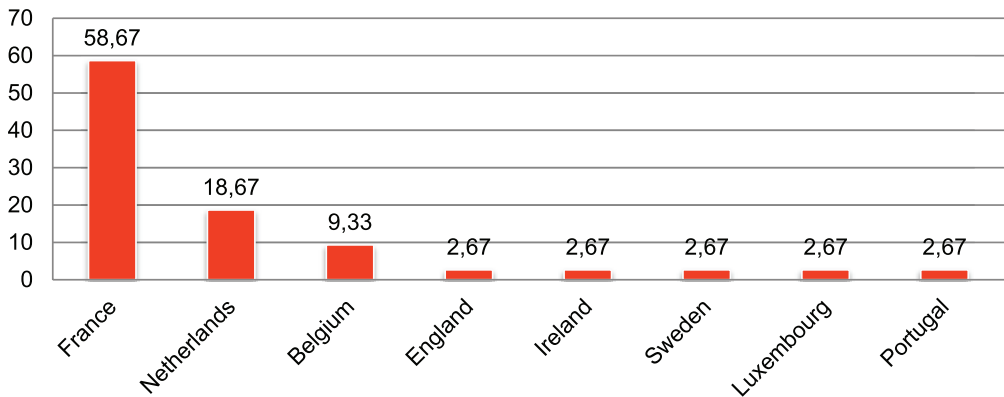


Figure 1. Euronext 100_ Distribution by Country (%)

In this regard, this study conducted a content analysis of independent audit reports by qualitative research method. As mentioned in the introduction, the audit reports of companies operating in Turkey and the European stock exchange were examined.

Istanbul Stock Exchange and Euronext were chosen as samples for related analysis. Examinations were made on the Euronext 100 and BIST 100 indices of Euronext and BIST, including 100 companies for a meaningful comparison.

Euronext was established by the combination of Paris, Amsterdam, and Brussels stock exchanges in 2000. It is listed cross-border in the markets of Amsterdam, Brussels, Dublin, Lisbon, Oslo, and Paris in 2020. Euronext defines itself as “a unique market linking six European economies”. Euronext consists of Euronext 100, Netherlands AEX, Belgium BEL 20, France CAC 40, Republic of Ireland ISEQ 20, Portugal PSI 20, Norway OBX 25. Again, Euronext works as the fifth most important stock exchange in the world with its all

indices. EURONEXT 100 includes the largest and most liquid stocks traded on Euronext (www.euronext.com).

Istanbul Stock Exchange was established as Istanbul Securities Exchange (IMKB) in 1985 and called BIST 2013. Important indices traded on Borsa Istanbul where most transactions are carried out in Turkey as follows: BIST 100, BIST 50, BIST 30, and BIST Banking indices. BIST 100 index is an indicator that is used to measure the performance of the highest 100 stocks traded on Borsa Istanbul in terms of market value and transaction volume. With this feature, it is the basic indicator of Borsa Istanbul Equity Market, it also includes the shares of BIST 30 and BIST 50 (www.borsaistanbul.com).

Since the companies in these indices are important operators in the capital market, this study endeavored to reveal the general view of audit reports analyzing audit reports of each company for the 2016-2019 period. Companies registered in BIST and audits carried out in these companies have been researched in many studies based on a national sample. Euronext is frequently utilized as an alternative for USA sample use (Boersma, 2017, Navas, 2017, Fülöp 2018, Collins, 2020).

Annual reports and audit reports that are published on websites of stock exchanges and companies (on EURONEXT and BIST official sites and companies' websites) were used as a data source to conduct the study.

First of all, companies traded on EURONEXT 100 on 31 December 2020 were listed. Then, companies listed in the index for four years between 2016 and 2019 were determined. 75 companies were obtained for the sample when the number of companies, which was 101 on December 31, 2020, was extracted for the four-year time series.

Later, annual activity reports and independent audit reports were obtained from the investor relations tab on the official websites of each company. There are 75 companies from eight countries listed in the EURONEXT 100 included in the sample. As seen in Figure 1, 58.67 percent of the companies are based in France, 18.67 percent in the Netherlands, 9.33 percent in Belgium, and 2.67 percent in England, Ireland, Sweden, Luxembourg, and Portugal.

This variety also affects the publication language of audit reports. Especially the general run of France companies publishes their audit reports and other annual financial reports in their mother language. Therefore, it was reviewed in terms of the selected variable, translating all related reports.

For the Turkey sample, companies listed on the BIST 100 on December 31, 2020, were listed and the number of companies listed in the BIST 100 for four years was determined as 83. Since it is obligatory to publish the annual financial statements and independent audit reports of companies traded in stock exchange indices in Turkey on the official website of the

Public Disclosure Platform (PDP), the data for the BIST 100 index was directly taken from the PDP.

At least, as seen in the Figure 2: the sample consisted of 158 companies whose 75 are in EURONEXT 100, 83 are in BIST 100. So, the total sample has 632 companies whose 300 companies/year are in EURONEXT 100 and also 332 companies/year are in BIST 100.

■ EURONEXT 100 ■ BIST 100

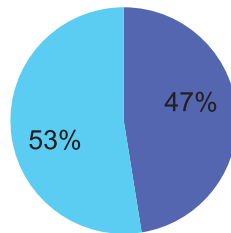


Figure 2. Total Sample

Audit reports that were obtained for both indices were classified in terms of the headings of according to the scope of the research,

- Audit opinion,
- Number of audit report pages,
- Audit Reports Lag,
- Audit firm size,
- Gender of auditor,
- Audit firm or auditor rotation,
- Going Concern Opinion, and
- Key Audit Matters according to the scope of the research.

The audit reports of the enterprises in both indexes were determined in terms of titles and compared after classification. On the other hand, regarding the time series (2016-2019) of the research, the year 2016 has been chosen as the starting year because it is the date of entry into force of independent audit regulations both in European countries and in Turkey. Financial risks caused by Covid-19, which was effective worldwide in 2020, are expected to affect the normal form of independent audit reports. Independent audit reports, which started to be

published as of the first months of 2021, draw attention to longer than normal reports, containing more KAM statements, and containing opinions except positive opinions and GCO reporting. Therefore, since the reports in 2020 do not show a normal tendency, the time series was limited to the year 2019.

Findings

The goal of this study was to research the independent audit reports' content of independent audit reports of companies in EURONEXT 100 and BIST 100. For this purpose, audit reports of companies in both indices were reviewed in terms of the headings of the Audit opinion, Number of audit report pages, Audit Reports Lag, Audit firm size, Gender of auditor, Audit firm or auditor rotation, Going Concern Opinion and Key Audit Matters.

At the beginning of the study, an analysis was also made in terms of audit opinion and going concern opinion. However, as is explained in the introduction part, a significant amount of data could not be obtained for these two variables because of the general positive financial condition of companies listed in EURONEXT 100 and BIST 100,³ Therefore, these two variables were excluded from the study. The findings obtained by analyzing in terms of other issues determined are listed in the following section.

Average Number of Independent Audit Report Pages

Traditionally, audits are associated with knowledge acquisition about basic financial systems and financial records of a company. However, audits in recent years have started to include nonfinancial issues such as security, information systems performance, and environmental risks. This situation affects the number of audit report pages as well. As is observed in Figure 3, the number of pages have tended to increase in reports that include explanations such as key audit matters, highlights, continuity of the business in both indices since 2016 (Except for a 1 percent decrease in the EURONEXT 100 index in 2018). The EURONEXT index has been observed over 5.5 pages and BIST 100 over 3.5 pages since 2017.

The maximum number of pages in EURONEXT 100 was 14 in 2017. There were 6 pages of reports at maximum in BIST 100. Tušek & Ježovita, (2018) conducted a study for Croatia in 2016-2017. They determined 6,25 of an average number of pages for Big_4, 5,01 of average number of pages for Non_Big. It can be said when the findings are compared with these numbers that the average of the European index is similar to the previous finding, but the average of the Turkish index is in less number of pages.

3 Navas (2017), one of the previous studies that conducted research on the Euronext index, similarly failed to identify qualified opinions in the Euronext index, and removed the auditor's opinion from the model.

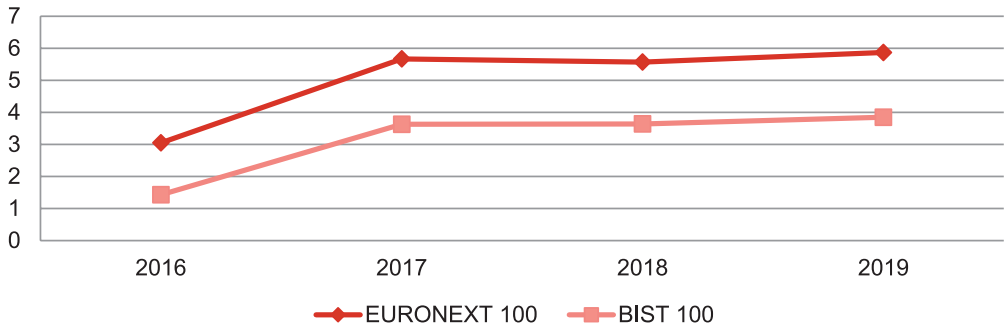


Figure 3. Average Number of Independent Audit Report Pages

Independent Audit Reports LAG

The period from the end of a fiscal year of a company to the audit report publication date is called Audit Report Lag. This period is generally accepted as the determinant of the significant financial reporting timing. It is important to observe the time it takes for the audit opinion to be issued when we consider that timely reporting is an area of interest for investors, managers, regulators, auditors, and academicians (Tanyi, Raghunandan, Barua, 2010).

Timeliness of financial reporting is an important qualitative characteristic that requires making corporate financial statement information useful in decision making and providing financial information to users as quickly as possible (Güleç and Mozeikçi, 2020, 126, Ahmed, 2003, 17). As the financial markets become global-oriented, an international understanding regarding time for expressing audit opinion becomes even more important.

In this regard, as is seen in Figure 4, the audit opinion publication time of Euronext 100 has been 69-70 days per year while audit opinion publication time for BIST 100 has been 52-62 days.

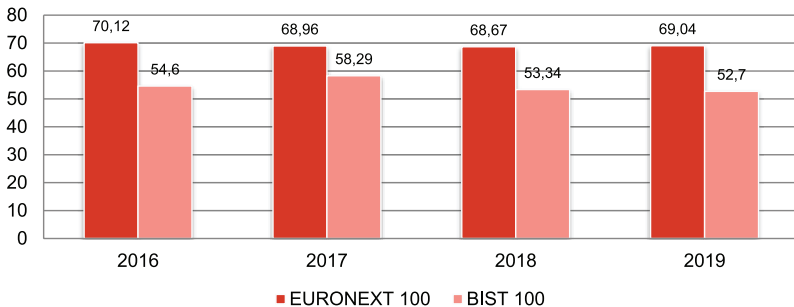


Figure 4. Independent Audit Report Publication Day Average

According to related numbers, the publication time of independent audit reports of companies in EURONEXT 100 took longer compared to BIST 100. However, eight audit reports with an audit opinion reporting period of 100 days or more were excluded from the sample and recalculated when the data in EURONEXT 100 was analyzed in-depth to understand this ratio. For the calculation, reporting time of EURONEXT 100 has been 60-62 days for four years. The tendency revealed when eight companies of extreme value were excluded from the sample that audit reports of EURONEXT 100 (average 60.75 days) were reported later than audit reports of BIST 100 (average 55 days).

Hout (2012) found an average audit report lag of 129 days for Germany, 92 days for the Netherlands and 158 days for Belgium in terms of the Euronext index. Tuan et al. (2020) and Ocak and Özden (2018) conducted a study and found an average audit report lag of 65,13 and 73,33 days in terms of the BIST index. It can be said when the previous findings are considered that the audit report lag period is getting shorter day by day in both indices.

Audit Firm Size

Audit firm size is one of the most frequently used factors in independent audit research . The size of the audit firm was used as an indispensable variable in almost every study investigating the audit market, since 1981 when DeAngelo used the audit firm size as a criterion for audit quality. Thus, audit firm size was naturally used as an indicator.

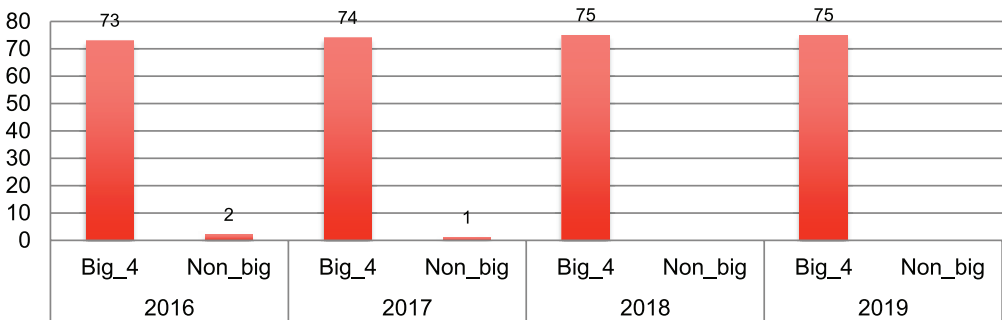


Figure 5. EURONEXT 100 – Audit Firm Size.

Figure 5 shows audit firm distribution of EURONEXT 100. Audit firms taking the audit work are taken as a basis when this graphic that represents the entire sample including France was prepared. Findings reveal that Non_Big audit firms can hardly get any share from the EURONEXT 100 audit market. The number of Non_Big audit firms that undertake the audit work alone is only three in the total sample. The distribution of audit firms of French companies is also explained in Figure 7 by ignoring the Non_Big auditing firms, which are auditing with Big_4.

Figure 6 shows Big_4 audit firms that took the most share from the market based on an average four-year time series of Euronext index.

According to this Figure, market distribution can be seen as follows:

- PWC by 28%
- EY by 27%
- Deloitte by 22%
- KPMG by 21%

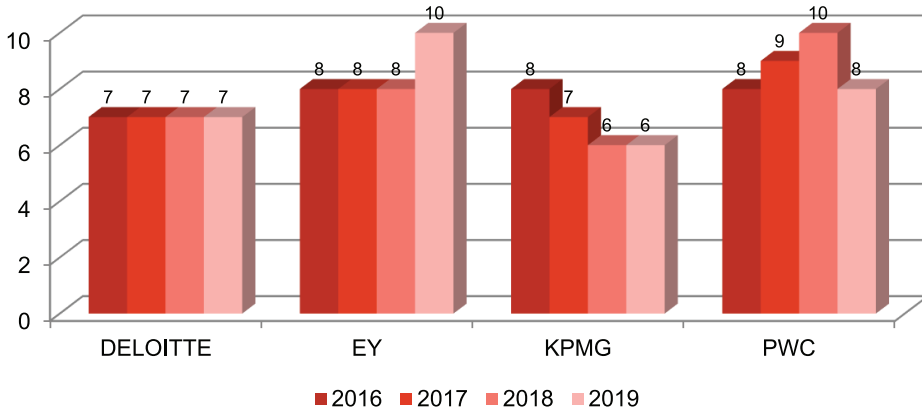


Figure 6. EURONEXT 100 – Distribution of Big_4 audit firms (Except France)

Figure 6 does not show audit firm distribution in France. There has been applied joint audit in accordance with the statutory audit regulations for fifty years in France that generates 60% of EURONEXT 100 sample⁴. So, a joint independent audit report is published every year by at least two audit firms for an independent audit.

It is seen that some companies in EURONEXT 100 in France are audited by more than two audit firms. 9 independent audit reports were audited by three audit firms in 2019 while 9 independent audit reports were audited by three audit firms in 2018 and finally, 3 independent audit reports were audited by three audit firms in 2017. There was at least one non-large audit firm for 16 reports published by two or three audit firms in 2016, 2017, and 2018 years,

4 In joint audits, two (or more) audit firms are appointed to share responsibility for a single audit engagement and to produce a single audit report. Joint audits typically involve joint planning, fieldwork allocated between the firms, and a cross-review by each firm of the other's work. The firms jointly report to the audit committee and are both parties to the audit report. For detailed information, see: <https://www.ifac.org/system/files/publications/files/IFAC-Joint-Audit-The-Bottom-Line.pdf>

there was at least one non-large audit firm for 18 audits in 2019. Mazars and Grant Thornton from France are the audit firms out of Big_4. According to the study that was conducted in EURONEXT PARIS in 2019, Mazars succeeded to take equal share with Big_4. The reason for this share may result from the joint audit in France (Audit Analytics, 2019, 4).

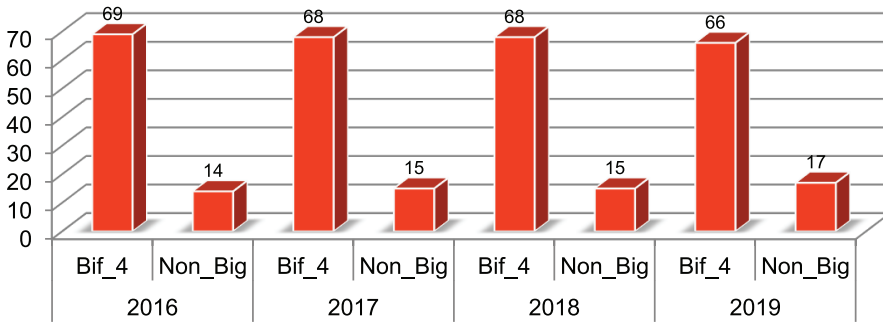


Figure 7. BIST 100 – Audit Firm Size

For Figure 7, Non_Big audit firms, too, relatively find a place in BIST 100 compared to EURONEXT 100. 18% Of the total sample was audited by Non_Big audit firms. Non_Big audit firms other than Big_4 can also benefit relatively from the market in Turkey when these findings are compared with data from Europe. This situation also proves the market dominance of Big_4 considering that Big_4 has a share of over 60%.

As is seen in Figure 8, regarding the distribution of Big_4 in BIST 100, the biggest share belongs to PWC. Audit firms that take the biggest share in BIST 100 respectively are PWC by 29%, EY by 21%, Deloitte by 18%, Non_Big by 18% and finally, KPMG by 14%.

In terms of comparison, the average distribution of Big_4 and Non_Big respectively is (78%-22%) for England-London Stock Exchange, (83%-17%) Italy-Italian Stock Exchange, XETRA(%59-%51) for Germany Stock Exchange (Audit Analytics, 2019, 4-8). Data on Germany alone give clues that audit firms that are not large in the audit market are also given a share.

For Audit Analytics (2019) data, London Stock Exchange distribution of Big_4 audit firms as follows: PWC by 23,6%, KPMG by 22%, Deloitte by 7,2%, EY by 16% and Non_Big audit firms by 31,2%, German Stock Exchange of Big_4 audit firms as follows: PWC by 18,7%, KPMG by 17,1%, EY by 16,2%, Deloitte by 6,3%, and Non_Big audit firms by 41,7%.

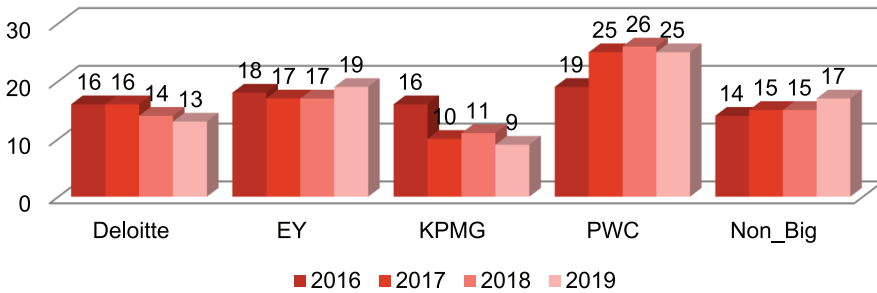


Figure 8. BIST 100 – Distribution of Big_4 Audit Firms

Gender of Auditor

There are several national and international studies regarding the position and effect of women in the audit market (e.g. Breesch & Branson, 2009, Montenegro & Bras, 2015 CAAF, 2016, Setiawan, 2018, Jones, MacTavish, & Schultz, 2019, Taç and Çardak, 2020). For a study that was performed by CFA Institute in 2018, the earning difference between male and female auditors in England is 43% for PWC, 38,1% for EY, 43,2% for Deloitte, and 42% for KPMG (CFA, 2018). Similarly, women are less represented than men in all professions in many countries. Women's representation is low in both indices of this research as well.

Figure 9 shows that only 16% (637) of total auditors in EURONEXT 100 are women. Much as the number of female auditors has increased over the years, the general tendency is an increase in the number of male auditors.

Following items are determined when companies in EURONEXT 100 are analyzed in terms of the gender of auditor:

- There were only three female auditors in 2016 (1 Deloitte, 2 KPMG),
- There were four female auditors in 2017 (2 Deloitte, 1 KPMG, and 1 PWC),
- There were five female auditors in 2018 (1 Deloitte, 1 EY, 1 KPMG, and 2 PWC),
- There were four female auditors in 2019 (1 Deloitte, 1 KPMG, 2 PWC).

Regarding the number of female auditors who signed audit reports of companies of EURONEXT 100 index,

- There were twelve female auditors in 2016, five in 2017, nine in 2018, and sixteen in 2019.

It is seen the same female auditors took a part in 104 audit contracts in which female audit partners were utilized. This determination reveals that the presence of women in audit contracts is lower than it appears.

Gender distribution for the BIST 100 sample can be seen in Figure 10. Only 16% (54) of auditors (332) are women. Just as the EURONEXT sample, although the number of female auditors has increased over the years, the general tendency is that male auditors still find more space.

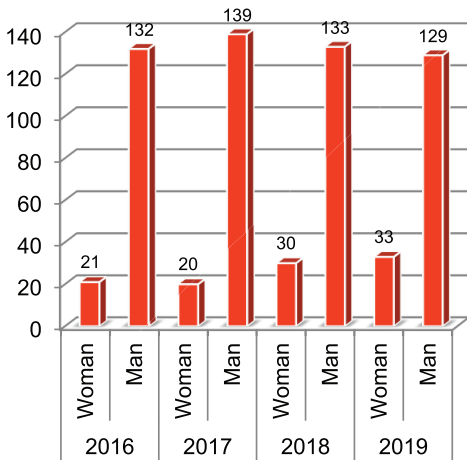


Figure 9. EURONEXT 100
Gender of Auditor(number)

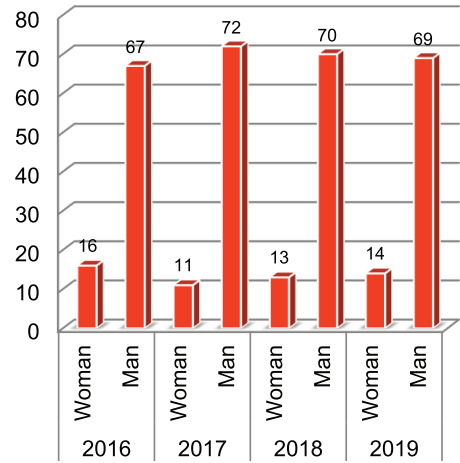


Figure 10. BIST 100
Gender of Auditor (number)

Regarding BIST 100, the number of companies that are audited by female auditors can be seen below: Sixteen in 2016, eleven in 2017, thirteen in 2018, and fourteen in 2019.

Following items are aligned when the audits that were conducted by female auditors are classified in terms of audit firms:

- Deloitte 6, EY 3, KPMG 3, PWC 2, and Non_Big 2 in 2016,
- Deloitte 1, EY 5, KPMG 3, and PWC 2 in 2017,
- EY 4, KPMG 4, PWC 4, and Non_Big, 1 in 2018.
- Deloitte 1, EY 6, KPMG 3, PWC 2, and Non_Big, 2 in 2019.

This situation, just as findings of EURONEXT 100 index, highlights that women auditors are less involved in the audit market than it appears. Just as EURONEXT 100, the same female auditors were assigned in BIST 100 as well. There were 10 female auditor names for the

year 2016, seven female auditor names for the year 2017, eight female auditor names for the year 2018 and finally, there were 10 female auditor names for the year 2019.

Auditor / Firm Rotation

EU audit regulations published in 2014 and entered into force in 2016 oblige the rotation of auditors every ten/twenty years and the rotation of audit tasks every ten years. There are regulations of member countries. The member states have regulations with different year terms.⁵ The “joint audit” applied in Europe, especially in France and Denmark, allows the period of rotation in all member countries to be increased to 24 years. On the other hand, in Turkey, companies that have signed contracts with the same audit firm seven times during the retrospective review of 10-year audit contracts for audit firm rotation are obliged to change the audit firm in the new fiscal year. Moreover, the same regulation prohibits auditing the same auditor by the responsible partner auditor for more than five financial years. These regulations have been implemented in Turkey since 2010.⁶

Companies included in the EURONEXT 100 index are companies subject to EU regulations. The compulsive regulation of the EU in audit rotation identified audit firms retrospectively since 2016 and provided them to change audit firm and/or auditor for the years that the relevant country is based on (e.g., 10 fiscal years for Sweden and Netherlands, 9 fiscal years for Belgium, 6 fiscal years for France, etc.). It is to the point to say that rotation applications are also observed before the rotation regulation of the 8th Directive in countries such as France, Holland, England, and Spain. So, rotations can be applied voluntarily as well as compulsorily. Therefore, the rotation findings of this study include all mandatory or voluntary rotations.

However, as is seen in Figure 11, there is still not an intense rotation application in companies in EURONEXT 100. The rotation ratio was 10-12,5 in the 2016-2018 period while this ratio increased to 22% in 2019.⁷ This finding proves the effects of the EU 8th Directive. Again, the same Figure shows that the auditor rotation occupies a relatively large place compared to the rotation of the audit firm.

5 Compulsory rotation in the framework of EU audit reform; See: Yalçın, (2019) For detailed information about the rotation practices of the member states: Compulsory rotation in the framework of EU audit reform; Rotation Applications of Member Countries.

6 See for detailed information <https://kgk.gov.tr/ContentAssignmentDetail/301/Rotasyon-Uygulamas%C4%B1-Hakk%C4%B1nda-Kurul-Karar%C4%B1>

7 The change of each audit partner has been calculated separately while examining the rotation status of these countries due to the implementation of joint audit in France.

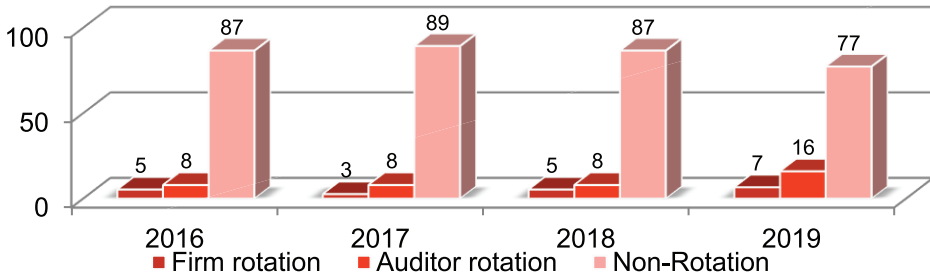


Figure 11. EURONEXT 100 Auditor or Firm Rotation (%)

The situation of BIST 100 in terms of rotation in audit can be read in Figure 12. The sample performed 31% of auditor rotation in 2016, 56% of auditor rotation in 2017, 29% of auditor rotation in 2018 and finally, 28% of firm/auditor rotation in 2019. 56%, which is the highest rotation ratio of BIST 100 is due to the end of the seven years in 2017 as per the regulation that has been in force since 2010 in Turkey.

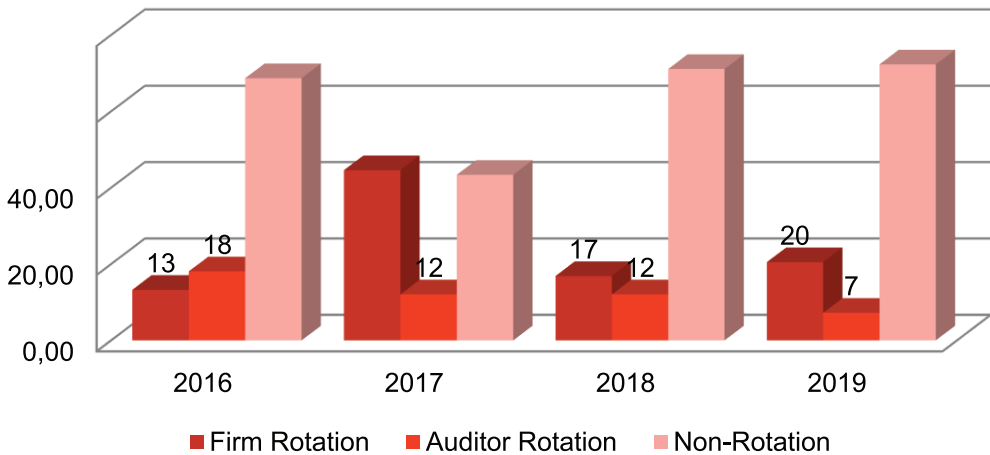


Figure 12. BIST 100 Auditor / Firm Rotation (%)

Compulsory rotation findings are the concrete indicators of the matter that independent audit regulations carried into action in Turkey before European countries.

Numbers of Key Audit Matters

The International Audit and Assurance Standards Board (IAASB) published the Communicating Key Audit Matters in the Independent Auditor’s Report ISA 701 (KAM) in January 2015 (IAASB, 2015). This new part in the auditor report consists of explanations that are

crucial for understanding financial statements better and also critical for auditors' analyses. This standard aims to provide a more understandable language for users of financial statements and also a common order for audit reports in different countries. Therefore, reviewing the reflections of related standards in both Turkey and Europe samples is essential to the audit report comparatives.

Figure 13 shows the total number of KAM in audit reports of companies listed in Euronext 100 and BIST 100 for four years. As is seen in Figure 13, the number of KAM reported in Euronext 100 each year throughout the time series is more than the number of KAM reported in BIST 100. No KAM was reported in BIST 100 while 81 KAMs were reported in 2016. The reason for this situation is the date of entry into force of the KAM standard (2017). Therefore, it is understood when a comparison is made in the following years that auditors who provide audit services to Euronext companies tend to report more KAM.

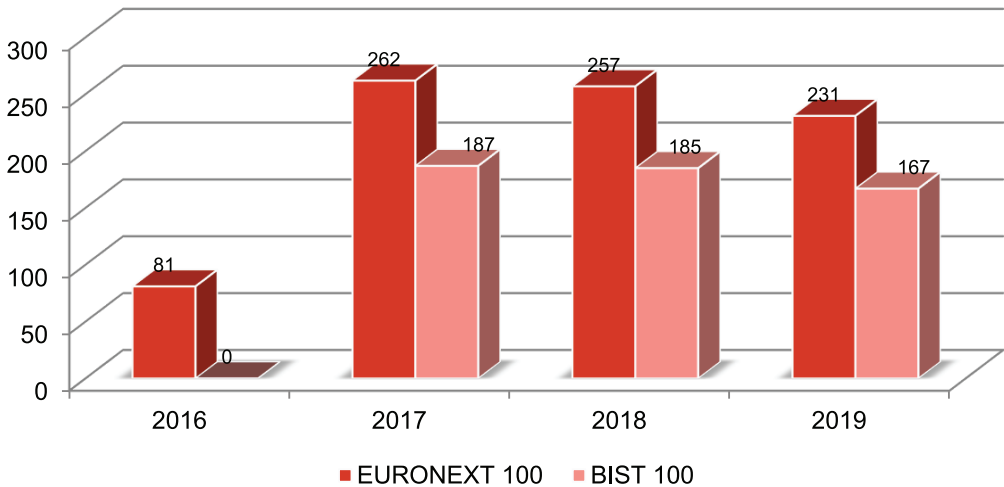


Figure 13. Numbers of KAM

Figure 14 shows the annual average number of KAMs reported in both stock market indices in the sample. For the graphic, KAM is reported annually between 2-2.5 for BIST 100 companies while it is reported annually between 3-3,5 for Euronext 100 companies for the other three years except 2016. The annual KAM average of both indices never falls below the average of “2” found in previous studies when the findings are compared with previous studies conducted with the average number of KAM data (Akdoğan and Bülbül, 2019, Can and Çil Koçyiğit, 2020, Yalçın, 2020, Çağırın and Varıcı, 2019, Doğan, 2020, Ertan and Kızılcık, 2019, Fereira & Morais 2019, Karacan and Uygun, 2018, Pinto and Morais, 2018, Shao, 2020, Tušek&Ježovita, 2018).

Reported KAM numbers are in a downward trend after the first year of the regulation (Excluding EURONEXT 100-2016). In other words, the auditors conducting audits in both the European sample and the Turkish sample tend to declare less KAM in the following years after the first-year implementation of the regulation.

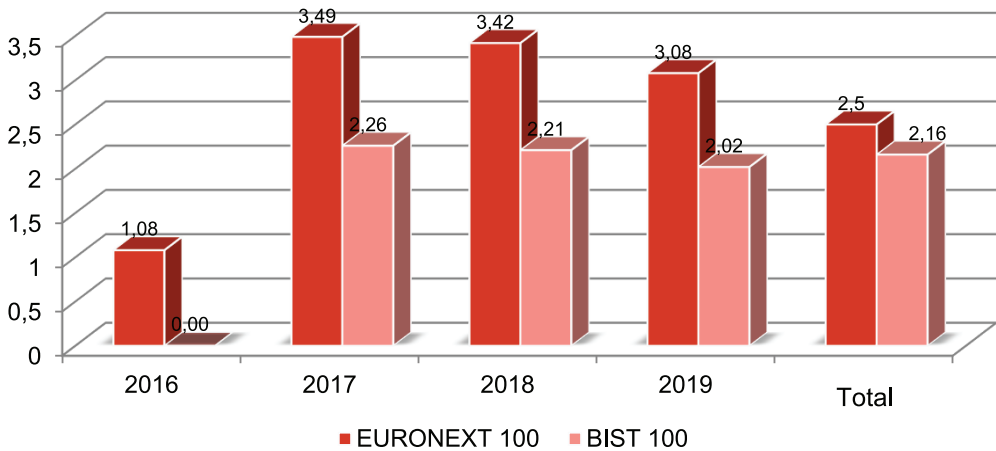


Figure 14. Average of KAM

KAM paragraphs impose new responsibilities on auditors, such as reputational concerns, economic concerns, and litigation costs. As clearly stated in ISA 701, research findings obtained due to the fact that KAMs are related to the professional judgment of the auditor provides information about the effect of the characteristics of the auditing company and the auditor on the KAM besides the financial risk status of the audited company (Yalçın, 2020, 4230).

Moreover, KAMs that were reported by auditors of companies in both indices were deeply analyzed in terms of content. More than forty issues were reported as KAM for every year in both indices. For this reason, frequently recurring topics were identified and classification was made. In this context, KAMs, which have been reported at least five times per year, are listed in both indices. KAMs that were reported at least five times for EURONEXT 100 constitute 51% of the total of KAMs reported in 2016, 69% of the total of KAMs reported in 2017, 77% of the total of KAMs reported in 2018, 79% of the total of KAMs reported in 2019.

The first rank in the total of reported KAMs is the recognition of revenue in 2016, and the impairment and/or fair value calculation of goodwill, tangible and intangible fixed assets in all other years. Following this, there also are the issues such as valuation of tax and related provisions, valuation of financial instruments, valuation of investment properties and other investments, lawsuits and litigation risks, mergers, construction contracts, and retirement, and other post-employment liabilities.

In terms of subject headings of BIST 100, KAMs, which were reported five times or more over the years constitute 66% of the total of KAMS reported in 2017, 74% of the total of KAMS reported in 2018 and 2019.

Among the total KAM titles reported in the BIST 100, the most recurring topic is the recognition of revenue for each year. Following this, there also are the issues such as impairment of tangible and intangible assets and goodwill, recoverability and impairment of trade receivables, stocks and valuation of stocks, classification and valuation of financial instruments, the recoverability of the deferred tax asset, valuation of pension liabilities, the evaluation of leasing transactions.

Conclusion

Publishing the independent auditor's report is a long and complex process. Examination of many documents, research, and examination of many information constitute the essence of audit activities. But for many years, the result of this long-term activity was released to the public so as to be limited to a single-page independent audit report and auditor's opinion. Audit firm size started to be added to these audit activity researches in the early 1980s. Audit studies have been conducted on audit reports that reveal limited information for nearly two decades. Traditional, that is, reports expressing only what the auditor's opinion is, did not allow the comprehensive information of the auditor about current audit and also the information regarding how risks of material misstatement are handled to pass to the readers of the audit report. Later, financial scandals in various countries around the world required review of audit reports and even audit activities. There occurred a need to transfer more information on the quality of financial reporting to those concerned. For this reason, it has been aimed to increase the information and communication value of the audit reports with the new legal regulations since 2002. These new regulations have also changed and expanded the form and scope of the audit report. As these changes started to be implemented, a kind of action started to emerge on the audit reports. It is thought that determining and understanding this action will be beneficial for audit reports to achieve the goal.

Since European countries are subject to common union (EU) regulations, they basically use EU norms in these auditing regulations. On the other hand, Turkey closely follows EU regulations due to the EU membership process, geographical proximity, and some economic similarities. Therefore, this study analyzed the actions of auditing in stock indices in two economies.

Research findings were explained in detail in the previous chapter. The following items are seen when the findings are comparatively commented on here.

- *Regarding the findings on the number of pages of audit reports, the new regulations affect the numbers of pages in direct proportion, and the number of pages has increased over the years.*

It has been observed that the reports have been expanded to comply with the new regulations, and this situation is also more pronounced in the European index since 2017.

- *Regarding the findings of the audit report lag, the publication time of the audit opinion in EURONEXT 100 takes longer than the BIST 100 index.*

It can be said when the periods are compared with the previous literature that the audit report lag duration is getting shorter in both indices day by day. The days in which the independent audit report is published can be considered as an indicator of timeliness, which is one of the factors that reveal the importance of the information produced by the accounting and audit. However, it should be kept in mind that this time factor and the pressure on the auditor will affect the audit quality.

- *Regarding the findings on audit firm size, the presence of Big_4 is predominately felt in both indices as well as the BIST 100 index contains more Non_Big audit firms compared to the EURONEXT 100. Moreover, the largest share in Big_4 has been determined as the PWC audit firm in both indices and previous studies.*

Small and medium-sized audit firms are increasingly moving away from the supervision of capital market-oriented companies. This situation causes increased oligopolistic fees as well as significant competitive disadvantages for large audit firms.

- *Regarding the findings of the gender of auditors, female participation in the audit market is equally and quite low in both indices, and the rates have decreased even more in in-depth studies.*

Gender-related inequalities are the common and insurmountable problem of almost every business line. The audit market is among the markets where this inequality is felt the most, regardless of geography and time. Although the increasing trend is seen in both indices over the years, it is obvious that it will take many years to close the gap.

- *Regarding the findings on rotation, the effect of the dates of entry into force of rotation regulations of countries on indices is so apparent. The rotation practice, which started especially in European countries after 2016, caused the rotation levels in the EURONEXT 100 index to remain at low levels in the sample. On the other hand, since Turkey has been obliged to implement a mandatory rotation for ten years, BIST 100 findings showed a higher adaptation . In addition to all these, we can say when the findings are scrutinized in terms of the type of rotation that rotations of the EURONEXT 100 index, albeit a small number, tend to change auditors while there is a tendency to change the audit firm in the BIST 100 index.*

There are many studies about the effects of rotation application in the independent audit on the reliability and quality of the audit. Related studies reveal proof of the advantages and

disadvantages of the rotation. Since rotation is a must for economies with both indices, more information about the validity of previous evidence will be available in future studies with longer time series.

- Regarding the findings on KAM, both indices have kept pace with the issue of KAM reporting. EURONEXT 100 showed a higher conformation than BIST 100 in terms of the reported KAM average. On the other hand, the KAMs reported in both indices tend to decrease after the first year.

- Another finding is about the similarities of KAM issues reported. The most frequently reported topics in both indices were similar.

KAM consists of disclosure areas that the auditor finds important, are predicted to be critical, and are relevant to a more accurate understanding of the financial statements of the company during the audit process. This standard aims to provide a more understandable language for users of financial statements and also a common order for audit reports in different countries. With reference to the findings of this paper, the targeted common language has started to come true.

As mentioned above, results of this study that was conducted on the audit reports containing two stock indices including companies from different economies emphasized the similarities and differences about the audit process of indices. This paper only shows the auditing behavior of companies listed in the two selected indices. Researching the reasons for emerging audit actions may also be a research object. Overcoming the limitations of this study, comparing more indices and using more variables and time series can bring along new evidence in future studies. By building a basis for confidence, auditors reduce financing costs, and contribute to an efficient allocation of capital to fuel economic growth. Because of this important contribution, the value of research in the field of auditing is profound.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The author has no conflict of interest to declare.

Grant Support: The author declared that this study has received no financial support.

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Istanbul Business Research

Submitted: 08.12.2020

Revision Requested: 20.09.2021

Last Revision Received: 08.10.2021

Accepted: 18.12.2021

Published Online: 27.06.2022

RESEARCH ARTICLE

Can Eye Movements Be a Predictor of Implicit Attitudes? Discrimination Against Disadvantaged Individuals During the Recruitment Process

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Abstract

The present study examined the effect of eye movements during the recruitment process with eye-tracking technology as an indicator of negative implicit attitudes against disadvantaged groups. We composed eleven fictional resumes, and we asked the recruitment experts to hire the most suitable candidate for the position in the laboratory environment. The study used a mixed-methods approach. First of all, we evaluated the psychosocial characteristics of the participants. Then, we recorded the eye movements of the participants during the recruitment process. Lastly, we held interviews with the participants about their choices.

We concluded that the recruitment experts had spent more time examining the social identities of the candidates than the candidate's work experiences and educational background. Furthermore, we also found that the disadvantageous social identities of these candidates were more influential in the recruitment process.

As a result, we can say that our implicit attitudes affect our behaviors and preferences, and eye movements can be a useful tool in predicting intentions and implicit attitudes.

Keywords

Discrimination in the Workplace, Eye Movements, Human Resource Management, HRM, Implicit Attitudes

Introduction

Sigmund Freud's theory in the 20th century refuted the assumption that human behavior is mostly conscious, deliberate, and intentional. Many researchers pointed out the implicit, unconscious processes of human behavior with Freud's concept of the unconscious. (Greenwald et al., 2002; Greenwald et al., 1998; Rudman & Glick, 2001). One of the issues of this field is implicit attitudes; they are the attitudes that the individual is not consciously aware of (Greenwald et al., 1998). In the present study, implicit attitudes will be discussed together with unconscious discrimination and implicit bias.

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To cite this article: Celik, S., & Turker, M. V. (2022). Can Eye Movements be a predictor of implicit attitudes? Discrimination against disadvantaged individuals during the recruitment process *Istanbul Business Research*, 51(2), 459-489. <http://doi.org/10.26650/ibr.2022.51.837555>



Anti-discrimination movements have spread across the whole world. Despite awareness-raising campaigns and legal sanctions, many studies show that discrimination against disadvantaged groups continues today (Smith, 2014; Burton et al., 2013). If so, do legal sanctions fail to prevent discrimination? Lee (2005) argues that legal sanctions can only prevent intentional discrimination. However, discriminatory behaviors continue in many different forms.

Some researchers claim that we learn prejudice and stereotypes starting in childhood (Clark & Clark, 1939; Quillian, 2006; 2008). Clark and Clark's (1939) study of children aged 3-7 years is one of the most striking examples of this statement. The children learn, develop, and internalize prejudices in their social life. Jean Moule (2009) makes a clear distinction between children and adults when it comes to prejudices. According to him, children can express prejudices more directly than adults without censoring. Adults, on the other hand, will not show their true intentions as clearly and explicitly as children.

Similarly, Gaertner and Dovidio (2005) argue that adults cannot express their discriminatory behaviors as explicitly as children due to the notion of "good people do not discriminate." Hooton (1937), therefore, says that people try to legitimize their prejudices and discriminatory behaviors. In a study by Schuman et al. (1997), a vast majority of Americans stated that they support equal treatment regardless of race. However, the results of the survey and the rate of the people exposed to discrimination were contradictory.

In a study by Norton et al. (2006), participants were asked to hire one of the two candidates for the position. One candidate was black, and the other one was white. Researchers manipulated the characteristics of the candidates, and they told the participants that the white candidate had more successful job interviews and slightly more experience. After the recruitment process, most of the participants hired the white candidate, and they claimed that the job experience was the reason for their decision. Then, the researchers changed the conditions and told the participants that the black candidate had more work experience, and this time, the participants stated that the successful interviews were the reason for their decision. The researchers noted that this was not consciously "lying," and unconscious tendencies affected the decisions (Shin, 2010).

Theoretically, the eye-mind assumptions reveal the extent of discrimination (Just & Carpenter; 1980). The eye-mind hypothesis indicates a strong causality between "the fixation of the eyes" and "the contents of the mind."

In this research, we examined the relationship between gaze behavior and the recruitment process. In this respect, the participants are assumed to choose the resumes that they spend some time examining. Eye-tracking technology helps us in determining the decision-making process and motivations (Russo, 2011; Gidlöf et al., 2013). The relationship between visual

attention and selection behavior are areas in the marketing and advertising sector. According to some researchers, visual attention plays an essential role in all of our selection behaviors through our eye movements (Maughan et al., 2007; Milosavljevic and Cerf; 2008). Krajbich et al. (2010) examined the causality between gaze behavior and selection behavior in a controlled study. In this study, the participants were asked to choose one of the two products. As a result, they chose the product that they gazed at the most. Shimojo et al. (2003) stated that gaze behavior affected our preferences and caused a bias, which was why the selected product was the one the participants gazed at more and fixated on more in the study.

In this study, we examined the implicit attitudes of recruiters towards disadvantaged groups during the recruitment process through their eye movements. We also investigated that among 11 resumes, which fictional resume the recruiters selected, and why they made this decision and how the unconscious processes affected their decisions.

Method

Participants

The participants were recruitment specialists who worked in the recruitment departments of companies in Ankara, Turkey. The age range was between 24-47 years old ($M = 30.20$, $SD = 7.60$). Amongst the selection criteria for the recruitment companies in the study was to be in the list of the top 500 companies determined by the Istanbul Chamber of Commerce (Istanbul Chamber of Commerce, 2017), out of which 24 companies, which were (1) the member of Ankara Chamber of Commerce, (2) had published policies such as the management of diversity in human resources recruitment and anti-discrimination policies in their official websites and (3) followed a policy in their recruitment strategies that provided equal job opportunity regardless of ethnic origin, sect, language, religion, gender etc., were selected to be included in the study. The reason why these criteria were applied was to understand whether the recruitment specialists would prioritize their own attitudes or the company's benefits in the decision-making process in the presence of the company's clear discriminatory policy. Another reason, as Baert et al. (2015) argues, was to prevent the legitimation of the discrimination by relying on the assumption that the "clients and employers" would not choose to work with someone from a disadvantaged group. Thus, if the recruitment specialist did not hire someone from a disadvantaged group, he would not be able to justify it as if he was trying to protect the company's benefit.

The human resources departments of these 24 companies were then sent an invitation, which included the information on the purpose, venue and time of the study. Fifteen out of 24 companies responded. Out of all the recruitment specialists who worked in the selected companies and agreed to take part in the study ($N=15$, Males = 8, Females = 7), 9 of them had a

bachelor's degree and the remaining 6 had masters or doctoral degrees. They were graduates of the Departments of Business Management (N=5), Psychology (N=3), Electrical and Electronics Engineering (N=2), Computer Engineering (N=1), Labor Economics (N=1), Economics (N=1), Mathematics (N=1), and Metallurgy and Material Engineering (N=1). While one of the participants was a graduate of Gazi University, the rest of the participants had all graduated from Middle East Technical University, one of the best state universities in the country.

Materials

Fictional resumes. 11 resumes were fictionally composed. The resume forms were prepared according to the standards of general application forms used in international companies operating in Turkey.

As well as work experience, information with respect to the candidate's health, previous convictions or demographical data were also included in the resume forms. The names of the companies were hidden so as to protect confidentiality. The determinants of disadvantaged group membership were specified to be i.) gender, ii.) sexual orientation, iii.) ethnicity, iv.) sect, v.) mental illnesses and vi.) former convictions. As a control, a neutral resume was also prepared without any information on identity or membership of a disadvantaged group. In one of the resumes, it was stated that the candidate was born and had completed his education and some early work experience in Holland in order to examine at what rate an applicant from Europe would be preferred over those from Turkey.

The birth dates of the fictional candidates were invariably fictionalized within a narrow range of 1993 to 1988 with a marital status of "Single". Since male obligatory military service might have possibly been used as one of the selection criteria, all male candidates were fictionalized as if they had already completed their service or held an exemption.

In the resumes, both male and female applicants belonged to different ethnical backgrounds so that we could test the double jeopardy hypothesis, according to which, candidates with a second disadvantaged group membership are exposed to more discrimination than those with a single disadvantaged group membership (Berdahl & Moore, 2006). In this case, it was thought that the first disadvantageous group membership was gender (i.e. being a female), whereas the second one was the sect or ethnic origin.

All fictional candidates had graduated from Turkish universities (Ege University, Dokuz Eylül University, Istanbul University and Marmara University) with similar levels of achievement, except for the one that was born in Holland. The aforementioned Turkish universities were chosen so as to have closer success scores according to the 2016-2017

Times Higher Education (THE) and URAP (URAP, 2017) listings. The fictional characters were graduates of Business Administration Departments and had completed their university courses within 4 years.

In terms of experience, all of the candidates were selected from companies in Turkey operating on fast moving consumer goods: Kraft Heinz Company, ADECCO, Mars INC., Pepsi Co., Johnson & Johnson, Nestle SA, Colgate-Palmolive, Pfizer Inc., Procter & Gamble, Kimberly Clark Turkey, Unilever Turkey.

All participants had computer knowledge of Microsoft Office. However, this information was presented in varying forms for the sake of credibility such as, Microsoft Word, Microsoft Package Programs, Office programs.

All candidates knew English at the Intermediate Level. The English equivalence table of the Council of Higher Education in Turkey was used to find the equivalent scores (Council of Higher Education, 2017) in the National Foreign Language or IELTS exams in order to introduce variability across different resumes.

Candidates' social identity in terms of sexual orientation, sect and ethnicity was expressed through memberships. The same method had already been used in previous studies on discrimination in the recruitment process (Bursell, 2007; Rooth, 2010; Ahmed et al., 2013; Drydakis, 2009). Realism was prioritized while giving clues about the discrimination group memberships. For this reason, social identities were not expressed directly, but were rather expressed as a sympathy for that identity. For example, in order to express the Alevi identity or Alevi sympathy of the candidate, it was written in the membership part as "Volunteer in the 4+4+4 Education System Project of the Federation of Alevi Associations". Although this statement did not provide any evidence that this person was Alevi, it still gave the impression that the person at least sympathized with the Alevi people and was in close contact with the community. Similarly to the religious sect identity, the same assumption was valid for the homosexuality identity, too. Here the assumption was that a person's positive attitude towards homosexuality would be enough for them to be discriminated against during the recruitment process.

Our study included both innate and acquired identities. In this context, the question was whether being an ex-convict or having a psychiatric disorder would cause any prejudice during the recruitment process. As previously emphasized, in some other countries, this information is kept as confidential by law, although it is still allowed in Turkey, thus, it was included in our current study. The presentation types of the identity information regarding the group membership/sympathy are shown in Table 1.

Format of the resumes such as the font size, font type and number of pages were all equated in different resumes.

Following the composition of the resumes was an assessment stage, where the resumes were evaluated in terms of their validity, credibility, and relevance to the purpose of the study by an arbitration committee. The committee consisted of 4 members who were faculty members from the fields of social psychology, industrial and organizational psychology and business administration, together with a professional who had 10 years of experience as a human resources specialist. All arbitrators agreed that the female candidates were more experienced than the male candidates. The resumes were finalized following the examination of the arbitrators.

Table 1
Expression Methods of Group Belongingness-sympathy

Group belongingness or sympathy	Expression methods and membership associations
Belongs to an Alevi Group	I volunteered for the 4 +4 +4 Education System Project of the Federation of Alevi Associations.
Homosexual woman	Club of Lesbian Women in Professional Life, Izmir
Homosexual man	Lesbian, Gay, Transsexual Families and Relatives Association (LISTAG)
Male of Kurdish origin	Istanbul Kurdish Institute
Woman of Kurdish origin	Kurdish Research and History Association (KATED)
Foreign (neutral)	Elas Cyran (name) and the schools he studied tried to emphasize his ethnicity.
Ex-convict	I stayed in prison for 6 months due to evasion of enlistment.
Psychiatric illness	I spent one month in a closed psychiatric ward due to obsessive-compulsive disorder (in Bakırkoy)
Psychiatric illness	I have been followed with schizophrenia for 2 years. (I have a no objection certificate for working as long as I receive the treatment.)

Eye-tracking device. Eye movements of the participants were recorded using a Tobii T120 recorder. Data analysis was conducted using Tobii 2.0.5 analysis software. The experimental part of the study was held in the “Middle East Technical University Human Computer Interaction Research and Application Laboratory”. The Tobii T120 is a computer with an attached 17-inch monitor (1280 x 1024 megapixels). The device can monitor and record from both the right and left eyes simultaneously with a degree error of 0.5 and a temporal resolution of 10 Hz.

Demographic questionnaire. In a typical Likert-type scale questionnaire, participants were asked to give ratings in the range of 1 (never...) to 6 (very...) over their demographic information and experiences in the business life. They were also asked questions on whether they had previously been exposed to any discrimination or had social relations with disadvantaged groups (and if so, to what extent). In addition, they were asked 1 question about their tendencies, for example, conservativeness, traditionalism, and authoritativeness. The reason why three tendencies were queried in one question rather than a scale was that if the scale was used, the number of questions would increase, and this would increase the total time of the experiment.

Social identity scale. We added a social identity scale to the method section because we wanted to manipulate the possibility of bias that might be caused by the social identities of the candidates during the recruitment process. We distributed these scales to participants to see whether they were close to any of them. They were allowed to mark more than one, and they could also add a new section if they did not feel close to any of the given ones. We thought that it was unethical, or it might make the participant feel uncomfortable if we directly asked about the participant's social identity.

Social dominance orientation scale. The scale was based on the social dominance theory of the researchers, and it measured the tendency of discrimination in the social hierarchy (Sidanius et al. 1994).

Interviews. We used the face-to-face interview method and the semi-structured method during interviews. We formed the upcoming question according to the participant's answer to the previous question. The questions were generally about the participant's decisions. We used Socratic questioning and directed discovery methods to determine whether the participants had made any discrimination among candidates during the recruitment process.

Procedure

Data collection took four days. We collected the data in the METU Human-Computer Interaction Laboratory. First of all, we informed the participants about the technical equipment, and we performed the calibration. After the calibration, we held a sample interview with each participant. We told the participants that the experiment had begun. The experimental part had three phases. In the first phase, the participants each examined all the resumes for the first time. We asked the participants to evaluate the resumes by using three criteria. The scores of these criteria (between 1 - not enough and 9 - exceeds requirements) would show the sufficiency of the educational background, the adequacy of the experience, and the competencies and characteristics of the candidates for the position. In this stage, participants were permitted to review the resumes for as long as they required, and they could move on to the evaluation questionnaire when they wished. After completion, the participant was not allowed to review the same resume again. In the second phase, we asked the participants to choose the three most suitable candidates along with the least suitable candidate. In this phase, each participant reviewed each resume for 45 seconds before moving on to the next one. They were not allowed to review the resumes again. After the participants finished examining all the resumes, we asked them to write down the three candidates (to place the best one in the first row) that they found the most suitable and the candidate that they found the least suitable for the position on a blank sheet of paper.

In the last phase, we gave the participants one more opportunity to review the three best candidates that they had selected. They reviewed all the resumes once more for ten seconds

and we asked them to confirm their choices. With this phase, we aimed to make sure that the participants did not get confused about the resumes due to the limited time. We also intended to use the time as a stressor to examine which part of the resumes the participants spent more time reviewing during the decision-making process.

Results

Comparison of Psychosocial Characteristics of Participants

We used the Friedman test to examine the psychosocial variables of the participants (such as conservativeness, traditionalism, authoritativeness, social dominance orientation, political view, and the effect of religious activities on daily life). According to the results, there was no significant difference between the participants in terms of psychosocial variables ($\chi^2(5) = 9.796, p = .081$). The mean scores of the 15 participants regarding traditionalism, authoritativeness, conservativeness, the effect of religious beliefs, and political view was $2.73 \pm 1.43, 3.40 \pm 1.24, 2.27 \pm 2.26, 2.40 \pm 1.72$ and 2.60 ± 0.82 , respectively.

Comparison of Perceived Proficiency Scores of the Fictional Candidates

We used the Friedman test to analyze whether there was a significant difference between the proficiency scores given to the first fictional resume (neutral male candidate). According to the Friedman test, there was no significant difference in perceived proficiency scores of the first resume ($\chi^2(2) = 2.108, p = .349$). Significance results regarding perceived proficiency scores of other resumes are below in Table 2.

Table 2

Results of the Difference between the Perceived Proficiency Scores Given by the Participants on the Resumes (Friedman Test)

	ξ^2	df	p
1st Candidate's Resume ¹	2.108	2	.349
2nd Candidate's Resume ²	1.902	2	.386
3rd Candidate's Resume ³	6.865	2	.032*
4th Candidate's Resume ⁴	7.644	2	.022*
5th Candidate's Resume ⁵	1.682	2	.431
6th Candidate's Resume ⁶	4.571	2	.102
7th Candidate's Resume ⁷	6.333	2	.042*
8th Candidate's Resume ⁸	21.808	2	.000*
9th Candidate's Resume ⁹	13.220	2	.001*
10th Candidate's Resume ¹⁰	9.905	2	.007*
11th Candidate's Resume ¹¹	4.909	2	.086

*p< .05.

This resume belongs to the male candidate who is not given a social identity.

² In the membership section of this resume, it is written “I volunteered for the 4 +4 +4 Education System Project of the Federation of Alevi Associations.”

³ In the membership section of this resume, an expression is written including, “Club of Lesbian Women in Professional Life”

⁴ In the additional information section of this resume, it is written “I have been followed with schizophrenia for 2 years. (I have a no objection certificate for working as long as I receive the treatment.)

⁵ This is the resume of a foreigner named Elas Cyran.

⁶ This resume belongs to the female candidate (neutral) who is not given any social identity information.

⁷ In the additional information section of this resume, it is written “I stayed in prison for 6 months due to evasion of enlistment.

⁸ In the membership section of this resume, an expression is written including “Lesbian, Gay, Transsexual Families and Relatives Association (LISTAG)”.

⁹ In the additional information section of this resume, it is written “I spent one month in a closed psychiatric ward due to obsessive-compulsive disorder”.

¹⁰ In the membership section of this resume, an expression is written including “Kurdish Research and History Association (KATED)”.

¹¹ In the membership section of this resume, an expression is written including “Istanbul Kurdish Institute”.

In table 3, a significant difference was found between the proficiency scores of the third, fourth, seventh, eighth, ninth, and tenth resumes. The Wilcoxon Signed-Rank test was later used for the same resumes to have a deeper insight into the differences. The Wilcoxon Signed-Rank test scores are below in Table 3.

Table 3

The Paired Comparison Results of Perceived Proficiency Scores (Wilcoxon Signed-Rank Test)

	Education	Experience	Total	p
3 rd Candidate’s Resume	5 (4 – 8)	6 (3 – 9)	6 (3 – 9)	0.040* 0.013# 0.564+
4 th Candidate’s Resume	5 (2 – 8)	6 (4 – 8)	5 (3 – 8)	0.014* 0.458# 0.191+
7 th Candidate’s Resume	6 (2 – 8)	6 (4 – 8)	5 (3 – 8)	0.058* 0.087# 0.012+
8 th Candidate’s Resume	6 (2 – 8)	7 (3 – 9)	4 (1 – 6)	0.031* 0.001# 0.001+
9 th Candidate’s Resume	6 (2 – 8)	7 (5 – 8)	5 (4 – 8)	0.004* 0.714# 0.007+
10 th Candidate’s Resume	6 (2 – 8)	8 (5 – 9)	7 (1 – 9)	0.004* 0.714# 0.007+

*: Comparison of Experience and Education; #: Comparison of the Total and Education; +: Comparison of the Total and Experience

In table 3, there was a difference in the proficiency scores of the candidates. For example, a significant difference was found between total proficiency scores and experience scores in the eighth resume. This difference was the difference between the candidate’s score of proficiency regardless of the other characteristics and the score of all the characteristics. The median value

was 6.000 for educational background and 7.000 for work experience, while it decreased down to 4.000 for all characteristics. Therefore, the other characteristics of the candidate negatively affected the educational background and work experience. In the beginning, we told the participants to evaluate education and experience regardless of the other characteristics. For example, the participants found the education backgrounds and previous experience of the eight resumes sufficient for the position. However, the candidate's perceived proficiency score decreased when the participants evaluated the resume as a whole. Since we manipulated foreign language knowledge and computer skills, we consider that disadvantaged group membership was the main reason for the decreased perceived proficiency scores.

It was the same for the tenth resume, which belonged to a candidate called Rojbin. We gave this Kurdish name deliberately after noticing that participants focused mostly on the candidate's names with the analyses of the heat maps of the second stage. The participants found the candidate's work experience sufficient (median=8.000), and they gave a score of a minimum of 5 out of 9. The candidate was also a member of a Kurdish history association. When the participants evaluated the candidate as a whole, the candidate's median value decreased to 7.000. This time the candidate's total score dropped below 5. It seemed that the association membership or the Kurdish name irritated the participants.

Moreover, when we examined the scores of a male and a female candidate who were both members of the Kurdish history association, we found that the participants perceived the female candidate less proficient. This result shows that membership of two disadvantageous groups means more discrimination from recruiters.

The effect of gender also existed between the third and ninth resumes. The third resume belonged to a female candidate, and the ninth resume belonged to a male candidate, and both of the candidates were members of a gender-oriented association. The perceived educational proficiency scores of the two candidates were close to each other, and there was no significant difference between them in terms of job experience. However, there was a significant difference between the perceived total proficiency scores. The overall rating of the resumes indicated that the third resume was considered more suitable for the job. This result shows that between a male and a female candidate, who were both members of the LGBT association, the candidates perceived the female more positively.

The candidate in the third resume was a member of the lesbians in professional life club while the candidate in the ninth resume was a member of the Lesbian, Gay, Transsexual Families and Relatives Association (LISTAG). The Mann-Whitney U test was used to determine whether there was a difference between the education, experience, and total proficiency scores. We aimed to examine the effect of the association memberships on the perceived proficiency scores. According to the Mann-Whitney U test results, there was no significant difference between the two resumes in terms of education and experience ($p >$

0.05), while there was a significant difference between the total proficiency scores ($z = -2.752, p < 0.01$). According to these results, the participants found the female candidate (Mdn = 6.000; min: 3 – max: 9) generally more suitable than the male candidate (Mdn = 4.000; min: 1 – max: 6).

Distribution Frequency of Initial Fixations Among Stages

The participants became more familiar with the resumes after the first, second, and third stages. In this section, we examined the participant's first fixations and analyzed the frequency across the stages. We divided the fictional resumes into six parts to simplify the process. These sections were from top-to-bottom: Demographic Information, Educational Background, Work Experience, Computer skills, foreign languages, and hobbies (CFH), Membership information, and Additional information.

The participants examined the resumes for the first time in the first stage. The first section they looked at was the demographic information section. This finding was related to the characteristics of the Turkish language (top-to-bottom script direction). In the first stage, the first fixation results for demographic information, educational background, work experience, the CFH, the memberships and the additional information sections were 44.81% (SD = 11.55), 17% (SD = 8.66), 16.23% (SD = 9.63), 6.49% (SD = 5.93), 7.14% (SD = 6.38) and 7.79% (SD = 6.38), respectively. According to these findings, the participants examined the demographic information section more than the other sections in the resumes when they reviewed the resumes for the first time.

In the second examination, the participants already had an initial impression of the resumes. The first fixations were mostly at the demographical data section, with a rate of 29% (SD = 9.59) for all the resumes. And the results for educational background, work experience, CFH, membership and additional information were 10.38% (SD = 7.91), 27.92% (SD = 11.82), 8.44% (SD = 7.03), 12.33% (SD = 10.13) and 11.03% (SD = 11.42), respectively. Here, the difference between membership and additional information was remarkable. The participants realized that memberships and additional information sections were giving clues about the candidate's social identity. None of the participants looked at the membership sections of the ex-convict, the candidate with OCD and the candidate diagnosed with schizophrenia ($N = 0$), the same thing was valid for the additional information sections of the candidates with gay, lesbian, Alevi, and Kurdish identities ($N = 0$). Only for these resumes, the average first fixation rates increased for membership sections and additional information sections from 12.33% to 21.43% and 11.03% to 25%, respectively.

In the third stage, the difference between the departments regarding the first fixation widened to a greater extent. It decreased down to 18.82% for demographic data. It increased up to 10.38% for educational background, and work experience, CFH, membership, and additional information results were 24%, 7%, 30.95%, and 42%, respectively.

Rankings of the Fictional Candidates

We required the participants to place all the fictional candidates from the most suitable candidate (rated as number 1) to the most unsuitable one (rated as number 11). The fictional candidate with the lowest average score was the most suitable. We used two different methods during the evaluations. First, we averaged the rankings, and then we presented them in terms of genders. The rankings are in Table 4.

Table 4

The comparison of the mean values of Norm Group

	NormM	Alevi	Lesbian	Schizophrenia	Elas	NormF	Ex-convict	Gay	OCD	KurdishF	KurdishM
	1	2	3	4	5	6	7	8	9	10	11
Mean Value	5.46	5.38	3.92	8.38	5.46	4.46	9.46	4.85	8.00	3.85	6.77
Mean Value of the Male Participants	2.33	5.00	3.86	9.00	5.71	3.86	8.14	7.86	6.57	4.14	6.86
Mean Value of the Female Participants	6.14	6.14	4.86	7.86	5.00	4.57	10.14	2.71	9.14	3.29	6.14

Comparison of Heat Maps

Heat maps can reveal the sections of the resumes that participants are focused on the most (Dukowski, 2007). In this section, we examined the fixation changes among stages. As mentioned earlier, a total of 15 people participated in the study, however, one person with a total fixation recording rate of below 70% was excluded from the analysis. The heat maps are displayed for 14 participants (see below).



The remaining contents are presented in the appendices at the end of the text.

Discussion

Graph Interpretations of Initial Fixation Distributions Among Stages

The research assumes that “the initial look is always at the most effective part in the decision-making process.” We had a total of 14 initial fixation points for each stage. In the first stage, there were two paradigms of the initial fixations. The first one was due to the characteristics of the language as the participants were expected to look at the demographic information section first since the script direction of the Turkish language was from left-to-right and top-to-bottom. The second one was due to marketing science (Tatler, 2007; Atalay et al., 2012). According to this, participants looked across directly because their heads were naturally in the upright position. From this point of view, Atalay et al. (2012) state that the salesmen who desperately want to sell a product, should put it in the middle aisle in the supermarkets, that way the product would sell more, and people would remember it more. In the present study, the participants saw the demographic information section first as it was in the top part of the resume. In the second stage, the frequency distribution of the first fixations in demographic areas decreased in all resumes. However, in the 3rd stage, we believed that the participants were going to look at the parts that were most important to them within a limited time. The participants looked more at the membership sections of the male candidate who was a member of the Alevi association, the female candidate who was a member of the lesbian association, the female and male candidates who were members of Kurdish history association and the gay male candidate who was a member of the LGBT association. From this point of view, the participants seemed to examine the distinctive sections more than the other sections. So, they initially looked at the additional information parts of the resumes of the candidate diagnosed with schizophrenia, the candidate with OCD, and the ex-convict candidate as these sections were the most distinctive parts of the resumes.

The heat maps also proved that the participants mostly looked at the name and experience sections of the fictional candidate, Elaz Cyran. This resume lacked membership information. This finding supports our assumption that a piece of different information creates a distinction among resumes. As for the resumes without any membership information, the first fixations were mostly on the experience and demographic information sections. To sum up, participants paid more attention to the membership sections than the educational details, work experience, computer knowledge, and foreign language sections. Moreover, their unconscious fixations affected the candidate rankings and caused unconscious discrimination. The heat maps supporting this assumption are below.

Interpretation of the Heat Maps

The real extent of the discrimination is usually not revealed with research based on oral statements as the participants are usually not aware of the origin of their actual behaviors.

Eye-tracking is a method that reveals “the reality” rather than an analysis of the socially acceptable statements. Eye-tracking technology also provides a more objective study of the visual-cognitive aspects in decision-making processes. (Gidlof et al., 2013; Henderson, 2008). As eye tracking is a new technique, its use in decision-making processes is limited (Blondon et al., 2014). The developments in neuro-marketing recently proved that the consumers were not always making conscious and rational decisions when purchasing products (Babiloni, 2012). From this point of view, we consider that the unconscious affects decision-making processes in the new marketing strategy approach. Moreover, consumer behaviors cannot be explained only by oral statements and it is now a necessity to understand the unconscious and the emotional reactions of the consumers as well (Aierly & Berns, 2010; Damasio, 1994; Zaltman, 2003; Giray & Girişken; 2013; Girişken, 2017). In our study, the unconscious played a vital role in recruitment expert’s decisions. Although the recruiters stated that they were searching for a candidate with the most suitable work experience and the best educational background, the candidate’s belonging to a group was also an active factor in decision-making processes. In this study, we interpreted eye movements through heat maps. What makes heat maps more preferable is that they reveal the frequency and duration of the eye fixations. (Dukowski, 2007). In the present study, the heat maps defined the period (in seconds), and the frequency of the fixations at a certain point.

Studies show that looking at a specific visual stimulus for a longer time than any other incentives indicates that this area attracts the most attention (Deubel & Schneider, 1996; Hoffman & Subramaniam, 1995; Kowler et al., 1995). Just and Carpenter (1980), in his eye-mind hypothesis, revealed a strong causality between “where” the eye fixated and “what” the mind processed. From this point of view, we can assume that the most prolonged fixations are on the “most effective” areas in the decision-making processes in this study. The heat maps revealed that, in the first stage, the fixations were scattered all over the area; in the second stage, it narrowed down to the work experience section, and in the last stage, the red area only focused on the name and this data supported our hypothesis. In the resumes of the OCD, candidate diagnosed with schizophrenia, and ex-convict candidates, the fixations were expected to be in the additional information section. This result suggested that the participants made a distinction between the parts of membership information and additional information. The fixations were on the membership sections of all resumes with social identity information.

The distribution of the fixation areas was also significant. In the first stage, the fixations were scattered across all areas of the stimulus; in the second stage, the red areas gathered in certain narrow areas and in the last stage, the red areas narrowed more and became more intense and more specialized. This distribution shows that recruitment experts made general-to-specific reasoning during the recruitment process. They first considered the candidate as a whole, and then they eliminated some of them due to their criteria. Lastly, they focused on the most critical part when giving the final decision.

Ranking of The Eleven Resumes

We asked the participants to place 11 resumes from the most suitable candidate to the least suitable. Later, we compared the heat maps of the first fixations during the ranking. We believe that the participants looked at the areas that were most important to them, and their fixations affected the rankings. We had manipulated the identities of the candidates in terms of ethnicity and sect variables to prevent positive discrimination. The participant, EP2, identified himself with his Kurdish identity, so he was not included in ranking analyses. The fictional candidate with the lowest average score was the most suitable candidate for the position. The higher the average, the more unsuitable the candidate was for the job. The most suitable candidate was Rojbin, who was a member of the Kurdish Research and History Association (KATED) with an average of 3.85. This candidate ranked in the first place by four participants. The candidate, who was a member of the Lesbian Businesswomen Association, was next. The female candidate, without social group identity, ranked in third place with an average of 4.46. The male candidate who was a member of LISTAG, came forth, and the fifth candidate was the one that came from Holland. The participants selected the best candidates among the females. This expected result proves that the candidates ranked regardless of their disadvantaged group memberships. This finding correlates with the verbal statements of the participants stating they were cautious about not discriminating during the interviews. The lowest average belonged to the ex-convict candidate with a score of 9.46 out of 11. We expected this result, and we separately analyzed the average ratings given by the male and female participants to notice the ranking differences. The male participants selected the male candidate without social identity information as the most suitable one with a score of 2.33, and they put the female candidate without social identity information in the third rank with a score of 3.86. This finding proves that the male participants had discriminated against candidates. The male participants were supposed to choose one of the female candidates as the fictional resumes of the female candidates were constituted with a lot more work experience and with more senior job titles than the male candidates. The male participants also discriminated against the participants with the disadvantaged group memberships as they put another female candidate without social identity in the second rank. This behavior proves that the severity of the discrimination increases with the number of disadvantaged group memberships. For example, a Kurdish woman faces discrimination due to both her ethnicity and gender. This finding is called the “double jeopardy discrimination hypothesis” in the literature, and it is consistent with previous research (Berdahl & Moore, 2006; Deros et al., 2014). In the third rank, there was the female candidate with the membership of the Lesbian Businesswomen Association. The participants thought that as a member of such an association, this candidate had a “masculine” characteristic. The male participant, EP5 stated:

“What matters most to me is work experience. Oytun worked as an expert for 19 months. Her membership in Lesbians in Business Life made me think that she had courage. You know,

these things are not prevalent among us. (Well, does her membership give us an idea of her characteristics?) I believe she also has a strong personality in business life. It is not easy to get accepted like this. I can imagine that she is ambitious, competitive, and highly persuasive. (Well, do you think that means you favored this candidate because of her membership?) No, because everyone mentioned their memberships. Not everyone can think of such things. This candidate made a difference.”

This comment shows that EP5 was justifying his bias in some way. Remarkably, this justification originates from an unconscious tendency. Another finding that supports this view is that the eight candidates (a member of the Lesbian, Gay, Transgender, Families and Relatives Association (LISTAG)) ranked ninth. This candidate was right before the ex-convict candidate, and the candidate diagnosed with schizophrenia and the participants chose him as the third most unsuitable candidate. EP3 was the participant who placed this candidate last. He stated:

“(In your opinion, Mustafa is the most unsuitable candidate for the position. Well, what makes him the most unsuitable?) Why didn’t we like Mustafa? First of all, I do not have any issues with his memberships. However, to me, the candidate seems like a spirited person, and this might lead to mistakes. (Can’t this dynamism and excitement be used more positively by the managers?) Of course, it can, but for example, Mustafa seems like a sensitive person to me. I mean, he is an emotionally intense person. This sensitiveness may cause him to lose his objectivity when doing his job. He might decide under the influence of his emotions. Other than that, I do not care about his memberships. “

EP5 also discussed the reason why he placed the same candidate at the bottom. He stated:

“(…) (Well, you have chosen Mustafa as the most unsuitable person to the position. What is the main reason for this?) First of all, I could not think of any other name. I later noticed that I only remembered the best candidate. I wrote the best ones down, and this way, he came at the very last (long pause) I chose the best eleven very quickly, and I placed him there totally by chance.

Freud, one of the founders of psychoanalysis, states that pausing during a speech indicates a resistance or a defense mechanism. (Yalom, 2000; McWilliams; 2016), and most often, this can occur unconsciously. It is also remarkable that the participants referred to the identities of the candidates by mentioning their membership information.

All fictional candidates were neutral in terms of social identity. For example, there were no expressions like “I am gay” or “I am Kurdish.” A gay person could join a gay association, and a gay person could also join the same association for support. Memberships did not give specific information about the ethnic origin, sect, sexual orientation of the individual. However, the participants mostly chose to take the membership information as a reference to the identity. This false reference might lead to discriminatory decisions given by unconscious tendencies. During the decision-making process, one participant stated:

“(What are your criteria when evaluating candidates?) I examined work experience, but they were almost the same. So, I considered the internships. They were not very different, either. I checked the name of the companies. After that, I searched for clubs or something. All the resumes looked near enough the same to me. I did not care much about their English language knowledge, as the position was in Turkey. After all these, only their membership information left. That is why the memberships affected our decisions. “

The bilateral interpretation was useful when interpreting the rankings. For example, the lesbian female was discriminated against because of her sexual orientation when compared to both the male and female candidates without social identity information. However, she had taken precedence over other participants. The lesbian candidate was possibly readily accepted and given priority due to her “masculine” characteristics. This finding is consistent with other research findings (Berg & Lien, 2002; Black et al., 2003;). The female candidate who was a member of the Kurdish Research and History Association was in the fourth rank. This result showed that the male participants placed importance on work experience only after they placed the candidates without social identities in the higher ranks. So, the membership information was more effective than work experience in the decision-making process.

The most preferred candidate of the female participants was the so-called gay candidate. The male participants placed the same fictional candidate ninth during their selection, yet the female participants chose him as the most suitable candidate. The female participants were thought to have developed sympathy for the candidate who was presumed to be gay. We can call it a kind of positive discrimination. One of the female participants stated:

“(Well, what is the difference between the participants Berk Soylu and Mustafa Ates? You placed one of them as the 2nd and put the other one in the last place) (...) As I said, there was not much difference between them. However, Mustafa (supposedly gay) is a member of the gay association. I do not have any issues with gays; this only made me think that Mustafa might be more understanding. (Berk said he was a member of the TEMA Foundation. He also takes part in volunteering projects. So, what is the difference between these two?) I might have given this decision under the influence of my notions. I believe LGBT associations should be more in the forefront. Okay, humans exploit and destroy nature as well,, but sometimes people can become invisible because of their preferences. I hear a lot about how these people face discrimination. He identified himself as gay, which was a courageous thing to do that no one would ever dare. Other recruiters might eliminate him straight away upon such a statement. I think he wrote this information in his resume for a reason, maybe to defend his belief. I do not want this person to experience discrimination because of his preferences. Similarly, if he faced discrimination before, he would be more sensitive in his job.

Female and male participants ranked the most unsuitable candidates differently. The most unsuitable candidate for male participants was the candidate diagnosed with schizophrenia

(mean score: 9.00), while it was the ex-convict candidate (mean score: 10.14) for the female participants. There was also a remarkable score difference between the two candidates. The participants discriminated due to sect, sexual orientation, and ethnicity under the influence of their implicit attitudes. Although the participants revealed their negative attitudes and judgments against the most unsuitable candidates, they were still totally unconscious about their discrimination. In other words, not employing someone because of their mental state or imprisonment status was not discrimination according to the participants; it was a way of protecting the company and other employees, and a way to legitimize their discriminatory behaviors and implicit attitudes. Here is what a male participant stated about placing the candidate with schizophrenia at the very bottom:

“(In your opinion, what makes this candidate the most unsuitable?) A patient with schizophrenia. Even if he has a report, it does not make any sense to me that he can work one-on-one with anyone. It is more logical that he works more in the background. (Which part of the job do you think he might not be able to accomplish as a candidate diagnosed with schizophrenia?) Ultimately, he will be hiring people. His condition might affect his decision-making process. He might evaluate people in a short time. Another office position might be more suitable for him. I do not think he should work among many people. (Can you tell if a person has schizophrenia when you see this person?) No, but if he has to decide for me, I do not want this decision to be affected by his condition. (In this case, if you cannot tell about his condition, you would never know what affected the decision about you. Do you think there is anyone around you who has schizophrenia?) No. (Well, have you ever read about schizophrenia or heard about it from media?) Yes. (So, what are the characteristics of schizophrenia patients?) For example, they can see things that no other people see. Alternatively, they have difficulties in distinguishing between dreams and reality. (So, this person said that he had his treatment and has a “no objection certificate” from the doctor. Did you consider this information when you were evaluating this person?) No, I did not mean that he should not work. I only say that he cannot work with other people. (Well, do you think you discriminate against this person’s condition?) No, because his situation does not let him move forward, not me. Lastly, I was looking for a person who would work with other people. As a human resources specialist, I should also hire the best candidate. This person is not suitable for the job.

EP4 also placed the candidate diagnosed with schizophrenia at the very last. He stated:

“(…) One of them is Alevi, the other one is a lesbian, and the other one has schizophrenia, maybe I am a little uneasy about the candidate diagnosed with schizophrenia one. It may also be because of my ignorance. My anxiety may result from my ignorance.”

From this point of view, attitudes towards the candidate diagnosed with schizophrenia might have resulted from the lack of knowledge. We think that the participants could have

acquired negative opinions about mental disorders through media and misinformation, or a lack of information might have led to negative attitudes and discrimination. Other studies confirm that people with mental illnesses are discriminated against in work life due to the lack of knowledge about other people around them (Lee et al., 2006). From this point of view, Hinshaw and Cicchetti (2000) suggest that discrimination would stop when anti-labeling programs become widespread. However, giving information is not enough on its own to prevent implicit attitudes and stigmatization, yet its effect could be weak and short-lived (Hinshaw & Cicchetti, 2000; Stuart & Arboleda-Flórez, 2001). In this case, social relationships help a great deal in preventing discrimination (Whitley, 1990). The participant, KP2 stated:

“I observe the people around me when they have such kind of illnesses. Unfortunately, although it is genetic, I decided not to hire them as well. (Well, in his resume, the candidate said he had the treatment, and the illness would not reoccur as long as he continues the treatment. Has this statement affected you?) There are six schizophrenic patients, undergoing treatment right now, around me. Moreover, upon seeing what happens in their lives when they do not take their medications, I would not want to take this risk in the workplace.”

The participant, KP5 stated:

Would he confuse the real with the unreal? Would he have problems with the applicants during the interviews? I mean, I do not know, he could get angry over minor things at the very moment and might go furious suddenly. He might be suspicious. (Have you ever heard about schizophrenia?) I checked it online. I did not read a scientific material about it, but for example, I heard that they start fights quickly. I could not trust him because I do not have enough knowledge about them, but I guess I would not like to work with them.

Female participants decided that the ex-convict candidate was the most unsuitable one. This result was due to the prejudices of women who did not feel safe when they worked with ex-convicts. They claimed that the ex-convicts always had the possibility of re-committing the crime, and they were usually irresponsible. The participant, KP1 stated:

“(…) (Well, you placed the deserter in the last place). Well, he escaped from the army, I mean, it is not hard to postpone such a thing. If he is avoiding such a responsibility, he can also flee from other duties too. Of course, the fact that he spent time in prison already develops a stigma. The fact that he had escaped from being a soldier means he might escape from his responsibilities, as well. “

The participant, KP2 stated:

“The reason I put the convicted candidate in the last place is about responsibilities. He did not postpone his military service while he could. That means he is an irresponsible person.”

The participant, EP8 stated:

“There is another reason I placed this candidate at the very end. He is an ex-convict. Especially in large companies, people are more likely to be tolerant of different identities. However, in today’s business world, I thought someone with a criminal record could not work comfortably with his colleagues. For example, if this person has a criminal offense not because he is a deserter but because he has committed a crime of thought and is accused due to a legislative bill, then I would not still support this previous idea. However, if it were because of infamous crimes, I would put him right in the end as well. (What would you decide if he was involved in a political crime?) He would be in the higher ranks. Because his crime would have nothing to do with the regulations in the workplace. I would think that he still might be able to work cooperatively with his friends.”

As mentioned earlier, both male and female participants differently interpreted the lack of social identity in the resumes. The female participant, KP2 stated:

“(Is there anything you want to add?) I noticed that people said that they are Kurdish or Alevi in their resumes. I believe that people who do not reveal that they are Turkish, Kurdish, or Alevi are superior to others. I am a human being; my habits are these; for example, I am a hardworking person. I believe this person becomes more subjective when he/she depends on these identities through memberships. That is like using a superscript when introducing and identifying yourself. For example, when I was introducing myself, I only marked that I am an atheist and a woman. I want to introduce myself that way. That is why I do choose someone that I introduce himself/herself with such characteristics. For example, when I ask, “Who you are?” I do not want this person to say, “I am a gay, I would rather him say, “I am a human being.” I am looking for someone who claims he/she is a world citizen and who can think broader.”

KP2 is the only participant who put the first resume in the higher rankings. KP2 said that a resume without identity information was a result of the marginalization process. Out of a male and a female candidate without identity information, KP2 placed the male candidate in a higher rank. The participant, KP2 stated:

“Yes, the first candidate did not indicate he was either Turkish, Kurdish, or gay, so I placed him in the second row. For example, Aylin is in the third row, and she also did not mention anything about her identity either. There was only one woman among the first three people I have chosen. (Well, from this point of view, can we say that you placed the male candidate Berk before the female candidate Aylin?) Err. Unconsciously maybe. However, I did not do it on purpose. I did not think of that. However, Aylin only slightly falls behind Berk.

As we mentioned earlier, if the participants had prioritized work experience, they would all have chosen the female candidates. However, their decisions might have been negatively

affected by unconscious tendencies. This participant, despite being a woman herself, positively discriminated in favor of males. Persistent exposure to discrimination can lead individuals to internalize the prejudice and may cause the victim to start discriminating against disadvantaged groups. This finding is consistent with Clark and Clark's trial in 1939. In the study, the black children chose the white baby as the best one, just like the female participant, KP2 chose the male candidate among female candidates.

Limitations

The first limitation of this study was the number of participants. We constituted the study around eye-tracking data and, we supported this data by collecting data through scales and interviewing methods. Due to the small number of participants, we could not specify and calculate the population, samples, or study samples. We defined the people who took part in the study as "participants" rather than samples. Due to the low number of participants, we could not conduct the reliability and validity studies of the social dominance scale used in the study. Another limitation was that we included the people living in Ankara because the laboratory was in the Ankara Province. We believe that it was also a confounding factor that 6 of the participants had completed an MA or a doctoral degree, and 3 of them were psychologists. Human resources departments attract many graduates from all fields. Many graduates from various areas have the chance of working in human resources departments with a certificate taken from other institutions due to the legal gap. Our participants consisted of highly educated human resources experts who had training in discrimination, prejudices, and psychology, and they were aware of discrimination during recruitment processes. This fact had a moderating effect on our research. We believe that upcoming studies on discrimination might achieve more realistic results by including participants who graduated from other departments. Likewise, the researchers' average self-concept of traditionalism, conservatism, and authoritarianism is lower when compared to society in terms of the psychosocial variables. The overall aspect of the results and candidate rankings of HR experts, who identify themselves as conservative, right-wing supportive, authoritarian, or traditional, is an issue of concern in the upcoming studies.

Inferences and Conclusions

We concluded that unconscious bias has an effect on choices and implicit attitudes and this effect is possibly the reason for the prejudices against disadvantaged groups. Accordingly, we examined whether tracking of eye movements was an experimental method that could be used in the investigation of implicit behaviors. As far as we know, this study is the first study examining whether eye movements might be a measurement tool for implicit behaviors. We analyzed eye movements as a predictor of implicit behaviors in the context of job interviews. We examined whether there is a qualitative relationship between "the place that they look

at” and their choices. Also, this study used an experimental method which separates it from other studies investigating discrimination during the hiring process. Using objective methods in obtaining data is vital for reliable results in studies to be conducted regarding variables that may behave according to social desirability. Remarkably, our participants declared that they had chosen the best candidate for the benefit of the company. However, their profiles regarding resume evaluations were based upon the differences of the fictional candidates.

The sample of the study consists of a particular population regarding psychosocial variables. Studies on discrimination indicated that low-educated individuals with high scores of traditionality and conservatism were clearly found to discriminate more against the others. Regarding the scale scores, 6 out of 15 participants were postgraduates and they described themselves as being below average in terms of psychosocial variables (Bilgin, 2013). Also, all the companies that the participants had been working for clearly defined their anti-discrimination policies in their hiring policies. Regarding their professions, the participants were senior executives in companies regarded as being in the top 500 companies in Turkey, and they had experience in hiring. Despite the features of these profiles above, they also had a mindset of implicit bias and thoughts of ill-intentioned discrimination. Although the participants defined themselves as “more humanistic, less prejudiced, less discriminatory or more humane,” the verbal statements should be considered as they do not always reflect the real actions. In our study, the oral statements of the participants similarly did not match with their unconscious discriminatory decisions. During the investigation, we examined the proficiency score differences among the fictional resumes, and we analyzed the fixations through the eye-tracking data and confirmed the results with interviews. However, more studies should be carried out with more participants to generalize these findings. Finding resources and training that raise awareness of discrimination might also help to reduce this kind of attitude. The participant, KP7 stated:

In your research, I think you observe how liberal and conservative the people are and to what extent they accept differences. People might give you socially acceptable answers. I am also a little uneasy about that. Someone might have the same motives as Hitler, but I do not know if we can reveal this with such a questionnaire.”

This comment is an excellent example of the necessity of questioning research that attempts to measure discrimination and prejudice through scales. According to the participant, social desirability can easily manipulate the responses. Therefore, different methods should be carried out to predict true intentions. In this study, we used eye-tracking technology to measure unconscious tendencies. The results of the experiment show that eye-tracking technology is a useful tool to understand intentions and implicit attitudes.

Both the results of our study on implicit attitudes and on unconscious tendencies, and the studies on this area from past to present (Clark & Clark, 1939; Schuman et al., 1995; Steele &

Aronson, 1995; Correll et al., 2002; Norton et al., 2006) revealed that the parents' prejudices against disadvantaged groups pass onto the child through social and political environment, in which the child is born and raised, and through media. Legislators are supposed to solve this problem. Although Lee (2005) argues that legal sanctions are not effective in preventing unconscious discrimination, legal penalties are considered necessary to fight against discrimination.

In terms of business disciplines, differences are known to create a chaotic environment, and HR managers are responsible for dealing with this so-called chaotic situation. Some of the suggestions for them are listed below:

- To turn anti-discrimination practices into written policies and to implement these policies effectively,
- To create a serene environment for employees with differences to work cooperatively, to let the brand identity unite the employees, to reduce perceived individual differences among employees and to cherish the similarities,
- To place importance on teamwork, communication skills, and awareness training,
- To adopt human rights and equality concepts as the company's highest value, to ensure they are adopted and to put these concepts in practice,
- To implement forms and procedures in a more humanistic way without discrimination, especially when making recruitment assessments (for example, not to ask female candidates about their marital status or not to ask questions to newly married female candidates indicating whether they intend to have children or not, and to ask the candidates to remove photos from their resumes).

We consider that the above recommendations are useful at least in reducing discrimination.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

Author Contributions: Conception/Design of study: S.Ç., M.V.T.; Data Acquisition: S.Ç., M.V.T.; Data Analysis/Interpretation: S.Ç., M.V.T.; Drafting Manuscript: S.Ç., M.V.T.; Critical Revision of Manuscript: S.Ç., M.V.T.; Final Approval and Accountability: S.Ç., M.V.T.

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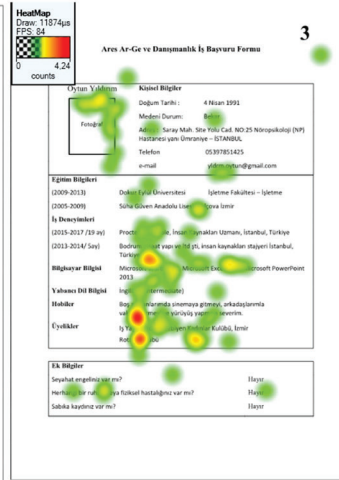
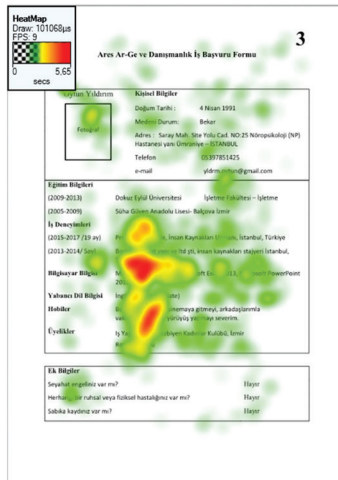
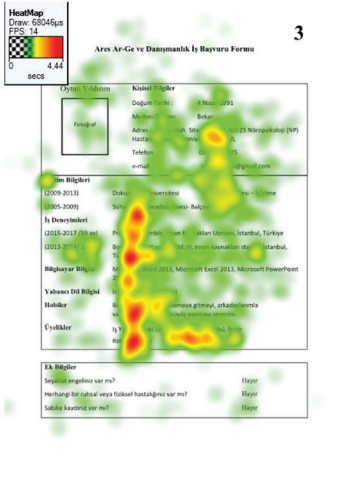
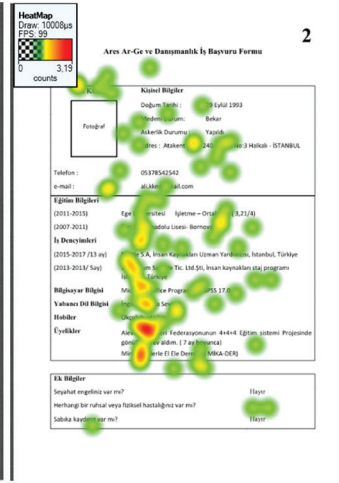
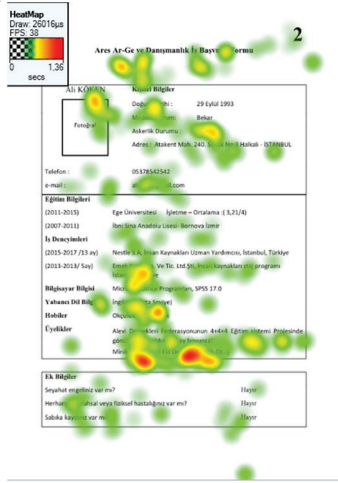
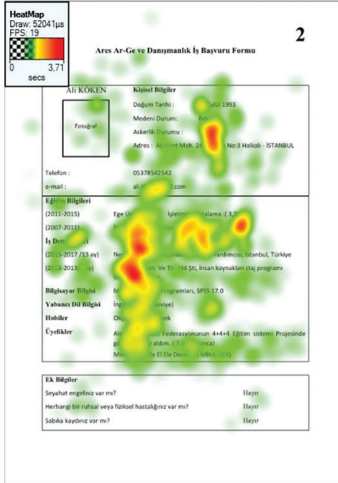
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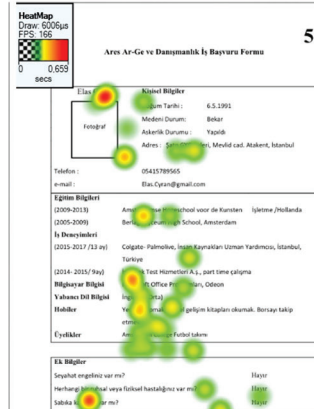
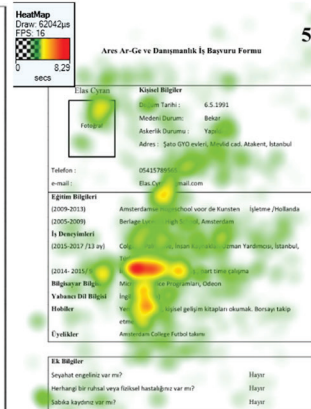
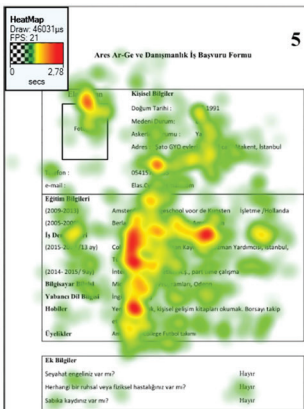
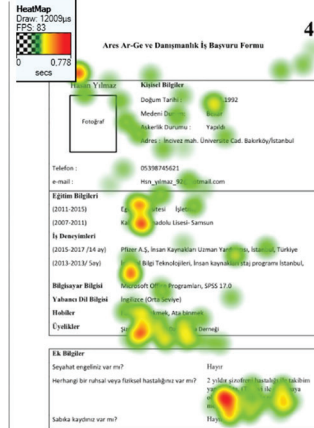
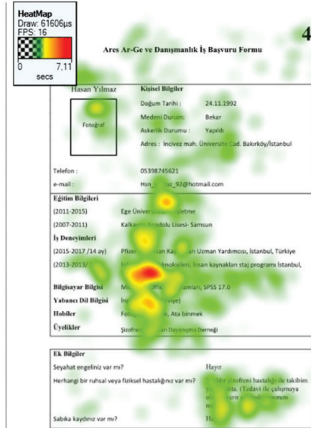
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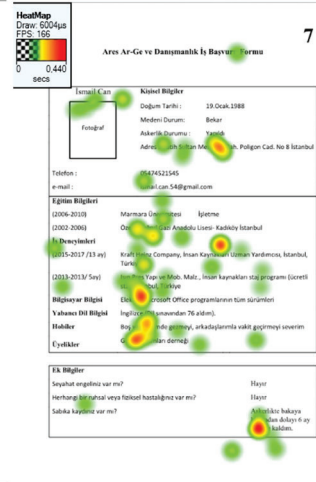
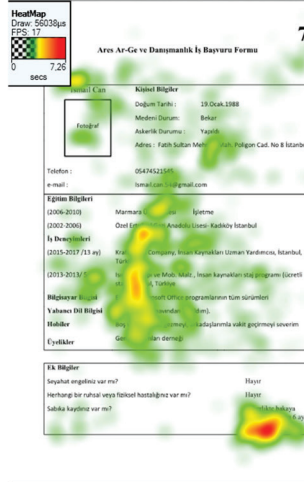
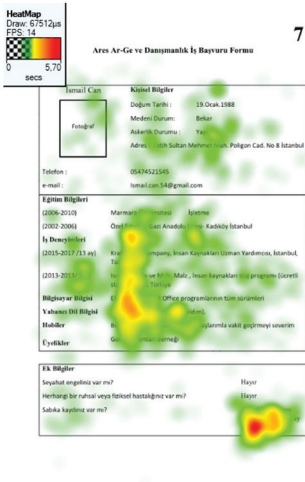
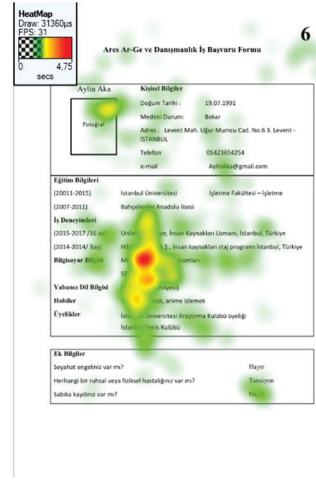
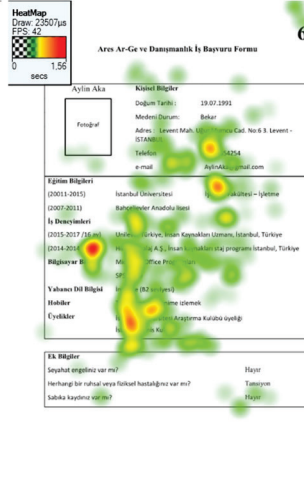
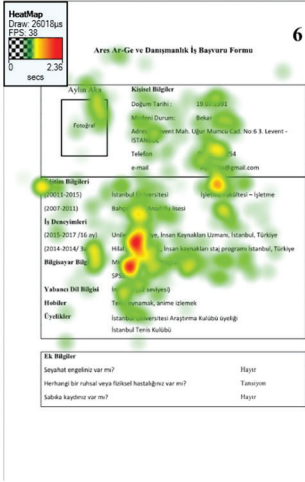
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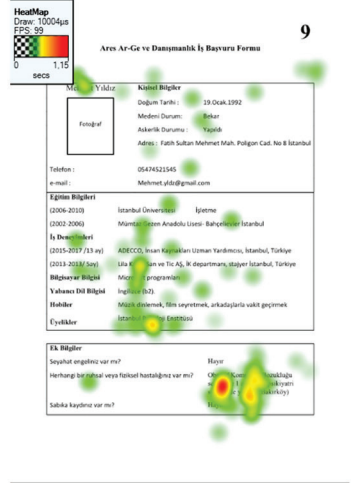
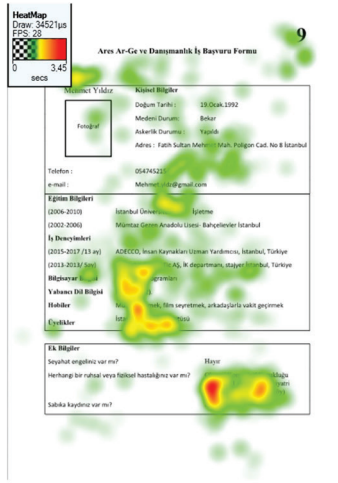
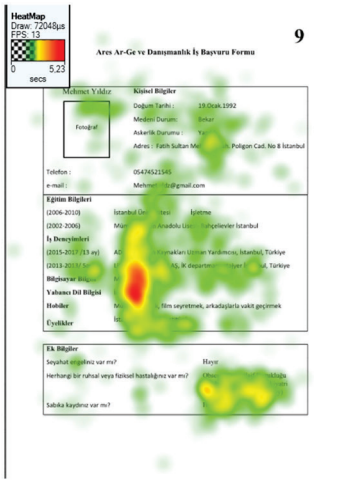
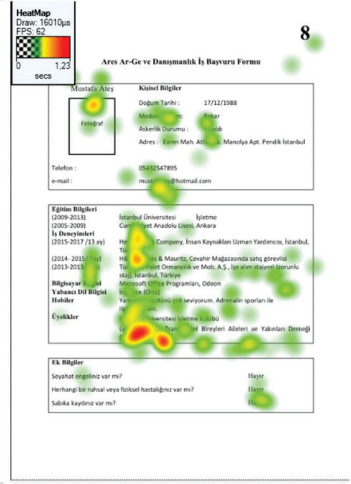
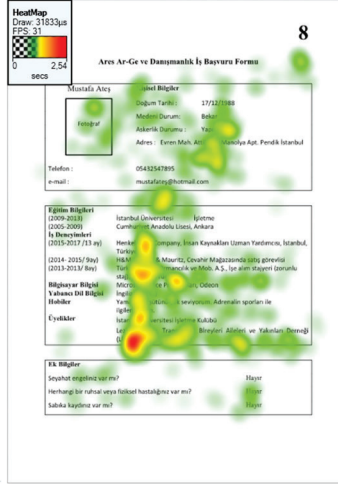
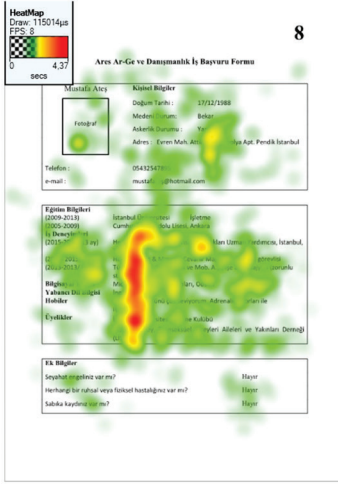
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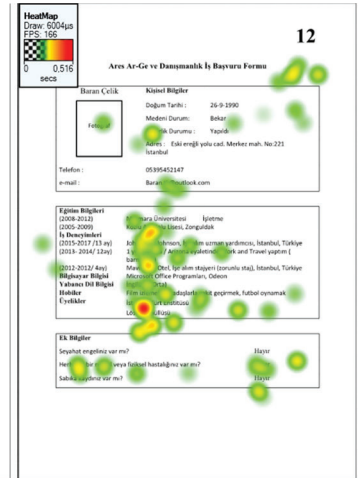
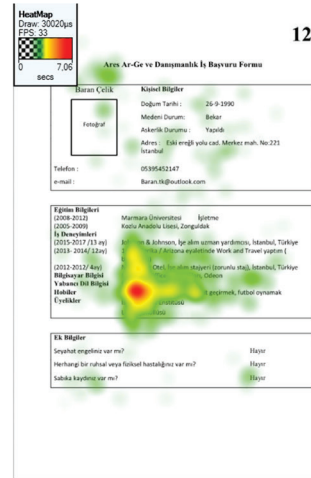
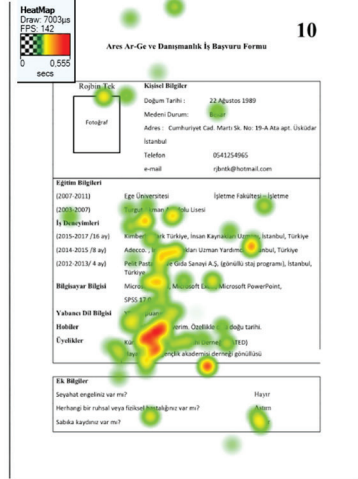
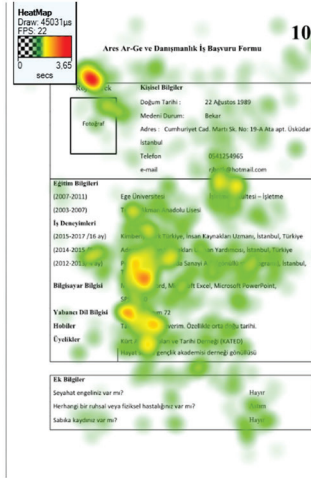
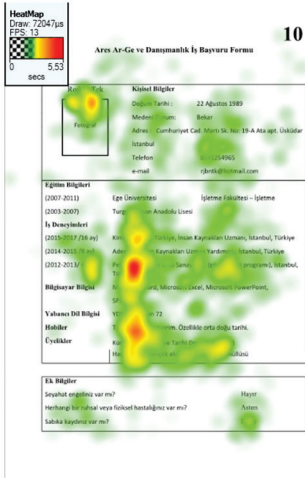
Appendices













Istanbul Business Research

Submitted: 14.01.2021

Revision Requested: 28.08.2021

Last Revision Received: 30.08.2021

Accepted: 20.01.2022

Published Online: 22.09.2022

RESEARCH ARTICLE

Linking Leaders' Humor Styles and Employees' Organizational Creativity: Moderating Role of Organizational Tenure

Ozan Büyükyılmaz¹

Abstract

The purpose of this research is to determine the relationship between the positive (self-enhancing, affiliative) and negative (self-defeating, aggressive) use of humor of leaders and the organizational creativity of employees. The moderating role of organizational tenure in the relationship between humor styles and organizational creativity is also examined. The data used in the research are gathered by questionnaire from 335 employees working in different organizations. Research hypotheses are tested by hierarchical regression analysis. As a result of the research, a positive relationship is determined between the use of self-enhancing and affiliative humor of leaders and organizational creativity, and a negative relationship is determined between the use of aggressive humor and organizational creativity. The findings also indicate that organizational tenure has a moderation role in the relationship between affiliative humor and organizational creativity and between aggressive humor and organizational creativity.

Keywords

Humor, Humor in organizations, Humor styles, Organizational humor, Organizational creativity

Introduction

Humor is a core element of human nature and human relations. Humor and laughter are universal aspects of human experience in all cultures and almost all individuals in the world (Martin, 2007). Philosophers and researchers from various disciplines have always had a great interest in the concept of humor. Hence, it can be said that humor is an important concept that is examined academically in various fields. In this context, numerous studies were conducted such as the relationship between laughter and humor (Gervais & Wilson, 2005), the effects of humor on physical health and mental health (Galloway & Cropley, 1999; Martin, 2001), the relationship between humor and personality (Mendiburo-Seguel, Páez, & Martínez-Sánchez, 2015), and the use of humor in romantic relationships (Hall, 2017). However, more research

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To cite this article: Büyükyılmaz, O. (2022). Linking leaders' humor styles and employees' organizational creativity: Moderating role of organizational tenure. *Istanbul Business Research*, 51(2), 491-516. <http://doi.org/10.26650/ibr.2022.51.861340>



is needed on humor in business and organizations because humorous situations are inevitable, and humor has wide-ranging consequences.

It is stated that humor can facilitate different organizational processes. Humor helps to establish and support relationships in the workplace (Cooper, 2008), facilitates group processes (Romero & Pescosolido, 2008), allows employees to deal with stress (Doosje, De Goede, Van Doornen, & Goldstein, 2010) and increases creativity in problem solving (Holmes, 2007). It is believed that the leaders who use humor are more popular (Holmes & Marra, 2002; Hughes & Avey, 2009).

Despite various positive effects, humor also has negative aspects. For example, it may create some problems such as distracting employees from the job at hand, hurting employee's credibility, or causing offense in increasingly diverse work settings (Scheel & Gockel, 2017). The use of negative humor in the workplace can increase hostility by enabling prejudice against the intended person (Janes & Olson, 2015), cause employee alienation and the good employees leave the organization (Plester, 2009), may lead to discrimination in the workplace (Quinn, 2000) and may reduce manager's reputation result in non-compliance with executive decisions (Lyttle, 2007).

Although there has been a greater interest in the use of humor by leaders and employees, limited studies have been conducted on humor in business and organizations. The literature reviews about the use of humor in organizations are carried out from the perspective of organizational management such as administrative communication (Wood, Beckmann, & Rossiter, 2011) and humor management in the workplace (Lyttle, 2007). Moreover, literature reviews have been conducted in areas such as humor use in the workplace (Cooper, 2008), humor styles and leadership (Romero & Cruthirds, 2006), and humor and emotions in the organizational climate (Robert & Wilbanks, 2012). Although these researches are useful, a great majority of these studies have not been empirically tested with regard to the functions of humor. Therefore, these studies are the starting point for future research initiatives (Butler, 2016).

Based on previous research on humor, the use of humor, and humor styles, this study focuses on the relationship between the leaders' humor styles and employees' organizational creativity. The purpose of this study is to determine the relationship between leaders' positive humor styles (self-enhancing, affiliative) and negative humor styles (self-defeating, aggressive) and employees' organizational creativity. The moderating role of organizational tenure in the relationship between humor styles used by the leaders and organizational creativity is also examined.

Literature Review

Humor, Organizational Humor and Humor Styles

The concept of humor has been discussed in a wider and multifaceted manner in recent studies. In humor studies, the concept has been defined in different ways and has had different characteristics such as surprise, incongruity, cognition and amusement. Long and Graesser (1988, p. 37) described humor as “something that is funny or amusing, intentionally or mistakenly made or said”. Martineau (1972, p. 114) examined the concept of humor from a sociological perspective and described the concept as “any communicative situation perceived as humorous”. According to Hurren (2006, p. 11), humor means “any verbal or non-verbal message that provokes a positive sense of fun in the receiver”.

However, it can be said that humor is potentially related to all aspects of the workplace. Humor is not just for fun. It enhances integration among employees, fosters creativity, and promotes organizational development (Holmes, 2007; Romero & Pescosolido, 2008). Also, it enhances sincerity, solidarity, and kindness among employees (Holmes & Marra, 2002). Humor contributes to the improvement of the organizational climate and is closely linked to effective leadership. A leader who can use humor well is believed to be a “good” leader (Liu & Wang, 2016)

Studies that examine humor in the workplace often seem to focus on the concept of organizational humor. Cooper (2005, pp. 766-767) defined organizational humor as “any event shared by an agent (e.g., an employee) with another individual (i.e., a target) that is intended to be amusing to the target and that the target perceives as an intentional act”. According to Romero and Cruthirds (2006, p. 59), organizational humor is defined as “entertaining communications that create positive perceptions and emotions in individuals, groups or organizations”. From this definition, Dikkers, Doosje, and de Lange (2012, p. 76) stated organizational humor as “incongruity that performed for amusement for an individual, group or organization and that shared without seriousness in workplace relations”. For Lynch (2009, p. 445) organizational humor is used as a sensemaking process that will eliminate the tension caused by a cognitive incompatibility in the workplace.

Positive organizational humor can help not only in building a good organizational climate for businesses, but also in promoting their own development (Liu & Wang, 2016)6D5CB516}. Moreover, organizational humor may have a negative aspect. Jokes carried out in order to mock and needle may have negative consequences on organizational effectiveness (Decker, Yao, & Calo, 2011).

Intentionally or unintentionally, people use humor in some way. However, people have different characteristics and these differences make a discrepancy in the form of humor. Hence, when humor styles are referred to, people’s ways of using humor are mentioned (Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003).

Studies show that humor styles can be classified in different ways. Duncan, Smeltzer, and Leap (1990) distinguished humor styles as positive humor and negative humor. The negative humor style focuses on the feeling of victory over another person. In other words, negative humor is that person's laugh when he or she gains superiority over another person. The positive humor style is a deliberate violation of rational language or behavior patterns. Laughing in this style is associated with unexpected, ambiguous, illogical, or inappropriate situations (Duncan et al., 1990, pp. 258-260)

The most popular distinction about humor styles in the literature was carried out by Martin et al. (2003). They distinguished between four humor styles: self-enhancing humor, affiliative humor, self-defeating humor, and aggressive humor.

Self-enhancing humor is the tendency to enjoy disagreements (distress, strain) in daily life and it helps people to get rid of stressful situations. Self-enhancing humor includes a general humorous view of life, the ability to have fun with conflicts in life, and maintaining a humorous appearance in the face of stress or difficulty. People who tend to use this style do not lose a humorous view even in difficult situations. They use humor as a tool to regulate their feelings (Martin et al., 2003, p. 53; Scheel & Gockel, 2017, p. 19).

Affiliative humor is the most social humor style. It is the tendency of a person to facilitate relationships by telling and making funny jokes. In other words, it is the use of humor to entertain other people, improve relationships and make the organization enjoyable. People who tend to use this style are more likely to express funny things or jokes to entertain other people, facilitate relationships and reduce interpersonal tension. Affiliative humor is the non-hostile, tolerant use of humor and has the effect of increasing interpersonal cohesion and attractiveness (Chen & Martin, 2007, p. 216; Martin et al., 2003, p. 53; Romero & Cruthirds, 2006, p. 59; Scheel & Gockel, 2017, p. 18).

Self-defeating humor is a person's humiliation of himself/herself with telling funny stories or making jokes about himself/herself to win other's appreciation. By using self-destructive humor, the person puts himself/herself at the target of the pranks of others and laughs when he/she falls into a funny or humiliating situation. In this way, he/she tries to get accepted or to look good in his/her social environment. This style includes over-use of disparagement humor. This style also includes the use of humorous behavior in order to hide the negative emotions that exist in the subconscious and the use of humor as a form of defensive denial (Martin et al., 2003, p. 54; Romero & Cruthirds, 2006, p. 60; Scheel & Gockel, 2017, p. 19).

Aggressive humor refers to sexist and racist humor, such as irony, needling, and teasing. It is associated with manipulating or disparaging others. This style involves the use of humiliating or disparaging humor through pinning, mocking, hanging, or teasing. Aggressive humor (sexist or racist humor) is about the use of humor without thinking about how it influences

others. People who use aggressive humor aim to raise their own status and seek to feel better by pulling others down. Hence, people who use this style of humor often use humorous expressions that can hurt others (Martin et al., 2003, p. 54; Romero & Cruthirds, 2006, p. 60; Scheel & Gockel, 2017, p. 19).

Organizational Creativity

The concepts of creativity and innovation are intertwined and used interchangeably in management literature. However, researchers indicate that there are differences between the two concepts (Gupta & Banerjee, 2016; Klijin & Tomic, 2010). Creativity is defined as the creation of new and valuable ideas by individuals or groups (DiLiello & Houghton, 2006, p. 321; Gupta & Banerjee, 2016, p. 168); on the other hand, innovation is defined as strengthening or realizing the potential of creative thinking (Klijin & Tomic, 2010, p. 322; Rickards, 1999, p. 319). Creativity is seen as a sub-dimension of innovation (Woodman, Sawyer, & Griffin, 1993) or antecedent for the emergence of innovation and defined as the “production of new and useful ideas by an individual or a small group” (Amabile, 1988, p. 126).

In order to understand creativity in an organizational context, researchers adopt a more holistic approach and use the concept of organizational creativity. Organizational creativity is used to describe a relatively new area within the scope of organizational change and innovation. The most common definition of organizational creativity is the “creation of a valuable, useful, new product, service, idea, procedure or process by individuals working together in a complex social system” (Woodman et al., 1993, p. 293). Bharadwaj and Menon (2000, p. 425) stated that organizational creativity is a concept related to the degree to which the organization develops formal practices and policies and the degree to which the organization funds the promotion of original ideas that have meaning for the organization. Creative behavior implies behaviors that generate beneficial outputs to the organization by employees (Woodman et al., 1993, p. 293). The creative behavior of employees enables the emergence of new and useful products, ideas and processes that constitute an important input for organizational development and current practices (Oldham & Cummings, 1996, p. 607).

In previous research, it has been stated that there are various individual, group, and organizational factors that act as catalysts in the emergence of organizational creativity (Gupta & Banerjee, 2016; Klijin & Tomic, 2010; Woodman et al., 1993). It can be said that one of the important factors affecting organizational creativity is personality (Kim, Hon, & Lee, 2010; Williams, 2004; Woodman et al., 1993; Zhou, 2003). Research shows that individuals with a higher degree of openness to experience are more creative (George & Zhou, 2001; Mumford & Hunter, 2005; Williams, 2004). Similarly, research has found a relationship between creativity and personality traits such as self-confidence, flexibility, self-acceptance, sensitivity, and intuition (Shalley & Zhou, 2008).

Another important factor in enhancing organizational creativity is thought to be employee relationships or team processes (Caniëls, De Stobbeleir, & De Clippeleer, 2014). It is stated in the research conducted on creativity in groups that factors such as group cohesion, group compliance, and group structure play an important role in encouraging the creativity of employees (Woodman et al., 1993).

Besides, organizational factors such as organizational culture (McLean, 2005), organizational policy (Cengiz, Acuner, & Baki, 2007), leader support and interaction (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Madjar, Oldham, & Pratt, 2002) and resource distribution capacity (Gupta & Banerjee, 2016) have been found to be important factors that increase organizational creativity. Similarly, Andriopoulos (2001) lists organizational factors that support organizational creativity as organizational climate, leadership style, organizational culture, resources, capabilities, organizational structure, and organizational system.

The Relationship Between Humor Styles and Organizational Creativity

Creative employees help organizations to become more responsive to opportunities and more efficient. In addition, the organization can achieve a competitive advantage in order to maintain its existence and ensure success in the long term through the creativity of its employees (Woodman et al., 1993). Therefore, the factors affecting the creativity of employees are frequently investigated in the studies conducted on organizational creativity. At this point, it can be said that humor is an important factor that increases employee creativity. Studies have found a positive relationship between the use of humor in organizations and the creative behaviors of employees (Galloway, 1994; Ghayas & Malik, 2013; Holmes, 2007; Humke & Schaefer, 1996; Rouff, 1975; Thorson & Powell, 1993).

Humor makes people feel comfortable. Thus, employees become more open to new ideas and less critical of failures or different opinions. This increases the tendency to take risks, which is the basis of creative thinking and creative behaviors (Morreall, 1991, p. 369). The lack of harsh and severe criticism provides a secure environment in the organization which allows employees to display more creative behaviors and produce new ideas (Romero & Cruthirds, 2006, p. 62).

The existence of an amusing environment within the organization enhances creativity by feeding a contagious “cheerful mood” that increases employees’ production of original ideas (Ziv, 1983). It is also possible that in a humorous working environment, employees are more likely to participate in creative problem-solving processes. Research conducted for this purpose shows that the use of humor has a positive effect on creative problem-solving (Estrada, Isen, & Young, 1994; Isen, Daubman, & Nowicki, 1987).

Research has revealed important evidence that self-enhancing humor has a positive effect on individual outcomes. It has been determined that a negative relationship between self-

enhancing humor and negative emotions such as depression, anxiety, and more generally neuroticism, and a positive relationship between openness to experience, self-esteem, and psychological well-being exists (Chen & Martin, 2007; Martin et al., 2003; Mendiburo-Se-guel et al., 2015; Romero & Cruthirds, 2006). Moreover, self-enhancing humor also has a positive effect on organizational creativity (Amjed & Tirmzi, 2016; Lee, 2015). Romero and Cruthirds (2006, p. 62) emphasize that self-enhancing humor contributes to the development of a clear working environment where ideas can be expressed freely and norms that support creativity can be freely transmitted, shedding light on the failures associated with new ideas. Similarly, Lee (2015, p. 66) argues that the self-enhancing humor style of the leader plays an important role in the development of the creativity of the employees as an entertaining means of communication.

H1: A leader's self-enhancing humor is positively associated with organizational creativity.

Further use of affiliative humor facilitates the development and maintenance of social support networks that increase happiness. Therefore, a leader's use of affiliative humor style enables him/her to develop close and positive social relations with the employees. The positive relationship between the leader and the employees can facilitate the exchange of ideas and information, thus, it helps employees to produce more creative ideas (Atwater & Carmeli, 2009; Volmer, Spurk, & Niessen, 2012). Romero and Cruthirds (2006, p. 62) state that the leader's use of affiliative humor will create a positive climate between employees so that employees will be less afraid of failure and feel more comfortable to study in new ways. In this case, it will increase creativity within the organization. Therefore, it can be said that the affiliative humor style of the leader will have a positive effect on the creative behaviors of the employees.

H2: A leader's affiliative humor is positively associated with organizational creativity.

Further use of self-defeating humor can lead to the development of incompatible social support networks that have a negative impact on psychological health. In addition, the self-defeating humor that the leader uses to ingratiate himself/herself with the employees or to seem well to the employees can cause employees to underestimate the leader. The leader in such a situation can be perceived as inconsistent with his/her leadership status and power level (Dwyer, 1991, p. 2). Therefore, self-defeating humor is a disincentive factor for a leader to protect his/her power in cases where it is important to provide and maintain trustworthiness. However, inconsistent findings have been found in researches that investigate the relationship between the use of self-defeating humor and organizational variables. In some research, it was determined that self-defeating humor increased emotional exhaustion (Malinowski, 2013; Oktuğ, 2017) and depression (Dyck & Holtzman, 2013; Kuiper & McHale, 2009). On the other hand, in the majority of the research, there was no significant relationship

between self-defeating humor and organizational commitment (Romero & Arendt, 2011), job performance (Kim, Lee, & Wong, 2016), job stress (Avtgis & Taber, 2006; Kim et al., 2016; Romero & Arendt, 2011), job satisfaction (Avtgis & Taber, 2006), leader-member exchange (Wisse & Rietzschel, 2014) and emotional exhaustion (Avtgis & Taber, 2006; Tümkaya, 2007). However, some studies have found a negative and significant relationship between self-defeating humor and creativity (Amjed & Tirmzi, 2016), but others have found an insignificant relationship (Lee, 2015).

H3: A leader's self-defeating humor is negatively associated with organizational creativity.

Aggressive humor includes humorous expressions that can hurt others. Therefore, the use of aggressive humor harms the relationship between the leader and the employee (Romero & Cruthirds, 2006). Kim et al. (2016) found a positive relationship between social distance and aggressive humor. Aggressive humor increases the tension and addictive behaviors of the employees (Evans & Steptoe-Warren, 2018; Huo, Lam, & Chen, 2012) and has a negative effect on psychological well-being (Dyck & Holtzman, 2013; Kim et al., 2016). Thus, although the use of humor by a leader is related to employee engagement and group compliance, it can also lead to separation among subordinates (Dwyer, 1991). It is seen that aggressive humor is discouraging because of the potential to destroy the positive results and reveal the negative consequences. The leader's use of aggressive humor leads employees to think that their new ideas will be criticized and will be mocked by the leader. Thus, the use of aggressive humor can suppress the creativity of employees by avoiding risky behavior.

H4: A leader's aggressive humor is negatively associated with organizational creativity.

Moderating Role of Organizational Tenure

Tenure is an important demographic variable with an influential role in management and organization research (Bell, Villado, Lukasik, Belau, & Briggs, 2011; A. Cohen, 1993; Wright & Bonett, 2002). There is some research investigating the moderating role of tenure in the studies conducted on organizations (Agarwal & Bhargava, 2013; English, Morrison, & Chalon, 2010; Ohana, 2014). Some research has investigated the moderating role of tenure between humor and organizational variables (Gkorezis, Hatzithomas, & Petridou, 2011).

Prior studies have revealed that new employees react more positively to various organizational practices, which is referred to as the "honeymoon period" (Huang, Shi, Zhang, & Cheung, 2006, p. 351; Wright & Bonett, 2002, p. 1184). During the honeymoon period, employees look at the workplace through "rose-tinted glasses" and place emphasis on only the favorable aspects of the organization. Thus, the positive aspects of the leader draw more attention from new employees than negative aspects (Gkorezis et al., 2011). This means that

the positive use of humor of leaders has a stronger effect than the negative use of humor on short-tenured employees

H5: Organizational tenure has a moderating role in the leader's self-enhancing humor and organizational creativity relationship. The positive relationship between a leader's self-enhancing humor and organizational creativity is stronger for short-tenured employees than for long-tenured employees.

H6: Organizational tenure has a moderating role in the leader's affiliative humor and organizational creativity relationship. The positive relationship between a leader's affiliative humor and organizational creativity is stronger for short-tenured employees than for long-tenured employees.

On the other hand, long-tenured employees may have higher burnout and lower motivation which leads to unfavorable perspectives towards their organization than short-tenured ones (Huang et al., 2006). They are more sensitive to the leaders' negative use of humor than positive use of humor. Moreover, the relationships of long-tenured employees with the organization are changed due to the completion of the socialization process. As tenure increases, employees become closer to their leaders and get used to the leaders' positive use of humor (Gkorezis et al., 2011). Therefore, the leaders' negative use of humor has a stronger effect than the use of positive humor on long-tenured employees.

H7: Organizational tenure has a moderating role in the leader's self-defeating humor and organizational creativity relationship. The negative relationship between a leader's self-defeating humor and organizational creativity is stronger for long-tenured employees than for short-tenured employees.

H8: Organizational tenure has a moderating role in the leader's aggressive humor and organizational creativity relationship. The negative relationship between a leader's aggressive humor and organizational creativity is stronger for long-tenured employees than for short-tenured employees.

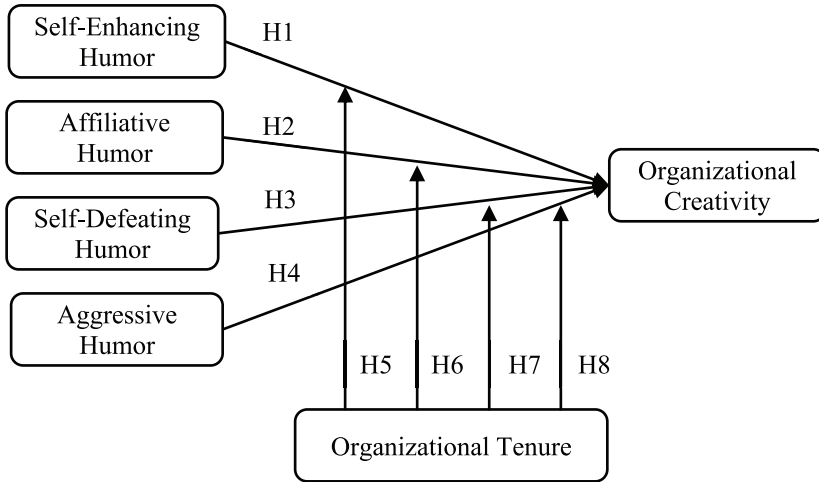


Figure 1. Conceptual Framework.

Methodology

Sample and Procedure

The research focuses on different sector employees and their supervisors. The data used in the analyses were obtained from the employees by evaluating the humor styles of their supervisors and their own attitudes. The participants are post-graduate students studying at the Social Sciences Institute of Karabuk University, Turkey, and also working in organizations in the banking, public administration, health, manufacturing, education, services, and unidentified industries. The questionnaire was distributed to the participants in the class and returned directly to the researcher. All participants completed the survey anonymously and voluntarily. Of the 550 questionnaires distributed, 358 were returned with a response rate of 65%. Among the returned questionnaires, 23 were excluded because of excessive missing data. Therefore, the sample of the research consisted of 335 participants.

Among the 335 participants, 52.8% (177 employees) were female and 47.2% (158 employees) were male. There were 187 single (55.8%) and 148 married (44.2%) in the sample. 83.9% of the respondents were MSc students and 16.1% were PhD students. The average age of the employees was 28 years and the average organizational tenure was 5 years.

Measures

All of the measures used in the study were preferred for their established validity and reliability in previous research. Cronbach's alpha was calculated separately for all measures.

The most commonly used measure in the studies conducted on humor styles is the Humor Styles Questionnaire (HSQ) which was developed by Martin et al. (2003). HSQ distinguishes between two positive styles (self-enhancing humor and affiliative humor) and two negative styles (self-defeating humor and aggressive humor), showing the specific ways in which people use humor in their lives. So, HSQ has four dimensions and there are 8 items in each dimension.

In this study, the Short Work-Related Humor Styles Questionnaire (swHSQ) developed by Scheel, Gerdenitsch, and Korunka (2016) was used to determine the degree of humor used by the leaders. The scale includes items that are directly suitable for working life within the HSQ, and thus focuses directly on the use of humor in working life. The swHSQ consists of four dimensions (self-enhancing humor, affiliative humor, self-defeating humor, and aggressive humor) and there are 3 items in each dimension. Each item is rated on a 5-point scale (1 = strongly disagree; 5 = strongly agree). Representative items from each of the dimensions are; self-enhancing humor "If my supervisor is feeling depressed at work, he/she can usually cheer himself/herself up with humor", affiliative humor "My supervisor enjoys making his/her colleagues laugh", self-defeating humor "My supervisor will often get carried away in putting himself/herself down if it makes his/her colleagues laugh" and aggressive humor "If someone makes a mistake at work, my supervisor will often tease them about it". Cronbach's alpha (α) was 0.88 for self-enhancing humor, 0.83 for affiliative humor, 0.77 for self-defeating humor, and 0.88 for aggressive humor. All the alpha scores exceeded 0.70 which is acceptable for the study (Nunnally & Bernstein, 1994).

The employees' perceptions of organizational creativity were assessed with the 10 items developed by Lang and Lee (2010). The organizational creativity questionnaire was anchored on a 5-point scale (1 = strongly disagree; 5 = strongly agree). Representative items for the scale are "Organizational members generate many original ideas", "We have no qualms about trying out new ideas" and "Staff members are encouraged to explore new fields of knowledge". The Cronbach's alpha (α) obtained for this measure was 0.92 which is acceptable for the study (Nunnally & Bernstein, 1994).

A single open-ended question was used to measure organizational tenure in which participants expressed their working year in their organization. Organizational tenure varied from six months to seventeen years and the mean was five years.

Results

Validity Tests

A confirmatory factor analysis (CFA) was conducted to evaluate the distinctness between the variables used in the study (Table 1). The results of the CFA represent that all standardi-

zed estimates were between 0.65 and 0.89 which exceeded the cutoff value of 0.50 and the minimum t-value (critical ratio) for measurement variables was 9.87 ($p < 0.01$). With regard to the goodness of fit of the model, the chi-square goodness of fit (χ^2/df) was 1.51, the goodness of fit index (GFI) was 0.93, the root mean square error of approximation (RMSEA) was 0.04, the normed fit index (NFI) was 0.93, the Tucker-Lewis index (TLI) was 0.97 and the comparative fit index (CFI) was 0.98. This means the overall measurement quality were achieved for the five constructs used in the study (Anderson & Gerbing, 1988; Byrne, 2016).

Additionally, the convergent validity and discriminant validity were calculated by the composite reliability (CR) and the average variance extracted (AVE) in order to determine whether the measurement variable was representative of the related construct (Fornell & Larcker, 1981). Convergent validity assesses the degree to which two measures of the same concept are correlated and discriminant validity is the degree to which two conceptually similar concepts are distinct (Hair, Black, Babin, & Anderson, 2014, p. 124).

Table 1

Results of Confirmatory Factor Analysis

Constructs and Items	Standardized Estimates	Standard Errors	t-value (critical ratio)	α	AVE	CR
Self-Enhancing Humor				0.88	0.71	0.88
(SEH1)	0.87	-	-			
(SEH2)	0.81	0.06	17.16			
(SEH3)	0.85	0.06	18.24			
Affiliative Humor				0.83	0.62	0.83
(AFH1)	0.80	-	-			
(AFH2)	0.79	0.07	14.51			
(AFH3)	0.77	0.08	14.03			
Self-Defeating Humor				0.77	0.53	0.77
(SDH1)	0.65	-	-			
(SDH2)	0.76	0.11	9.87			
(SDH3)	0.77	0.12	9.88			
Aggressive Humor				0.88	0.71	0.88
(AGH1)	0.78	-	-			
(AGH2)	0.89	0.06	17.36			
(AGH3)	0.85	0.07	16.55			
Organizational Creativity				0.92	0.54	0.92
(OCR1)	0.78	-	-			
(OCR2)	0.77	0.09	13.56			
(OCR3)	0.73	0.10	13.45			
(OCR4)	0.71	0.10	12.71			
(OCR5)	0.71	0.10	12.49			
(OCR6)	0.70	0.10	12.46			
(OCR7)	0.77	0.10	12.25			
(OCR8)	0.73	0.10	13.49			
(OCR9)	0.77	0.10	12.81			

(OCR10)	0.78	0.09	13.39			
Fit Indices	χ^2/df	GFI	RMSEA	NFI	TLI	CFI
	1.51	0.93	0.04	0.93	0.97	0.98

Note: α : Cronbach's alpha, AVE: Average variance extracted, CR: Composite reliability, χ^2/df : Chi-square goodness of fit, GFI: Goodness of fit index, RMSEA: Root mean square error of approximation, NFI: Normed fit index, TLI: Tucker-Lewis index, CFI: Comparative fit index.

In Table 1, all AVEs for self-enhancing humor, affiliative humor, self-defeating humor, aggressive humor, and organizational creativity were 0.71, 0.62, 0.53, 0.71, and 0.54 respectively which exceeded the cutoff value of 0.50. All CRs for self-enhancing humor, affiliative humor, self-defeating humor, aggressive humor, and organizational creativity were 0.88, 0.83, 0.77, 0.88, and 0.92 respectively which exceeded the cutoff value of 0.70 (Fornell & Larcker, 1981, pp. 45-46; Hair et al., 2014, p. 605). These values show that the convergent validity of each construct in the research model of the study is ensured.

The discriminant validity is ensured when the square root of the AVE of a construct is greater than the correlation values of that construct with the other constructs (Fornell & Larcker, 1981, pp. 45-46; Hair et al., 2014, p. 605). For example, in Table 2, the square root of the AVE for affiliative humor was 0.79 and all the correlations between affiliative humor and other constructs were lower. When the square root of the AVE values and the correlations between the variables are examined (Table 2), it is determined that the discriminant validity was ensured for all constructs.

Correlations and Descriptives

Descriptive statistics and correlations for all variables are reported in Table 2. The means for positive humor styles (self-enhancing humor=3.15 and affiliative humor=3.24) were significantly higher than that of negative humor styles (self-defeating humor=2.89 and aggressive humor=2.80). The self-enhancing humor and affiliative humor were positively correlated with organizational creativity ($r=0.47$, $p<0.01$; $r=0.71$, $p<0.01$, respectively), and self-defeating humor and aggressive humor were negatively correlated with organizational creativity ($r=-0.12$, $p<0.05$; $r=-0.69$, $p<0.01$, respectively).

Table 2

Means, Standard Deviations, and Correlations

	Mean	Std. Dev.	1	2	3	4	5
1. Self-Enh. Humor	3.15	0.91	0.84^a				
2. Affiliative Humor	3.24	1.01	0.49**	0.79^a			
3. Self-Def. Humor	2.89	0.73	-0.31**	-0.03	0.73^a		
4. Aggressive Humor	2.80	1.19	-0.48**	-0.62**	0.26**	0.84^a	
5. Org. Creativity	3.16	0.75	0.47**	0.71**	-0.12*	-0.69**	0.74^a

Note: * $p<0.05$ ** $p<0.01$; The diagonal values (a) are the square root of average variance extracted (AVE).

Hypotheses Testing

The hypotheses were tested with hierarchical regression analysis (Table 3). In the regression analysis, gender, marital status, age, and education level were used as control variables. Predictor variables were entered into the hierarchical regression analyses in three steps; (1) control and independent variables, (2) moderator variable, and (3) interaction terms. Interaction terms were derived after the centralization of the independent variables and moderator variable. The reason for centralization is to eliminate multicollinearity associated with the use of interaction terms (Aiken & West, 1991; J. Cohen, Cohen, West, & Aiken, 2003).

Hypothesis 1 and Hypothesis 2 predicted that positive humor styles (self-enhancing and affiliative) of leaders would be positively associated with organizational creativity. Table 3 (Model 1) shows that self-enhancing humor and affiliative humor were positively and significantly associated with organizational creativity ($\beta=0.11$, $p<0.05$; $\beta=0.37$, $p<0.01$, respectively). Thus, Hypothesis 1 and Hypothesis 2 were supported.

Hypothesis 3 and Hypothesis 4 stated that negative humor styles (self-defeating and aggressive) of leaders would be negatively associated with organizational creativity. As shown in Table 3 (Model 1), self-defeating humor was not significantly related to organizational creativity ($\beta=0.02$, $p>0.05$), whereas aggressive humor was significantly and negatively related to organizational creativity ($\beta=-0.38$, $p<0.01$). Thus, Hypothesis 4 was supported, but Hypothesis 3 was not supported.

Table 3

Hierarchical Regression Analysis Results

Predictors	Organizational Creativity		
	Model 1	Model 2	Model 3
<i>Control Variables</i>			
Gender	0.01	0.01	0.01
Marital Status	0.01	0.01	0.02
Education Level	0.03	0.03	0.04
Age	-0.08*	-0.13*	-0.14**
<i>Independent Variables</i>			
Self-Enhancing Humor	0.11*	0.11*	0.10*
Affiliative Humor	0.37**	0.37**	0.37**
Self-Defeating Humor	0.02	0.02	0.03
Aggressive Humor	-0.38**	-0.38**	-0.33**
<i>Moderator Variable</i>			
Tenure		0.07	0.07
<i>Interaction Terms</i>			
Self-Enhancing X Tenure			-0.04

Affiliative X Tenure			-0.13**
Aggressive X Tenure			-0.25**
R²	0.53	0.54	0.59
Adjusted R²	0.51	0.52	0.57
ΔR²		0.01	0.05**
F Value	45.15**	40.44**	36.43**

* $p < 0.05$, ** $p < 0.01$, $N=335$

Hypothesis 5 proposed that organizational tenure has a moderating role in the self-enhancing humor and organizational creativity relationship. In other words, the relationship between self-enhancing humor and organizational creativity is stronger when tenure is low rather than high. As shown in Table 3 (Model 3) the interaction term between self-enhancing humor and organizational tenure was not significant ($\beta = -0.04$, $p > 0.05$). Thus, Hypothesis 5 was not supported.

Hypothesis 6 predicted that organizational tenure has a moderating role in the affiliative humor and organizational creativity relationship. In other words, the relationship between affiliative humor and organizational creativity is stronger when tenure is low rather than high. As shown in Table 3 (Model 3) the interaction term between affiliative humor and organizational tenure was significant ($\beta = -0.13$, $p < 0.01$). Specifically, tests of simple slopes (Figure 2) showed that the relationship between affiliative humor and organizational creativity was positive and significant when organizational tenure was high (0.36, $p < 0.01$), and when organizational tenure was low (0.48, $p < 0.01$). Thus, Hypothesis 6 was supported.

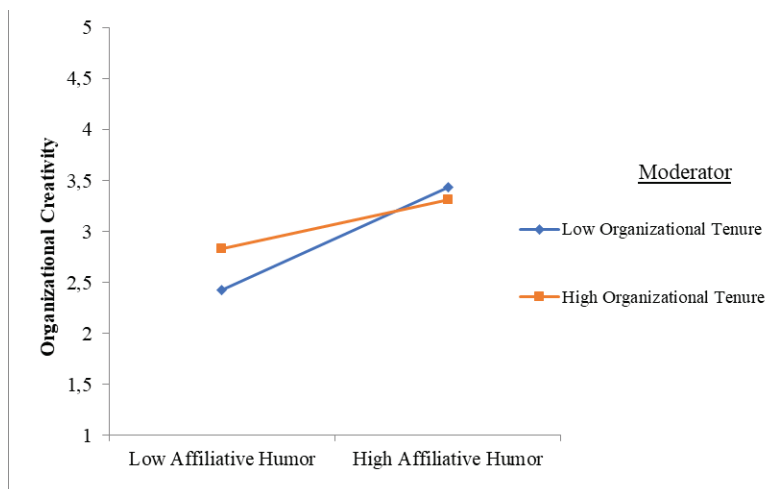


Figure 2. Affiliative humor and organizational creativity interaction for organizational tenure.

This means, if the leader's tendency to affiliative humor is low, the organizational creativity levels of the employees with low tenure are lower than those with high tenure. In other

words, while the leader's affiliative humor tendency is low, the difference between the organizational creativity levels of those with low tenure and those with high tenure employees seems to be greater than when the leader's socializing humor tendency is high.

Hypothesis 7 predicted that organizational tenure has a moderating role in the self-defeating humor and organizational creativity relationship. In other words, the relationship between self-defeating humor and organizational creativity is stronger when tenure is high rather than low. In Table 3 (Model 1), self-defeating humor had no direct effect on organizational creativity. Therefore, the moderating effect of organizational tenure in this relationship could not be examined. Thus, Hypothesis 7 was not supported.

Hypothesis 8 predicted that organizational tenure has a moderating role in the aggressive humor and organizational creativity relationship. In other words, the relationship between aggressive humor and organizational creativity is stronger when tenure is high rather than low. As shown in Table 3 (Model 3) the interaction term between aggressive humor and organizational tenure was significant ($\beta=-0.25$, $p<0.01$). Specifically, tests of simple slopes (Figure 3) revealed that the relationship between aggressive humor and organizational creativity was negative and significant when organizational tenure was high (-0.75 , $p<0.01$), but was not significant when organizational tenure was low (-0.15 , $p>0.05$). Thus, Hypothesis 8 was supported.

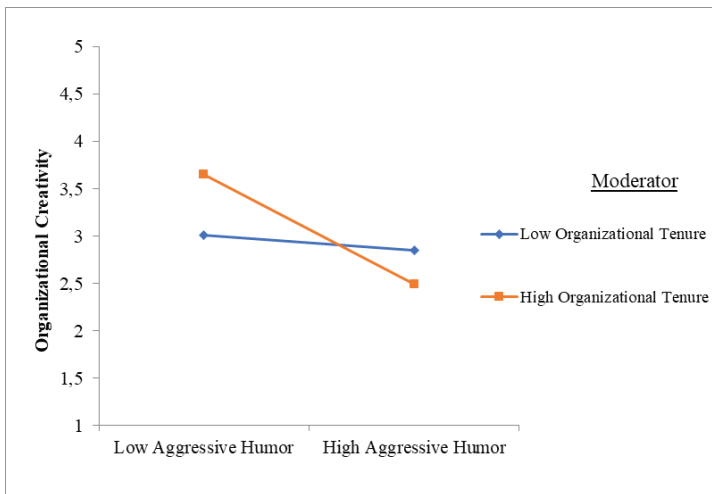


Figure 3. Aggressive humor and organizational creativity interaction for organizational tenure.

This means, in cases where the organizational tenure is low, the leader's use of low or high aggressive humor does not make a difference in organizational creativity. However, in cases where the organizational tenure is high, the level of organizational creativity decreases as the use of aggressive humor by the leader increases.

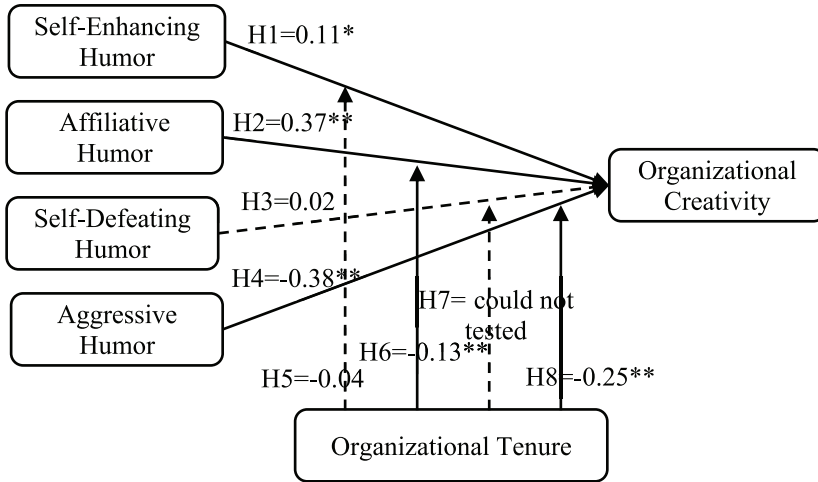


Figure 4. Final Findings of the Study.

Discussion

This research examines how leaders' use of humor affects organizational creativity. The study aims to determine the direct effect of the humor styles used by leaders on employees' organizational creativity and to reveal the moderating role of organizational tenure in the relationship between humor styles and organizational creativity. For this purpose, data were collected by questionnaire from 335 participants working in different organizations.

First, this research confirmed the predictions relating to the direct effects of positive humor styles (self-enhancing humor and affiliative humor) on organizational creativity. These results support and extend prior studies investigating the effect of positive humor on organizational outcomes (Mesmer-Magnus, Glew, & Viswesvaran, 2012; Romero & Arendt, 2011; Romero & Cruthirds, 2006; Wisse & Rietzschel, 2014) and specifically on organizational creativity (Amjed & Tirmzi, 2016; Lang & Lee, 2010; Lee, 2015). This means leaders who do not lose a humorous view even in difficult situations and use humor to entertain other people, to improve relationships, and to make the organization enjoyable contribute to the increase of the organizational creativity of the employees. In other words, a leader's use of self-enhancing and affiliative humor will create a positive climate in the organization, so that employees will not be afraid of failure and feel more comfortable working in different ways.

Second, the findings of the study show that the use of negative humor has a negative effect on organizational creativity. Although self-defeating humor has no significant effect on organizational creativity, it has been determined that aggressive humor negatively affects organizational creativity. This means that a leader's negative use of humor, particularly the

use of aggressive humor, makes the employees believe that their new ideas will be criticized and mocked. Studies that investigate the relationship between negative humor and employee attitudes indicate that the use of negative humor harms the relationship between the leader and employee. In these studies, it is also stated that leaders who use negative humor do not take into account the hurtful effects of humor on employees (Evans & Steptoe-Warren, 2018; Huo et al., 2012; Kim et al., 2016; Romero & Cruthirds, 2006). The findings of this study also support the findings of previous studies. Leaders who prefer to use negative humor want to tease and mock the employees, criticize and annoy them for their mistakes, and suppress them in the most general way. The negative use of humor by a leader makes it difficult for employees to establish positive relations with the leader and reveal negative consequences.

Third, hierarchical regression analyses were conducted to determine the moderating role of organizational tenure in the relationship between a leader's self-enhancing, affiliative, and aggressive humor respectively, and employees' organizational creativity. Because the relationship between self-defeating humor and organizational creativity was not significant, the moderating role of organizational tenure has not been tested in this relationship. However, as a result of the analyses, the moderating effect of organizational tenure on self-enhancing humor and organizational creativity could not be determined.

Study findings show that organizational tenure differentially influences the relationship between a leader's use of affiliative humor and organizational creativity. This means the leader's use of positive humor results in more organizational creativity of short-term employees. Short-tenured employees are more enthusiastic in their job and tend to react more positively to their leaders' behavior. They want to be accepted in the new workplace and want to feel like a member of the workgroup (Gkorezis et al., 2011; Huang et al., 2006). The affiliative humor used by the leader can cause newcomers to develop stronger ties with the organization and to make themselves feel well-received, respected, and reinforced. Besides, there is a good relationship between the employees with high-tenure and their leaders based on mutual trust (Cooper, 2005, 2008). Thus, it is thought that affiliative humor is an inefficient tool for leaders to increase the organizational creativity of high-tenured employees. So, it can be said that the relationship between affiliative humor use of leaders and organizational creativity is stronger for employees with short-tenure than employees with high-tenure.

Research findings also provide support for organizational tenure having a moderating role in the relationship between aggressive humor use of leaders and organizational creativity. Particularly, the relationship between a leader's aggressive humor and employees' organizational creativity is stronger for employees with long-tenure. For long-tenured employees, the jokes in the workplace mean a common understanding and a general way of communication. Short-tenured employees do not share the same understanding with their leaders. As a result, aggressive statements hidden in the humor by the leader may not be perceived by employees

with short-tenure (Gkorezis et al., 2011; Lynch, 2009). Therefore, the aggressive humor used by the leader has a lower effect on the organizational creativity of short-tenured employees. For long-tenured employees, although humor is a factor that enhances social relationships with colleagues, the aggressive humor used by a leader reduces their organizational creativity by causing them to feel humiliated and insulted. So, it can be said that a leader's use of aggressive humor has a more significant negative effect on the organizational creativity of long-tenured employees than on short-tenured employees.

Limitations and Future Research

The current research has some limitations. First, research data was only obtained by asking the subordinates to evaluate the humor styles of their leaders and to indicate their perception of organizational creativity. Leaders did not assess their own humor styles or organizational creativity levels of employees. An employee may not always be able to understand the reasons behind the humor style used by the leader. The findings of current research should be confirmed by using leader-reported measurements in future studies. Second, cross-sectional data were used in the analysis process of the research. The cross-sectional data limit the precise results of causal relationships between variables. Future research can provide more convincing evidence of causality through longitudinal data or experimental design. Third, the sample of data collection is composed of employees in different organizations and at different levels. Therefore, the findings may differ within the scope of data collected from a particular sector or a specific organization. The research findings should be replicated with future research in different sectors or countries. Fourth, only the moderating role of organizational tenure in a leader humor-organizational creativity relationship was investigated in the study. Further studies may contribute to a better understanding of the relationship between leader humor and organizational creativity by examining the role of other demographic factors such as gender or age.

Implications for Theory and Practice

The findings of this study have provided some important theoretical implications for humor and creativity research. First, numerous researchers have implicated the importance of demographic characteristics in social dynamics and have stated that demographic characteristics should be examined more in the organizational research (Agarwal & Bhargava, 2013; English et al., 2010; Gkorezis et al., 2011; Ohana, 2014; Wright & Bonett, 2002). By examining the moderating effect of organizational tenure, this study provides particular findings to the relationship between humor and employee attitudes and behaviors. Second, research findings show that humor has a multidimensional structure. Besides, the effect of a leader's humor on employee creativity may vary depending on humor style. Self-enhancing,

affiliative, and aggressive humor were significantly associated with organizational creativity, but self-defeating humor was not significantly associated with organizational creativity. This means that not all of the humor styles used by the leader affect employee creativity. Third, it has been found that organizational tenure has a moderating role in the relationship between some humor styles used by the leader and organizational creativity. Particularly, affiliative humor used by a leader results in a greater increase in organizational creativity of short-tenured employees, and aggressive humor results in a larger decrease in organizational creativity of long-tenured employees. In this context, it can be said that a moderating effect has contributed to the theory of humor in terms of determining how positive and negative humor affects employee outcomes. Besides, this finding shows that organizational tenure has a much more significant effect on the relationship between social humor styles (affiliative and aggressive humor) and employee outcomes than individual humor styles (self-enhancing and self-defeating humor). This is in line with the notion that humor is basically a social phenomenon that derives its effects from the individual and social processes it creates in an interaction (Cooper, 2008; Wisse & Rietzschel, 2014). Fourth, besides the humor literature, the research findings also contribute to the literature of creativity. Some research examined the relationship between humor and organizational creativity (Amjed & Tirmzi, 2016; Lang & Lee, 2010; Lee, 2015). In this regard, the research findings support previous research in order to understand which humor styles have an impact on organizational creativity.

The findings of the study also have provided important practical implications for leaders and organizations. First, leaders who want to increase the creativity of their employees in the organization should be careful about what type of humor they will use. Findings suggest that the use of positive humor (self-enhancing, affiliative) can increase the organizational creativity of employees, while the use of negative humor (aggressive) can hinder creativity. The convenient use of positive humor by leaders is likely to help the organizations which want to take advantage of employees' creativity. Thus, leaders need to take humor more seriously while using different humor styles and interacting with their employees. Second, leaders should also take into account the employee's organizational tenure when choosing what type of humor to use. Findings reveal that different humor styles used by a leader have different effects on organizational creativity depending on the employee's tenure. For short-tenured employees, it is better to use more affiliative humor to increase their creativity within the organization. For long-tenured employees, the situation is different. They are more affected by a leader's aggressive humor than affiliative humor. Thus, leaders should pay more attention to using positive humor to increase the organizational creativity of short-tenured employees and to avoid the negative humorous expressions that will reduce the organizational creativity of long-tenured employees.

Conclusion

The current study aims to expand growing research on humor in organizations and organizational creativity. Specifically, this study found evidence that affiliative and self-enhancing humor used by leaders may be a critically enhancing factor for organizational creativity. Also, it is found that aggressive humor used by leaders could have a negative effect on organizational creativity. In addition, the results showed that organizational tenure moderates the relationship between affiliative humor and organizational creativity and between aggressive humor and organizational creativity.

It is thought that this research contributed to an area that has shown more interest in recent years but has not yet achieved clear findings. Current research findings indicate the role of a leader's use of humor in the development of organizational creativity. However, although this study supports the notion that humor may be valuable for organizations, further research is needed.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The author has no conflict of interest to declare.

Grant Support: The author declared that this study has received no financial support.

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Recommendation of Active Employment Policy Based on Entrepreneurship and Social Innovation: Social Entrepreneurship Support Model for Youth in Turkey

Volkan Işık¹

Abstract

In this study, the social entrepreneurship support model will be designed in Turkey as an active employment policy proposal based on entrepreneurship and social innovation in the fight against youth unemployment. Within this framework, the model aims to organize a social entrepreneurship training program for unemployed youth and NEET (neither employed nor in education or training) youth by the Turkish Public Employment Agency (ISKUR). Based on this, it is envisaged that similar support to the ISKUR Entrepreneurship Training Program implemented by the state for young people will be implemented under the name of the Social Entrepreneurship Support Program in cooperation with ISKUR-KOSGEB and ASHOKA. The model also suggests to give financial and consultancy support for those who successfully complete training. This support is thought to be important for start-up social entrepreneurs. Finally, this study aims to discuss the possibility to implement a social entrepreneurship support model for youth in Turkey. Especially in terms of developing countries, the model is believed to be an alternative means of struggle with the fight against youth unemployment.

Keywords

Social Entrepreneurship, Social Innovation, Youth Unemployment, Social Responsibility

Introduction

Social entrepreneurship and social enterprises are not legally recognized in Turkey. For this reason, they mostly operate in organizational forms as a foundation, association, cooperative or for-profit company, as permitted by the legislation. In Turkey, social entrepreneurship showed a significant development especially in the last 20 years, despite the legal and institutional barriers. The Ashoka-Turkey Foundation has an important role in this development. The Ashoka Foundation is an international organization that promotes social entrepreneurship by affiliating social entrepreneurs in a network. It was organized in Turkey as Ashoka-Turkey in the early 2000s, and played a key role in the development of social entrepreneurship in Turkey.

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To cite this article: Isik, V. (2022). Recommendation of active employment policy based on entrepreneurship and social innovation: social entrepreneurship support model for youth in Turkey. *Istanbul Business Research*, 51(2), 517-533. <http://doi.org/10.26650/ibr.2022.51.871670>

Today, there are no legal regulations concerning social entrepreneurship in Turkey. In other words; social enterprises are not legally recognized in Turkey. They are mostly established as foundations, associations, cooperatives or private enterprises but they do not operate in these forms. Therefore, they often stretch their existing institutional structures and adapt them to their goals. This is one of the most important obstacles to the development of social entrepreneurship in Turkey.

Despite these obstacles when considering the youth population density, it can be said that Turkey has a substantial potential for social entrepreneurship in the future. When the tendency towards the voluntary sector and the tendency to be a social entrepreneur are examined demographically, it is seen that the young population density in social entrepreneurship is higher than in traditional enterprises.

If social entrepreneurship behaviour is examined in terms of age, it can be thought that young people will engage in more social entrepreneurial behaviours than middle-aged people. An important reason for this is that young people have a high risk-taking tendency due to having less career time (Prabhu, 1999: 142) and a desire for social causes and to reduce unemployment in India (Tiwari, Bhat & Tikoria, 2017) and South African (Manyaka-Boshilo, 2017). These countries are similar to Turkey in terms of unemployed youths. According to the “The State of Social Enterprise in Turkey Report” published by the British Council in 2019; 47.28% of leaders in social enterprises are below the age of 35, compared to 21.4% in conventional businesses in Turkey (British Council, 2019: 6).

A limited number of studies conducted in different periods in Turkey shows that social entrepreneurship is more common amongst young people. For example, according to a survey conducted by Ashoka Turkey, social entrepreneurs are concentrated in the age of onset between 20 and 25 years, and 75% of the total employment at these social enterprises are in the 25-34 age range (Işık, 2016:196). These data show that any kind of support to social enterprises will be reflected positively on the youth unemployment in Turkey.

The British Council report suggests the development of a curriculum on social enterprise and mainstream the topic in related courses on entrepreneurship, sustainability, and social responsibility to motivate university students since harnessing the interest of millennials and young people will help social enterprises attract skilled staff in the long run (British Council, 2019: 19). Social entrepreneurship trainings in Turkey are limited to only creating awareness about what is social entrepreneurship. So, it is far from meeting the educational needs of potential social entrepreneurs. All programs are offered to a limited number of groups who are interested in the subject and do not have a common curriculum, structure, or methodology.

This study proposes a training and support model for the development of social entrepreneurship as an alternative for people who are neither employed nor in education or training

(NEET) and unemployed youth. The main objective of the model is to increase the participation and effectiveness of youth in social entrepreneurship in Turkey, thereby reducing the current youth unemployment and NEET. Within the proposed model; the study stresses the need to promote social entrepreneurship among young people in the fight against youth unemployment and NEET in developing countries. The model of social entrepreneurship based on Ashoka, Small and Medium Scaled Industry Development and Support Directorate (KOSGEB), and Turkish Employment Agency (ISKUR) cooperation supports, besides providing an important contribution to the development of social entrepreneurship in Turkey, will be considered as an alternative active employment policy tool in the fight against youth unemployment in future.

A Conceptual Framework of Social Entrepreneurship

In the neo-liberal period, the struggle against social problems has been carried out jointly by the public, private and third sectors. With the adoption of the welfare mix approach, new tools are emerging in the fight against social problems in the public, private and non-governmental sectors. In the private sector, corporate social responsibility investments are gaining importance, social municipalism is becoming widespread and membership in non-governmental organizations is increasing. In addition, innovative and creative initiatives are being developed within NGOs; philanthropic/individual entrepreneurs are shaping social entrepreneurship with their innovative solutions.

With the neoliberal policies adopted after 1980, the welfare state of the Keynesian era has weakened. In the neo-liberal process, the solitary state provision of welfare has been minimal. Benefits have been modest and social assistance provided on a need basis. This approach is usually called “the welfare mix” in literature (Özdemir, 2004; Metin & Özyayın.2016; Powell & Barrientos, 2004). According to the welfare mix approach; the private and non-governmental sectors, and even families, religion and individual philanthropy are responsible for ensuring welfare. Third sector organizations have assumed critical roles in fighting against social problems. Evers (1995) explains the third sector as the part of the welfare mix system that made up of the market-based activities, the state, and the informal private household spheres.

Not only the third sector but also the market-based organizations (second-sector) take responsibility within the welfare mix. Many researchers have increasingly agreed that market-based organizations are a mix of economic and social impacts, and have responsibilities in the fight against social problems. (Kent & Dacin, 2013, Husted & Salazar, 2006). This is particularly evident in social entrepreneurship, which combines social missions with market approaches to tackle social problems at the global level (Short, et al., 2009). The rapid development of social entrepreneurship in the UK and the United States can be interpreted as a

result of the welfare mix approach. Today, Social Enterprise UK from the United Kingdom and ASHOKA from the US are the biggest networks that have played an important role in tackling social problems.

Despite the prevalence of social entrepreneurship activity, conceptually there are different definitions in the literature (Dees, 1998). A group of researchers explains social entrepreneurship as a non-governmental organization that is seeking alternative financing strategies to create social value (Austin, et al. 2003; Boschee, 1998). Some researchers understand this as the social responsibility practice of market-based organizations dealing with cross-sectoral partnerships that mean social responsibility (Waddock, 1988, Sagawa & Segal, 2000). The third group understands that it is able to operate in all sectors as a means to relieve social problems and accelerate social transformation (Alvord, et al., 2004).

The social benefit associated with non-governmental organizations and the profit motive associated with the profit sector come together in social entrepreneurship. The sectoral position of these two opposing focuses brings them closer together in social entrepreneurship. Cook, Dodds and Mitchell (2002) define social enterprises as social partnerships developed between the public, non-governmental organizations and commercial sectors to use the market power for the public good.

Social enterprises consist of a combination of social benefit and entrepreneurial aims; they are different from the third sector because of their financial resources, and different from traditional profit-oriented enterprises because they serve social purposes. In addition to the traditional sources of income (donations and voluntary participation) of non-profit organizations, they are referred to as private initiatives that generate commercial gain (both from the founders' equity and public and private enterprises).



Figure 1. Sectoral Position of Social Entrepreneurship.

Source: (Ersen, B.T., et.al. 2011).

Figure 1, shows the sectoral position of social entrepreneurship. Accordingly, it is seen that social entrepreneurs are located in the middle of traditional non-profit non-governmental organizations and profit-making company structures. Haugh (2005) positions social enterprises as hybrid organizations associated with public, private and non-governmental organizations. According to him, social enterprises blur the boundaries between non-profit organizations and profit-making companies.

Although social entrepreneurs are in a hybrid field as a sectoral position, it is possible to say that the development of social entrepreneurship is directly proportional to the development of non-governmental organizations. Looking at examples of good practices such as the United Kingdom and Italy; it is seen that these countries have an advanced participatory democracy and civil society awareness, and active participation in the policy development processes of non-governmental organizations through improved social dialogue mechanisms. However, it will not be sufficient to explain the factor that activates social entrepreneurship only with the importance given by the countries to participatory democracy. In addition to this, as in Muhammad Yunus, who is the architect of micro-credit applications in Bangladesh with Grameen Bank; the increasing needs of countries in areas such as education, health, poverty, citizenship rights, environment, etc. cause the emergence of social entrepreneurs. Establishing the supporting legal and institutional infrastructure necessary for the expansion of social entrepreneurship is related to the countries' perspectives on civil society and participatory democracy.

Social Entrepreneurship in Turkey

The ratio of civil organizations owned per 10.000 people in Turkey is very low as in most developing countries. As of the year 2020, Turkey's population reaches 84 million even then, there are 121,720 associations, 5,775 foundations, and 84,232 cooperatives (total 211,727) according to government statistics. On the other hand, there are no social enterprises because there is no legal structure. Nevertheless, to the extent permitted by legal conditions, it is seen that social benefit-oriented initiatives are organized in the form of foundations, associations, cooperatives and private companies. Despite the legal obstacles in Turkey, the number of social entrepreneurs who develop innovative solutions in tackling social problems is increasing every year.

Despite this increased interest in social enterprise, the enabling mechanisms for developing an effective social enterprise ecosystem (incubation, acceleration, coworking or lab facilities for social enterprises) are very limited in Turkey. In 2016, according to an experts' poll conducted by the Thomson Reuters Foundation in cooperation with the Global Social Entrepreneurship Network, Turkey ranked last (44th from 44 countries) in terms of a favourable environment for social entrepreneurs (British Council, 2019: 22).

Since 2016, the social enterprise ecosystem in Turkey has been developing, yet sectors and actors are still operating in isolation. Interaction between actors (such as public bodies, local administrations, private bodies, universities and citizens) continues to be mostly spontaneous and event-based.

The British Council revealed the situation of social enterprises between October 2018 and May 2019 in Turkey with a survey. According to the survey; it is challenging to calculate the

number of social enterprises in Turkey, since there is no legal status for social enterprises, and relevant data are absent. However, based on this experimental and restrictive methodology, the calculations would suggest that there are approximately 9,000 organizations in Turkey that could meet the characteristics of the operational definition of social enterprises used for this research. (British Council, 2019: 29). The reason why these figures are considerably below the total number of civil society organizations (total 211,727) in Turkey shows that many organizations are not suitable for social enterprises. There are no tax exemptions for NGOs in Turkey, and only a limited number of organizations are granted this right with public benefit status.

According to the Third Sector Foundation of Turkey (TUSEV) and the British Council cooperation research results, tax issues are one the most important problems for the barriers to social entrepreneurship in Turkey. Cooperatives and non-profit companies, such as profit-making companies, are subject to corporate tax in terms of their earnings, income tax in terms of the people they employ and their real estate, and value-added tax due to the goods and services they provide. (TUSEV, 2012).

According to the British Council Survey in 2019, an adverse economic climate, high taxes, start-up costs, and bureaucracy are the main challenges facing social enterprises, with more than %85 of respondents selecting one of these as an important barrier to growth. In addition to this, social entrepreneurs in Turkey struggle to access finance, mostly relying on their financial resources or support from family and friends, and donations at the start-up phase (British Council, 2019: 65).

Obstacles to the development of social entrepreneurship in Turkey also bears resemblance to the results of research carried out at different times (Işık, 2016: 148; Tusev, 2012: 14-21, Kusif, 2017: 31-33, UNDP, 2012);

- The legal entities operating under the name of social enterprises are not legally recognized and therefore have to be established as foundations, associations, cooperatives, and their economic enterprises,
- Because of the lack of legal recognition of social enterprises, there is confusion about the definition of these enterprises,
- Difficulties in financial sustainability due to the lack of any tax exemptions for the economic enterprises and companies, cooperatives and non-profit companies of foundations/associations and financial support provided to foundations/associations with tax exemption / public benefit status,
- Difficulty in providing human resources to be employed in social enterprises,
- Bureaucratic, experiential and managerial problems affecting the internal order of organizations.

Estimated 9000 organizations in Turkey that could meet the characteristics of the operational definition of social enterprise; despite their existing barriers, they are both important indirect social policy actors with their employment potential and their creative business ideas for solving social problems.

Young population density and youth interest in the social enterprises in Turkey show that social entrepreneurship has an important potential for the young population. Organizing social entrepreneurship training through the state in order to help youth between the ages of 15-24 to start and develop their businesses, and provide institutional support for the social initiatives of young people who have completed this training, will make significant contributions to reducing unemployment and NEET rates among young people, as well as paving the way for new actors to participate in the fight against social problems.

As an Active Employment Policy: Social Entrepreneurship Support Model for Youth in Turkey

Public Active Employment Policies and Entrepreneurship Supports for Fight Against Youth Unemployment in Turkey

Today, youth unemployment is at the top of the labour market problems of both developed and developing countries. According to the ILO (International Labour Organisation) Global Economic Trends for Youth Report; the global youth unemployment rate of 13,6% in 2019 is projected to rise by 0.1 percentage point in 2020 and a further 0.1 percentage point in 2021 (ILO, 2020a: 33).

Gender-based discrimination in youth unemployment is noteworthy, as in general unemployment. On a global scale, labour force participation of young women was 16.6 points lower in 2017 than that of young men, while unemployment rates among young women were also higher than for young men. However, in the case of NEET youth, the gender gap is widening. On a global scale in 2019, the youth NEET rate was 22.2%, being 13.9% for young men and 31.1% for young women. (ILO, 2020a: 38). Globally, approximately one-fourth of youth have NEET status in 2019. It means that they are neither gaining experience in the labour market, nor receiving an income from a job, nor enhancing their education and skills. (ILO,2020b:16).

The youth unemployment was 25.2% in Turkey in 2019. The high level of inequality in gender distribution is noteworthy. According to this, the youth unemployment rate was 22.5% for males and 30.6% for females in 2019 (TUİK, 2020).

Turkey has a great potential due to the young population density. The young population constitutes approximately 15.4% of the total population (TUİK, 2020). However, due to problems in directing youth to the labour market and education, the NEET ratio among youth is

well above the OECD average. In 2019, the young people in the 15-29 age range NEET rate was 29% in Turkey, while the OECD (Organisation for Economic Co-operation and Development) average was 12.8%. With this rate, Turkey took the thirty-sixth place among 37 countries. (OECD, 2020). According to the OECD Education at a Glance 2020 Report, on average across OECD countries, 14% of 18-24 year-olds are NEET but this rate is at least 20% in Turkey. (OECD, 2020: 54). According to the OECD report; Turkey and Mexico are the only two OECD countries where the gender gap is over 20 percentage points (OECD, 2020: 57).

The young population plays a key role in economies. Because youth is the determiner of the potential of the future labour force quality and quantity. The high young population density in countries like Turkey could face widespread youth unemployment's socio-economic results if they cannot turn this potential into a competitive advantage through successful training and active employment policies.

Therefore, it is necessary to create new employment opportunities for young people, to support young entrepreneur candidates with various investment, tax and premium advantages, and to develop active employment policies that will equip them with skills to better adapt to developing and changing economic, social and environmental conditions.

Policies related to support and encourage to increase youth labour force in Turkey are found in the main programs of the National Employment Action Plan Strategy and National Development Plans. These programs are carried out by the three institutions, which are also active and passive employment policies implementers, the Turkish Employment Agency (ISKUR), the Small and Medium Scaled Industry Development and Support Directorate (KOSGEB) and the Social Security Institution (SGK) in Turkey. While ISKUR implements public active labour programs, SGK, unemployment benefits, etc. and manages passive programs, and KOSGEB manages financial supports.

ISKUR has undertaken important initiatives in the last 10 years in addition to its programs in the fight against youth unemployment. The most important of these can be sorted as the Supporting Youth Employment Program, Supporting Youth Employment in Sectoral Investment Areas, and Decent Work for All: National Youth Employment Program.

ISKUR is the national partner of the UN's Decent Work for All: National Youth Employment Program Joint Program, which was officially launched in October 2009. The program of the National Youth Employment Action Plan was developed within the scope of the program implemented between 2009-2012. It also aims to support labour demand dynamics at the local level, to eliminate the mismatch between labour supply and demand, to implement effective measures of employment, youth, and migration management for the benefit of young groups in the labour market. Within the scope of the program, vocational training, entrepreneurship, and basic skills courses were given to youngsters.

The Youth Employment Support Program implemented between December 2010 and December 2011 aimed to support ISKUR and all relevant stakeholders by increasing the employability of young people, young entrepreneurship and on-the-job training and internship opportunities for young people.

Another program in the last 10 years, co-funded by the EU and the Republic of Turkey, supports the implementation of the Sectoral Investment Areas Youth Employment Program between the years 2012-2015. The program aims to achieve the following objectives;

- To increase the employability of youth,
- To increase the entrepreneurship skills of youth,
- To promote sustainable cooperation between relevant actors of the labour demand and supply sides,
- To support the creation of new investment areas with active labour market policies,
- To provide services that include profiling, orientation, training, counselling, and matching services to support youth employment.
- To facilitate the transition between education and employment,
- To support university-industry cooperation.

The main purpose of the active employment policies for youth are to increase employment opportunities for job seekers and improve the matching of vacancies with job seekers. (Murat and Kasapoglu, 2018: 486). Thus, while these policies increase employment and growth, the budget allocated to passive employment policies such as unemployment allowances is saved.

There are two main instruments used in the context of active employment policies. The first is general programs targeting all unemployed people. The second is special programs for disadvantaged groups such as youth, women, elders, handicapped, long-term unemployed, and immigrants (Usen, 2007: 70).

Vocational training programs, on-the-job training programs, entrepreneurship training programs and projects, and social work programs constitute the framework of the active employment policies in Turkey. Entrepreneurship support from these policies and programs; has special importance in terms of increasing the employment of young people due to its two-way effect in terms of creating new employment areas on the one hand and combating unemployment on the other. Entrepreneurship supports carried out in collaboration with ISKUR and KOSGEB enable individuals to receive support for their start-up enterprises. Within the scope of the program, supports as technical assistance and micro-credits can contribute to the creation of small-scale enterprises and the promotion of self-employment.

In countries with developing financial infrastructures, private banks often cannot perform the risk assessments required to offer loans to individuals who want to create their own ventures. Public programs to support small business loans can be a useful contribution to addressing this defamiation from loan rationing (Betcherman, et al., 2008). Entrepreneurship support programs implemented by ISKUR and KOSGEB co-operation in Turkey various financial entrepreneurship supports are provided for those who complete these programs.

The Proposal of Social Entrepreneurship Support Model for Youth

Traditional entrepreneurs are supported by the entrepreneurship training program in the active labour force programs currently implemented by ISKUR in Turkey. At the end of the training program, a Certificate of Participation in Applied Entrepreneurship Training is issued to the participants. Individuals who receive this certificate can apply to KOSGEB New Entrepreneur Support and benefit from KOSGEB's traditional entrepreneurial support and advanced entrepreneurial support.

Government-supported courses and training in the field of entrepreneurship are common in many countries, but training on social entrepreneurship, in particular, is not common. Social entrepreneurship training is usually offered as an elective course or a certificate program at undergraduate or graduate levels. Also, it is seen that training is provided through various associations and foundations. In other words; there are no government-supported social entrepreneurship training or any supports in Turkey. Government organizations such as ISKUR or KOSGEB provide support only for traditional entrepreneurs. This is one of the major obstacles to the recognition and development of social entrepreneurship. Even in countries where social entrepreneurship has developed, for example in the UK, there are courses or a specific vocational curriculum specifically related to social entrepreneurship.

The results of Ong et al. (2020)'s research on young people reveal the multifaceted positive effects of promoting social entrepreneurship for young people. The results of the research revealed that social entrepreneurship can initiate the determination to be motivated to find the aim of their own life by increasing the awareness of young people about social-environmental problems. It also revealed that young people acquire various additional skills in order to fulfil their duties in social enterprises and to cope with difficulties (Ong et al 2020). It is important that the research was conducted in Malaysia, which is similar to Turkey in terms of youth population density.

In this sense, it is thought that the social entrepreneurship support model for youth will contribute to the development of social entrepreneurship in parallel to widespread social entrepreneurship training in Turkey. Social entrepreneurship training to be implemented within the scope of the planned model is to be added to ISKUR active labour force programs (in a similar way to entrepreneurship training program) and to give priority to young people between the ages of 15 - 24. In other words, priority will be given to the 15-24 age range in the candidate selection criteria. The main purpose of the relevant support model is to combat

unemployment and NEET among youths. In addition to this, social entrepreneurship will be encouraged as an area of profession, and thus, the state’s struggle against social problems will be supported. Thus, the aim of the proposed support model is to encourage youth to become social entrepreneurs and with this, the aim is also to encourage youth to work in social enterprises in order to reduce the youth unemployment rate.

The following outputs are planned to be achieved with the social entrepreneurship training to be implemented;

- To encourage entrepreneurship motivation, skills and mentality among young people;
- To raise their awareness in legal, financial, managerial, leadership, marketing, etc. areas for establishing and managing a successful business and social enterprise.
- Establishing a comprehensive network to have the opportunity to attract potential investors.
- To gain the basic knowledge and skills to become a social entrepreneur.

The minimum level of education for participation in the relevant training should be attending secondary/high school or completing the full secondary education cycle (high school or vocational education school).

The functioning of the social entrepreneurship support model is planned as shown below.

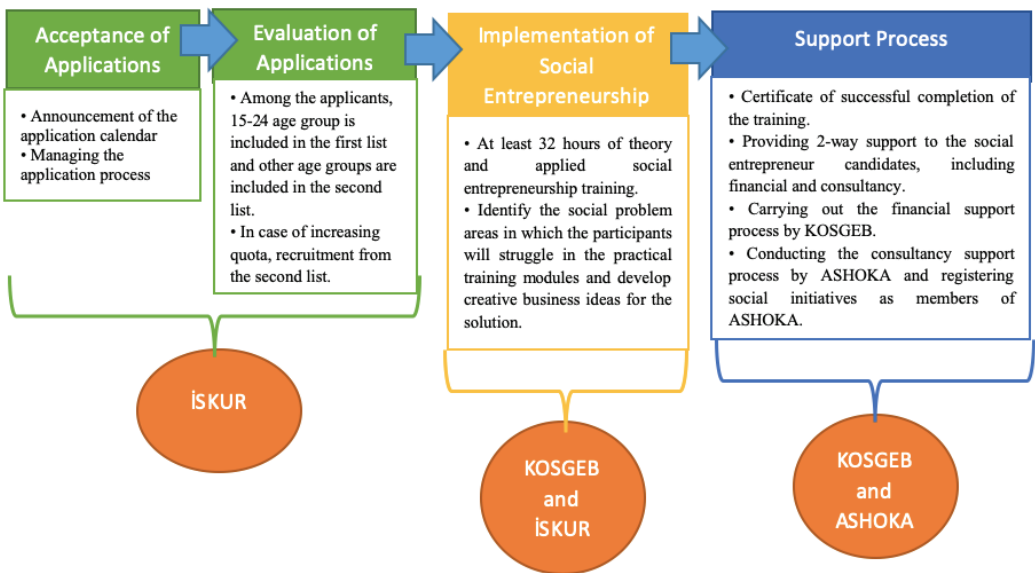


Figure 2. Functioning of Social Entrepreneurship Support Model.

Source: Author

As can be seen in Figure 2, three institutions were held responsible for the functioning of the social entrepreneurship support program. ISKUR is responsible for the acceptance and evaluation of applications to the social entrepreneurship training program. The determination of the content of the program and implementation of the training program will be realized in cooperation with ISKUR and KOSGEB.

After the program, the support process for the young social entrepreneur candidates who have been awarded the participation certificate will be carried out in cooperation with KOSGEB and ASHOKA.

At this point, it is necessary to mention ASHOKA, which plays an important role in the social recognition and development of social entrepreneurship in Turkey. Ashoka, founded by Bill Drayton, is an organization based on the idea that the most powerful force for good in the world is social entrepreneurship (Ashoka.org). ASHOKA is the first and largest global social enterprise network and therefore has an important place among international organizations supporting social entrepreneurs. In the early 2000s, ASHOKA began to accept members from Turkey, as the only social entrepreneurship network operating in Turkey.

Today, Ashoka has over 3500 members from 93 different countries, including Turkey. It brings together social initiatives that deal with fundamental social policy problems such as human rights, environmental issues, health problems, education and youth issues, unemployment and civic participation. There were 32 members of Ashoka from Turkey as of 2020.

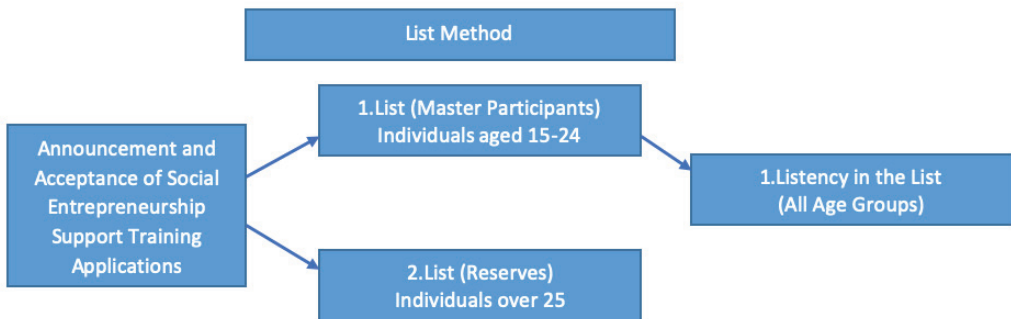


Figure 3. Candidate Selection Chart.

Source: Author

The list method as shown in Figure 3 will be used in the evaluation process of the applications. As the priority target of the program is young unemployed people, the 15-24 age group will be given priority in program admission. Applications of young people between the ages of 15-24 will be included directly in the first list. Applications of those aged 25 years or older will be placed in the second list for consideration in case of a quota gap.

After determining the number of participants, the implementation of the training phase will begin. The people who will provide the training can be ISKUR and KOSGEB training experts or universities or ASHOKA, and experienced social entrepreneurs.

The training content is expected to consist of at least 32 hours of theory and practice training. The subjects to be included in the training are 12 module contents as shown in Figure 4.

Modules	Duration (Minimum)	Training Modules and Contents
Preliminary Modules		
1	2 hours	Introduction to Social Entrepreneurship: Concepts and Emergence Process
2	2 hours	The importance of social entrepreneurship, types and distinctive features
3	2 hours	Social innovation and creative business idea development
4	2 hours	Social entrepreneur personality traits
Main Modules		
5	3 hours	Legal framework for social enterprises
6	3 hours	Making business plan and business plan elements
7	3 hours	Financing plan and ways to attract social investors
8	3 hours	Production and management plan
9	3 hours	Innovative business model development and implementation
Workshop Modules		
10	3 hours	Business model and business plan workshops I
11	3 hours	Business model and business plan workshops II
12	3 hours	Business model and business plan workshops III

Figure 4. Social Entrepreneurship Support Model Training Content.

Source: Author

As can be seen in Figure 4, the first four training modules are the initial modules for the general framework of social entrepreneurship which will be implemented for at least 2 hours each. In these modules, social entrepreneurship, social entrepreneur, social business concepts, and the distinctive features of social enterprises will be explained. These modules aim to eliminate the confusion of the concept which is considered as one of the important obstacles to the development of social entrepreneurship. It is also important to mention the concept of social innovation within the preliminary modules. The impact of social innovation on social entrepreneurial business ideas will be discussed, and participants will be asked to develop creative business ideas.

After the initial modules of the training (the first 4 modules) are completed, the main modules will be started. The five main modules, including module 5 and module 9, will describe the current legal framework for social enterprises and address the legal barriers to the development of social entrepreneurship. In this way, the aim is to determine the way of

organizing the social enterprises of the participants within the framework of the existing legal regulations. After the completion of the main modules, including subjects of business planning and elements, and business model development, the workshop modules will be started.

Before starting the workshop modules, the participants will be asked to identify the social problems they will struggle with, and develop creative business ideas for the solution of these problems.

In the workshop modules that constitute the last 3 modules of the training, the participants will present the business models to implement their creative business ideas. Participants will have the opportunity to discuss social entrepreneurship projects within the scope of the workshops, which are planned to last at least 9 hours in 3 modules.

Candidates who have completed the training will be given a participation certificate which is approved by KOSGEB, ISKUR, and ASHOKA after the presentation of their relevant business ideas. However, not all participants will be entitled to receive certificates. There are some selection criteria as listed below, and also for successfully passing the whole training.

1. To participate in the fully 32 hours of training.
2. To present the social business models to implement their creative business ideas.
3. To get a “successful” degree from the trainer.

Social entrepreneur candidates who successfully complete all three criteria will deserve to receive the certificate. With this certificate, they will be able to benefit from the support process when they start their social entrepreneurial activities. The support process includes financial and consultancy supports. Financial support will be given by KOSGEB, and will include start-up supports for social entrepreneurs. Consultancy support will be provided by Ashoka.

Conclusion

In the 21st century, the struggle against social problems is not only the state’s responsibility, as various actors are beginning to participate alongside social states. One of these actors, social entrepreneurs, has rapidly expanded in the last 20 years with the transformation process of the welfare state. Their creative solutions to combat social problems and their ability to solve problems through entrepreneurship, make social entrepreneurs popular with their socio-economic benefits.

Unlike traditional profit-making entrepreneurs, social entrepreneurship, which is becoming more prevalent demographically especially in the young population, uses its profits to provide social benefits, create innovative solutions to combat social problems, and generate

value for its target beneficiaries in a wide range of ways (beyond sharing profits). Therefore, the support of social entrepreneurship, on the one hand, matches up with the limited responsible state understanding of neo-liberal conditions, and on the other hand, it is thought to be important in the fight against social problems, especially youth unemployment.

The current legislation and legal entities related to civil society organizations in Turkey are not ideal structures for social-oriented social entrepreneur's commercial activities. Many social entrepreneurs operate in the form of foundations/associations, cooperatives or companies. Therefore, many social entrepreneurs are trying to stretch their existing institutional structures or adapt legislation to their goals. This situation constitutes one of the biggest obstacles for the development of social entrepreneurship in Turkey.

Despite the legal and institutional barriers to social entrepreneurship in Turkey, these organizations' activities are recognized as increasingly widespread. In this context, this study argues that social entrepreneur support as an active employment policy tool can be used to fight against youth unemployment which is the most important labour market problem in Turkey. This study aims to propose a training program model to support social entrepreneurship among youth. Based on this, it is envisaged that support similar to the ISKUR Entrepreneurship Training Program implemented by the state for young people will be implemented under the name of the Social Entrepreneurship Support Program in cooperation with ISKUR-KOSGEB and ASHOKA.

As a result of the implementation of the support program, the following benefits are expected;

- The creation of an active employment policy, which is the effect of increasing the labour force participation rate of the young population in Turkey,
- To encourage the motivation of social entrepreneurship,
- Contributing to the expansion of social entrepreneurship,
- Raising young people's awareness of establishing and managing successful business and social enterprises - legal, financial, managerial, leadership, marketing, etc.,
- Contribute to the fight against unemployment and NEET in the young population,
- To share responsibility with the state in the fight against social problems, thus, to contribute to increasing the effectiveness of the state in combating social problems,
- Preventing the difficulties faced by social entrepreneurs in accessing financial resources especially during the start-up phase, with state support,

- To ensure that the successful mechanisms and programs used to promote and develop entrepreneurship are adapted to social entrepreneurship.

In addition to all these benefits, the model can serve as a guide for the countries where social entrepreneurship has not yet developed.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The author has no conflict of interest to declare.

Grant Support: The author declared that this study has received no financial support.

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Istanbul Business Research

Submitted: 17.09.2021

Revision Requested: 28.12.2021

Last Revision Received: 21.01.2022

Accepted: 20.03.2022

Published Online: 22.09.2022

RESEARCH ARTICLE

Analysis of the Frequency-Based Relationship between Inflation Expectations and Gold Returns in Turkey

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Abstract

This paper explores the relationship between inflation expectations and gold returns of monthly and annual maturities in Turkey from 2006 to 2020 with 177 monthly observations through the application of wavelet cohesion and causality tests. The findings reveal significantly negative cohesion in the short term and significantly positive cohesion in the long term, indicating that the hedging ability of gold prices exists only in the long term during crisis periods. Therefore, the findings provide evidence for the validity of the expected inflation effect hypothesis in Turkey. The ordinary least squares results, on the other hand, show that the ongoing COVID-19 pandemic is the most prominent factor in the movement of inflation and gold at all wavelet scales for the two types of maturities. The continuous wavelet transformation based Granger-causality test provides little evidence for out-of-phase and unidirectional causality running from the inflation expectations to gold returns in the higher and medium frequency bands. Furthermore, the QQR results show an asymmetrical impact on each other—implying a hedging effectiveness of gold against inflation expectations—and reveal that its size and magnitude change significantly under different economic conditions and data frequencies. The results have significant implications for portfolio and risk management during normal market conditions as well as hedging and speculation activities during crises in short term and long term periods, respectively.

Keywords

Inflation expectations, Gold returns, Wavelet analysis, Causality, Quantile-on-quantile

Introduction

Inflation expectations have been a significant subject in academic literature and central banking since the 1970s. A precondition for the success of the Central Bank of the Republic of Turkey (CBRT), the main purpose of which is to achieve and maintain price stability, is to manage inflation expectations of various economic units. The expectations of economic units for an inflation increase in the future cause inflation to actually rise; therefore, the efforts of central banks to control inflation expectations are important in terms of price stability. In fact, it is argued that the direction of the inflation expectation directly contributes to the direction of the actual change in inflation. Several prominent methods exist for measuring inflation

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To cite this article: Gok, R., Tiwari, A. K. (2022). Analysis of the Frequency-based relationship between inflation expectations and gold returns in Turkey. *Istanbul Business Research*, 51(2), 535-561. <http://doi.org/10.26650/ibr.2022.51.996964>



expectations such as: (i) conducting a questionnaire, (ii) measuring the difference between inflation-indexed and ordinary government bonds, and (iii) wage negotiations between employees and employers. Of these methods, the CBRT prefers the first approach to measure the inflation expectations through the survey of expectations, which has been conducted monthly since August 2001. It aims to follow the expectations of experts and decision-makers in the financial and real sectors about several macroeconomic variables.¹ The timeline of inflation expectations and realized inflation rates in Turkey is given in Figure 1, which shows how well both rates matched during the sample period. It is clear that although both inflation rates followed a similar path and converged from time to time, the realized inflation rates were found to be higher than the expected rate, and this difference reached its highest level during the recent crisis. In other words, the magnitude of difference between the realized (6.30% and 25.24%) and expected inflation rates (2.05% and 17.03%) increased considerably during the recent currency crisis in Turkey for monthly and annual frequencies, respectively. The estimates of monthly (annual) inflation expectations exceed 90 (28) times the realized inflation rates for 177 observations and, as expected, there exists a high (low) approximate rate (close to zero) for short-term than long-term inflation rates in Turkey.

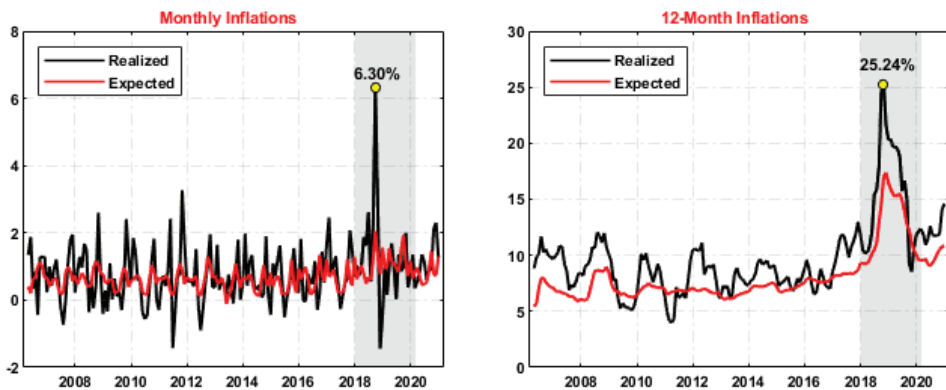


Figure 1. Monthly and Annual Inflation Rates in Turkey

On the one hand, the existing literature on the subject contains abundant information about the relationship of gold and ex-post inflation (see, for example, Kutan and Aksoy, 2004; Ranson and Wainright, 2005; Tiwari, 2011; Wang, Lee, & Thi, 2011; Conlon, Lucey, & Uddin, 2018, among others). Fisher's (1930) pioneering empirical study argued that expected nominal return of an asset could be seen as a combination of expected real return and inflation rate. In one of the earliest papers on this subject, Fama and Schwert (1977) examined the hedging effectiveness of certain investment assets against inflation and found that US government bonds and bills were excellent inflation-immunizing assets. Exploring gold as

¹ It includes 32 questions to measure short and long term expectations on inflation (8 questions), interest rates (17 questions), exchange rates (3 questions), current account balance (2 questions), and growth expectations (2 questions).

an inflation hedge, Ghosh, Levin, Macmillan, & Wright (2004) divided the demand for gold into two categories as “asset demand” and “use demand”. The first category, that is asset demand, reflects the widely maintained view that gold is held by governments, institutional investors, and individual investors as an investment tool since it is expected to provide an effective “hedge” against inflation, currency depreciation, and other forms of uncertainty. The second category, however, indicates direct use of gold in the production of jewelry, medals, coins, and electrical components, etc. Ghosh, et al. (2004), however, also noted that gold may constitute a safe haven for market participants in the long term, but it has significant price volatility in the short term. McCown and Zimmerman (2006) provided significant evidence for the hedging ability of gold and silver against inflation and reported that the two metals bore no market risk according to the estimates from the two leading theories: the capital asset pricing model (CAPM) and arbitrage pricing theory (APT). Worthington and Pahlavani (2007) argued that the reputation of gold was mainly driven by its durability, ease of transportability, universal acceptance, and easy authentication when compared to most other commodities. Although the demand for gold was greatly sensitive to cycles in business and uncertainty on economic activities (Baur and McDermott, 2010), the supply of gold was relatively stable and fixed because of its limited supply and production capacity (Garner, 1995; Beckmann and Czudaj, 2013). Proposing a new model of the gold standard, Faria and McAdam (2012) found that gold holdings and their prices increased over time as a function of population dynamics, but decreased with population growth rate.

On the other hand, the literature examining the relationship between gold and inflation expectations is relatively scarce and yields mixed results about the hedging effectiveness of gold prices against expected and unexpected inflation rates. A few studies such as Tkacz (2007), Le Long, De Ceuster, Annaert, & Amonhaemanon (2013), and Bampinas and Panagiotidis (2015), report a significantly positive association between the inflation expectations and gold prices, indicating the hedging ability of gold prices in the short term, the long term, or both. However, some studies also document insignificant results and report that gold prices are not useful in predicting future movements of inflation (Erb and Harvey, 2013; Tufail and Batool, 2013; Ghazali, Lean, & Bahari, 2015; Xu, Liu, Su, & Ortiz, 2019a). Among these studies, Blose (2010) has put forward two remarkable theories about the relationship between inflation expectations and gold. The first theory, or the expected inflation effect hypothesis, claims that the spot price of gold is highly dependent upon the changes in inflation expectations, implying that the level of expected inflation can be determined by following the changes in gold prices. Upward revisions in inflation expectations will lead to some investors purchasing gold with hedging or speculative investment motives, creating a sharp hike in gold prices simultaneously. The second theory reveals an important shortcoming of the first theory in that it ignores the effect of inflation on the interest rate and the cost of holding gold. Regardless of the source of financing, the effect of interest rates on the cost of investing in gold, whenever

upward revisions in expected inflation take place, cannot be avoided. Hence, any speculative profit generated by the advantage of having better knowledge of expected inflation during inflationary periods would be offset by higher borrowing costs. Blose (2010) defines this phenomenon as the carrying cost hypothesis. According to this hypothesis, inflation expectations cannot be determined by current gold prices due to the uncorrelated association between the spot price of gold and future inflation expectations. By testing these hypotheses and following the suggestions of Kiviahio, Nikkinen, Piljak, & Rothovius (2014), the current study aims to bridge the gap related to the association between gold and expected inflation in Turkey. The novelty of the paper lies in the application of wavelet-based tests, correlation and causality, and nonlinear quantile regressions to gold-inflation expectations in Turkey at monthly and annual frequencies, and this documents significant positive/negative associations and unidirectional causal linkages intensifying around short and medium time horizons during crisis and non-crisis periods.

Through the application of wavelet cohesion and causality tests as well as a simple ordinary least squares (OLS) regression model, this paper explores the association between gold returns and inflation expectations of monthly and annual maturities in Turkey over the period of 2006 to 2020 with 177 monthly observations. The findings reveal significantly negative cohesion in the short term and significantly positive cohesion in the long term, indicating that the hedging ability of gold prices exists only in the long term during the crisis periods. Therefore, the findings provide evidence for the validity of the expected inflation effect hypothesis in Turkey. The OLS results, on the other hand, show that the ongoing Coronavirus disease (COVID-19) pandemic is the most prominent factor in the movement of inflation and gold at all wavelet scales for the two types of maturities, whereas the changes in credit default swap (CDS) spreads are an insignificant factor of the same. The continuous wavelet transformation (CWT)-based Granger-causality test provides little evidence for out-phase and unidirectional causal linkage from the inflation expectations to gold returns in the higher and medium frequency bands. Additionally, the results of QQR show both positive and negative impacts of expected inflation rates on gold returns across all quantiles, suggesting gold does not always act as a hedge instrument against inflation regardless of frequencies. The results yield significant implications for portfolio and risk management during normal market conditions as well as hedging and speculative activities during crises in short term and long term periods, respectively.

The study is presented as follows. We discuss the literature related to this study in Section 2. In the next section, we describe the methodology and give a brief description for each of the wavelet-based tests. The dataset of the present study is given in Section 4. The empirical findings and implications are detailed in Section 5. The last section concludes the study with final remarks.

Literature Review

Chua and Woodward (1982) used a simple regression model in their pioneering study to investigate the inflation hedging value of gold prices for six industrialized countries over the period of 1975 to 1980. The findings showed that both expected and unexpected inflation rates were significant positive factors in explaining gold returns in the USA, but insignificant in the other five countries of Canada, Germany, Japan, Switzerland, and the UK. Hence, investing in gold was found to be a useful hedging instrument against inflation for the short term investors in the USA. Sherman (1983), Moore (1990), and Garner (1995) obtained similar results. On the contrary, Mahdavi and Zhou (1997) and Kutan and Aksoy (2004) argued that short term volatilities in gold prices and improvement in financial futures markets had undermined the role of gold prices as a reliable leading indicator of inflation in the USA and Turkey, respectively.

Christie-David, Chaudhry, & Koch (2000) examined the effect of macroeconomic news releases on asset prices of silver, gold, and bond futures over the period of 1992 to 1995 using intraday data and employing robust nonparametric tests. The findings showed that the prices of gold futures strongly reacted to the announcement of consumer price index (CPI), gross domestic product (GDP), producer price index (PPI), and unemployment rate in a 15-minute period following the announcement, providing estimates of ex-post and ex-ante inflation rates.

Adrangi, Chatrath, & Raffiee (2003) investigated the relationship of real gold and silver returns with inflation rates through the application of co-integration tests. The findings revealed a significantly positive linkage between real gold returns and expected inflation in the USA and an insignificant effect of unexpected inflation rates on the gold returns. Furthermore, the empirical results put forward evidence supporting the Fisherian hypothesis, but not Fama's proxy hypothesis. In another noteworthy article, Tkacz (2007) examined gold prices as leading indicators for the future path of inflation rates in 14 countries at different time intervals, including 6, 12, 18, and 24 months, from 1994 to 2005. The results indicated that gold prices are useful leading indicators for predicting inflation rates of many developed countries with formal inflation targets up to two years in advance.

Hoang, Lahiani, & Heller (2016) provided robust evidence for the hedging ability of gold against inflation risk in the USA, the UK, and India in the short term; however, the findings failed to put forward any evidence for the existence of a long term association between the CPI and gold prices in China, India, and France because of traditional aspects of gold usage and customs control for gold trade in these countries.

Considering the unexpected changes in CPI as a measure of change in inflation expectations, Blose (2010) investigated the relationship of unexpected inflation rates with both

gold and bond yields over a 20-year-period in the USA. The author presented a significantly positive impact of the changes in unexpected inflation rates on the changes in bond yields at time intervals of one, two, and three years, and further showed that this effect did not last for the two and three year maturities. On the other hand, the results yielded insufficient evidence against the null of the carrying cost hypothesis. This indicated an insignificant association between expected inflation and nominal gold returns during the examined period of 1988 to 2008 because the coefficients of the unexpected inflation rates are insignificantly different from zero. The author suggested investors to follow the changes in bond markets rather than the changes in gold prices for speculative purposes regarding inflation expectations. Xu et al. (2019a), on the other hand, tested the validity of both the expected inflation effect and the carrying cost hypotheses using a bootstrap causality test with a rolling window size of 60 months in the USA. The test results confirmed that the expected relation between gold returns and inflation was more steadily explained with the carrying cost hypothesis but not with the expected inflation effect hypothesis due to the existence of a negative relationship, indicating the hedging ability of gold exists only for certain periods.

Erb and Harvey (2013) examined the role of gold as a hedge or a safe haven against currency and unexpected inflation rates. The authors pointed out that during the period of 1975 to 2012, real gold prices were neither a safe haven nor a hedge against fluctuations in foreign exchange rates. Additionally, they found weak evidence that gold had been a useful hedging investment tool against unexpected inflation rates measured in both the short- and long-term. Furthermore, gold did not constitute a safe haven during highly inflationary periods in both developed and under-developed countries in the long term. The results of Sarac and Zeren (2014) contradicted previous findings since they found that gold was a useful hedging instrument against currency and inflation risks in Turkey. Additionally, Le Long et al. (2013) found that gold had acted as a hedge against both ex-post and ex-ante inflation in Vietnam and provided evidence in favor of the Fisher hypothesis given the oversensitivity of nominal gold returns for inflation rates during the period of January 2001 to December 2011. Similar results were obtained by Tufail and Batool (2013), finding that nominal gold returns, along with stocks and real estate, were immune to inflation rates (either expected or unexpected) in Pakistan over the period of 1960 to 2010. Conversely, the findings of Salisu, Raheem, & Ndaiko (2020) provided evidence against the Fisher hypothesis for investments in gold after considering asymmetry and structural breaks, suggesting equity and real estate investments instead of gold against inflation risk in the USA during periods of low or high market volatility.

Ghazali et al. (2015) examined the hedging ability of domestic gold prices against inflation, expected inflation, and unexpected inflation in Malaysia during the period of July 2001 to November 2011. The relationship between gold returns and all three forms of inflation was found to be negative, albeit not significant, indicating that gold is a poor hedging instrument in the short term domestically. Bampinas and Panagiotidis (2015) established that there was

significant evidence in favor of the hedging ability of gold and silver against three measures of inflation rates—headline, expected, and core CPI—in the UK and the USA over the period of 1791 to 2010, with 220 annual observations. The findings related to the time-varying co-integration approach demonstrated that the long term relationship between gold and expected inflation became stronger and more stable from the late 1990s until 2008. Lucey et al. (2017) investigated the relationship of gold with both predicted and realized inflation in the UK, the USA, and Japan. The findings indicated evidence of a significant time-varying co-integration relationship between inflation measures and gold prices in all tested countries, and the study put forward evidence in favor of money supply in this relationship.

Using monthly spot and futures contracts of 12 maturities for the period of December 1979 to August 2016 and employing a nonparametric test of causality-in-quantiles, Balcilar, Ozdemir, Shahbaz, & Gunes (2018) studied the predictability of the effect of the mean and variance of gold price changes on inflation in G7 countries. The findings reported a unidirectional causality in mean and variance from the seasonally adjusted CPI to the changes in gold spot and futures prices in the middle quantiles ranging from $t=0.20$ to $t=0.70$. This indicated that gold did not hedge inflation risk during quiet or highly volatile periods in gold markets. Using the same approach, Shahzad, Mensi, Hammoudeh, Sohail, & Al-Yahyaee (2019) found significant asymmetric causal associations of the mean and variance between inflation and gold prices in China, France, Japan, and the UK for the mid-quantiles, validating the hedging effectiveness of gold in predicting inflation rates during normal economic conditions. The results of the QQ regression approach revealed a heterogeneous impact from inflation to gold returns through all quantiles within each economy and showed that the size and magnitude of inflation shocks had significant effect on the gold-inflation linkage. In a recent paper, Salisu, Ndako, & Oloko (2019) examined the hedging ability of gold and palladium against the inflation risks in member states of the Organization for Economic Co-operation and Development (OECD) and revealed that gold acted as an inflation hedge in 11 out of the 32 countries observed, suggesting extraordinary hedging capacity in Austria, Belgium, Canada, France, Italy, Korea, Luxembourg, and the USA, and partial hedging capacity in the Czech Republic, Slovakia, and Turkey. Sui, Rengifo, & Court (2021) concluded that the role of gold as a hedging instrument against exchange rate and inflation risks varied due to the volatility of gold prices and economic conditions, such as the level of inflation beyond a certain threshold in Turkey and Peru. Accounting for the effects of structural breaks in the price and return of gold, Xu, Su, & Ortiz (2019b) revealed that real gold returns were easily characterized by a nonlinear mean-reversion over investment horizons ranging from 1 month to 15 years, and thus, confirming that gold has been a reliable hedging instrument against inflation risk in the USA for the past four decades.

Utilizing the CWT approach, Conlon, et al. (2018) examined the hedging ability of gold, gold futures, and gold stocks on realized and unexpected inflation rates in Japan, Switzer-

land, the UK, and the USA over the sample period of January 1986 to December 2014 using monthly observations, yielding 564 total observations. The findings validated the hedging power of all gold instruments held at higher and medium frequencies, corresponding to 0.25 in 4 monthly periods, for realized inflation rates in all tested countries. Similar results were also obtained for unexpected inflation rates in the short and long term investment intervals only in the USA.

Huang, Jia, & Xu (2019) studied whether a threshold effect existed in the focal association between gold prices and market sentiment with inflation expectations over the period of February 2003 to December 2017 by employing a multivariate threshold regression model. The paper found that both inflation expectations and market sentiment exhibit a threshold effect on gold prices, indicating the impact of inflation expectations and financial market turbulence on the hedging ability of gold and its role as a safe haven. Further, it showed that the observed threshold effects varied between the pre-GFC (global financial crisis) and post-GFC (2007-2009) periods, implying that the threshold effects of inflation expectations were significant in both periods whereas the effects were insignificant to the market sentiment before the GFC. Gulseven and Ekici (2020) argued that the importance of gold and real estate as a hedge against inflation in Turkey increased in the absence of interest-earning assets, which were previously the best hedging instrument against inflationary depreciation and volatility.

Methodology

The wavelet-based measures of Rua (2010) and Olayeni (2016) are adopted in the current study to investigate the hedging ability of gold prices per ounce in Turkish Lira (TRY) on inflation expectations at different maturities. These measures are preferred since they can uncover relation dynamics within the time-frequency domain, which cannot be captured by standard econometric tools or Fourier analysis. The wavelet analysis is implemented because, as noted by Conlon, et al. (2018), the hedging effectiveness of gold may be validated at particular points in time or may vary over different frequencies, due to investors' heterogeneous expectations across short and long term horizons. In addition, the quantile regression (QR) and the quantile-on-quantile regression models are employed to investigate the direction and strength of one variable on other variables over quantiles².

Wavelet Cohesion of Rua (2010)

In wavelet literature, two types of wavelet functions exist, namely, the father wavelet ϕ and the mother wavelet ψ and they satisfy the following fundamental property (Crowley, 2007):

2 Upon the suggestion made by one of the anonymous reviewers, we decided to examine the relationship between the two variables by establishing this nonlinear regression model as well as linear models.

$$\int \phi(t)dt = 1 \tag{1}$$

$$\int \psi(t)dt = 0 \tag{2}$$

Here, the father wavelet (scale function or low-pass filter) is used to capture the smooth/trend (low-frequency) movements of the signal while the mother wavelet (wavelet function or high-pass filter) represents the high-frequency details or deviation from the trend by scale. In a wavelet transform, the frequency and time information from the underlying signal/data can be captured by squeezing and shifting the mother wavelets

$$\psi_{\tau,s}(t) = \frac{1}{\sqrt{s}}\psi\left(\frac{t-\tau}{s}\right) \tag{3}$$

where the frequency parameter s is a sequence of scales and controls the width of the wavelet, and the location parameter τ is a position in time that controls the location. Further, the normalization factor $1/\sqrt{s}$ is used to verify that the outcome of the wavelet transform is effectively comparable across scales and time series (Crowley, 2007).

The CWT of a given discrete time series, such as $GR(t)$, the monthly gold returns, is obtained by multiplying it by the $\psi_{\tau,s}(t)$ function

$$W_{GR(t)}(\tau, s) = GR(t) * \psi_{\tau,s}(t) = \frac{1}{\sqrt{s}} \sum_{t=1}^N GR(t) \psi^*\left(\frac{t-\tau}{s}\right) dt \tag{4}$$

where ψ^* is the complex conjugate. For capturing both the time and frequency components of $GR(t)$ simultaneously, one must change the wavelet scale, s , and translate it with the localized time index, τ . Additionally, the wavelet power spectrum can be calculated as $|W_{GR(t)}(\tau, s)|^2$, which measures the relative contribution at each time and scale to the time series' total variance (Torrence and Compo, 1998).

Similarly, the cross-wavelet spectrum between $GR(t)$ and the monthly expected inflation rate, $EI(t)$, can be defined as $W_{GR(t),EI(t)}(\tau, s) = W_{GR(t)}(\tau, s)W_{EI(t)}(\tau, s)$. Since the mother wavelet is complex in general, and the wavelet spectrum is complex-valued, the cross-wavelet spectrum can be divided into the real part, $\Re(W_{GR(t),EI(t)}(\tau, s))$, and the imaginary part, $\Im(W_{GR(t),EI(t)}(\tau, s))$. By using the real part of the cross-wavelet spectrum as the numerator, the measure of wavelet correlation can be attained, as given by Rua (2010)

$$\rho_{GR,EI}(\tau, s) = \frac{\Re \left(W_{GR(t),EI(t)}(\tau, s) \right)}{\sqrt{|W_{GR(t)}(\tau, s)|^2 |W_{EI(t)}(\tau, s)|^2}} \tag{5}$$

Here, the real part of the cross-wavelet spectrum measures the contemporaneous covariance between $GR(t)$ and $EI(t)$. Additionally, $\rho_{GR,EI}(\tau, s)$ denotes wavelet correlation and quantifies the co-movement between the underlying time series in the time-frequency space, such that it provides information about the strength and direction of the co-movement, both at the frequency level and over time. Similarly, the standard coefficient of correlation, $\rho_{GR,EI}(\tau, s)$, is limited between -1 and +1, and its statistical significance is estimated using the Monte Carlo simulation approach.

Olayeni CWT-Based Causality Test (2016)

Based on the wavelet cohesion of Rua (2010), Olayeni (2016) proposed a new causality test in CWT, localizing causality in time and frequency appropriately. In the test, the first step is to explain the phase difference concept between two given time series, for example $GR(t)$ and $EI(t)$, with the condition of $-\pi \leq \phi_{GR(t),EI(t)}(\tau, s) \leq \pi$.

$$\phi_{GR(t),EI(t)}(\tau, s) = \tan^{-1} \left(\frac{\Im \left(W_{GR(t),EI(t)}^m(\tau, s) \right)}{\Re \left(W_{GR(t),EI(t)}^m(\tau, s) \right)} \right) \tag{6}$$

The interval $\phi_{GR(t),EI(t)}(\tau, s) \in (0, \pi/2)$ suggests that $GR(t)$ and $EI(t)$ are in-phase; that is, they move in the same direction and $GR(t)$ leads $EI(t)$. Similarly, it is inferred that $EI(t)$ leads $GR(t)$ in the case of the interval $\phi_{GR(t),EI(t)}(\tau, s) \in (-\pi/2, 0)$ since they are also in-phase. Conversely, the two variables are out-of-phase, that is, they move in a reverse direction, in the case of the intervals $\phi_{GR(t),EI(t)}(\tau, s) \in (-\pi, -\pi/2)$ and $\phi_{GR(t),EI(t)}(\tau, s) \in (\pi/2, \pi)$. Furthermore, the interval $\phi_{GR(t),EI(t)}(\tau, s) \in (0, \pi/2) \cup (-\pi, -\pi/2)$ indicates that $EI(t)$ leads $GR(t)$, implying that $EI(t)$ has significant predictive information about $GR(t)$.

To separate the hidden causal links from the non-causal content, Olayeni (2016) suggests using the aforementioned phase-difference intervals to restrict the Rua (2010) correlation. By formulating an indicator function $I_{GR(t) \rightarrow EI(t)}(\tau, s)$, Olayeni (2016) describes the following equations for the case of causality from $GR(t)$ to $EI(t)$

$$I_{GR(t) \rightarrow EI(t)}(\tau, s) = \begin{cases} 1, & \text{if } \phi_{GR(t),EI(t)}(\tau, s) \in (0, \pi/2) \cup (-\pi, -\pi/2) \\ 0, & \text{otherwise} \end{cases} \tag{7}$$

$$I_{GR(t) \rightarrow EI(t)}(\tau, s) = \begin{cases} 1, & \text{if } \phi_{GR(t),EI(t)}(\tau, s) \in (0, \pi/2) \\ 0, & \text{otherwise} \end{cases} \tag{8}$$

$$I_{GR(t) \rightarrow EI(t)}(\tau, s) = \begin{cases} 1, & \text{if } \emptyset_{GR(t), EI(t)}(\tau, s) \in (-\pi, -\pi/2) \\ 0, & \text{otherwise} \end{cases} \tag{9}$$

where Eq. (7) refers to a comprehensive causal link from $GR(t)$ to $EI(t)$; Eq. (8) purports a negative or out-of-phase causality from $GR(t)$ to $EI(t)$; and Eq. (9) shows a positive or in-phase causality from $GR(t)$ to $EI(t)$.

Inputting the lead-lag information through the indicator function into the Rua (2010) wavelet correlation formula, the proposed Granger causality can be described for the causal link from $GR(t)$ to $EI(t)$ as shown in Eq. (10) and from $EI(t)$ to $GR(t)$ as shown in Eq. (11).

$$G_{GR(t) \rightarrow EI(t)}(\tau, s) = \frac{\Im \left\{ s^{-1} |\Re \left(W_{GR(t) \rightarrow EI(t)}^m(\tau, s) \right) I_{GR(t) \rightarrow EI(t)}(\tau, s) | \right\}}{\Im \left\{ s^{-1} \sqrt{|W_{GR(t)}^m(\tau, s)|^2} \right\} \cdot \Im \left\{ b^{-1} \sqrt{|W_{EI(t)}^m(\tau, s)|^2} \right\}} \tag{10}$$

$$G_{EI(t) \rightarrow GR(t)}(\tau, s) = \frac{\Im \left\{ s^{-1} |\Re \left(W_{EI(t) \rightarrow GR(t)}^m(\tau, s) \right) I_{EI(t) \rightarrow GR(t)}(\tau, s) | \right\}}{\Im \left\{ s^{-1} \sqrt{|W_{EI(t)}^m(\tau, s)|^2} \right\} \cdot \Im \left\{ b^{-1} \sqrt{|W_{GR(t)}^m(\tau, s)|^2} \right\}} \tag{11}$$

$G_{GR(t) \rightarrow EI(t)}(\tau, s)$ is a measure of in-phase (positive) causality if the indicator function $I_{GR(t) \rightarrow EI(t)}(\tau, s)$ holds over $\emptyset_{GR(t), EI(t)} \in (0, \pi/2) \cup (-\pi/2, 0)$. Similarly, $G_{GR(t) \rightarrow EI(t)}(\tau, s)$ is a measure of out-of-phase (negative) causality if the indicator function $I_{GR(t) \rightarrow EI(t)}(\tau, s)$ holds over $\emptyset_{GR(t), EI(t)} \in (-\pi, -\pi/2) \cup (\pi/2, \pi)$, indicating a adversely predictive information flow from $GR(t)$ to $EI(t)$ over those frequency intervals.

Quantile-on-quantile method

To investigate the effects of the quantiles of gold returns on the quantiles of the inflation expectations and vice versa, we adopted the quantile-on-quantile regression approached proposed by Sim and Zhou (2015), which starts with the postulating the following equation

$$EX_t = \beta^\theta (GL_t) + \varepsilon_t^\theta \tag{12}$$

where EX_t and GL_t imply the inflation expectations (as dependent variable) and gold returns in month t at monthly or annual frequencies and ε_t^θ denotes an error term with a zero θ -quantile. Since the relationship function, $\beta^\theta(\cdot)$, is assumed to be priori unknown, it can be linearized by taking a first-order Taylor expansion around GL^f , the τ -quantile of the gold returns (GL_t), and a new equation emerges

$$\beta^\theta(GL_t) \approx \beta^\theta(GL^\tau) + \beta^{\theta'}(GL^\tau)(GL_t - GL^\tau) \tag{13}$$

Or it can be rewritten as

$$\beta^\theta(GL_t) \approx \beta_0(\theta, \tau) + \beta_1(\theta, \tau)(GL_t - GL^\tau) \tag{14}$$

Finally, one can obtain the following

$$EX_t = \underbrace{\beta_0(\theta, \tau) + \beta_1(\theta, \tau)(GL_t - GL^\tau)}_* + \varepsilon_t^\theta \tag{15}$$

if Equation (14) is substituted into Equation (12). To capture the overall dependence between EX_t and GL_t , we replace GL_t and GL^τ with their estimated counterparts \widehat{GL}_t and \widehat{GL}^τ , respectively.

By solving the following minimization problem, we can get the estimates $\hat{\beta}_0(\theta, \tau)$ and $\hat{\beta}_1(\theta, \tau)$

$$\min_{b_0, b_1} \sum_{i=1}^N \rho_\theta [EX_t - b_0 - b_1(\widehat{GL}_t - \widehat{GL}^\tau)] \times K\left(\frac{F_n(\widehat{GL}_t) - \tau}{h}\right) \tag{16}$$

where ρ_θ is the tilted absolute value function and yields the conditional quantile of the inflation expectations, EX_t , as the solution and h is the optimal bandwidth parameter of the Gaussian kernel function, $K(\cdot)$, which is employed to weight the observations in the neighborhood of \widehat{GL}^τ . Furthermore, these weights are inversely associated with the distanced observations, \widehat{GL}^τ and \widehat{GL}_t , in the empirical distribution function of \widehat{GL}_t , given by

$$F_n(\widehat{GL}_t) = \frac{1}{n} \sum_{k=1}^n I(\widehat{GL}_t > \widehat{GL}_k) \tag{17}$$

from the distribution function value of τ , corresponding with GL^τ .

Note that, we decide using the Silverman optimal bandwidth parameter³ which is given by

$$h = \frac{a\sigma}{\sqrt[3]{N}} \tag{18}$$

where σ is equal to $\min(IQR) / 1.34, std(GL)$, IQR and N indicate the inter-quantile range and the sample size, respectively, and a is numerically determined as 3.49.

Data

The dataset consists of monthly observations of inflation expectations and gold returns per ounce in TRY provided by the electronic data delivery system of the Turkish Central

3 We are grateful to Dr. Olayeni for providing the Eviews add-ins publicly available at <https://olayeniolaolu.blogspot.com/2021/11/quantile-on-quantile-regression-qqr.html> [January, 2, 2022].

Bank Database and Gold Council, respectively. It covers a 15-year period, from April 2006 to December 2020, with a sample size of 177 monthly and annual return observations. Table 1 reports the summary of the statistics for the returns series.

Table 1

Descriptive Statistics of Time Series

Variables	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	N
EXP_INF_M	0.6809	2.0500	-0.1100	0.3519	0.7537	4.2785	28.81***	177
EXP_INF_Y	8.0975	17.3800	5.4400	2.3683	2.1644	7.4455	283.95***	177
GOLD_M	1.6303	28.4097	-13.4727	6.1120	0.4497	4.5459	23.59***	177
GOLD_Y	20.1001	60.3057	-22.8809	16.9544	-0.1534	2.8825	0.8000	177

Note: *** shows rejection of the null hypothesis of normality at a 99 % level of confidence. JB denotes the result of the normality test of Jarque-Berra and *N* is the observation number.

It is observed that all variables exhibit a positive average mean during the test period, and gold returns have higher average values as compared to the average values of inflation expectations, regardless of data frequency. The maximum values of monthly and annual inflation expectations (2.05% & 17.38%) and monthly gold returns (28.41%) were observed during the currency crisis in Turkey in the second half of 2018, largely driven by domestic events as well as conflicts with the USA due to Trump administration policies. However, the largest yearly gold return (60.30%), which was witnessed during the COVID-19 pandemic, was fueled by the negative effects of the global pandemic and the weakening Turkish currency with a 41.5% depreciation against the US Dollar (USD). This situation led Turks to seek safety in gold as well as raise their foreign currency deposits from \$194.62 billion to \$221.04 billion. The minimum values of inflation expectations (-0.11%) and gold returns (-13.47%) for monthly observations were recorded in May 2013 and December 2020. The minimum value of inflation expectations (5.44%) for annual observations was recorded in April 2006, just before the depreciation of TRY from 1.325 to 1.425 against the USD. Furthermore, the minimum value of gold returns (-22.88%) for annual observations was recorded in June 2013, when it was announced that the US Federal Reserve planned to taper its latest bond-buying program, QE3. It can also be observed, using standard deviation measures with decreasing frequencies, that gold prices were more volatile than inflation expectations. Inflation expectations and monthly gold returns are positively skewed whereas annual gold returns are negatively skewed. However, the variables differ in terms of their kurtosis, with the annual gold returns exhibiting lower excess kurtosis than the other variables, implying that all are leptokurtic. Supporting the measurement of skewness and kurtosis, the JB test statistic strongly rejects the assumption of normality for three out of the four variables at a 1% level of significance.

Results and Discussion

Table 2 reports the findings of the Lee and Strazicich (2003) unit root test with multiple structural breaks. Following the procedure described in the paper, we computed the relevant test statistics for Model A and Model C through publicly available Gauss codes, allowing for

up to two unknown structural breaks. The results suggest that three out of the four variables are found to be stationary in level for Model A (Exp_Inf_M, Exp_Inf_Y, and Gold_M) and Model C (Exp_Inf_M, Gold_M, and Gold_Y). Considering these results together, we can assume that all variables are stationary; that is, they are $I(0)$.

Table 2

Lee and Strazicich's (2003) Unit Root Test Results

Model A	LM	10%	5%	1%	$\lambda 1$	$\lambda 2$	BP1	BP2
EXP_INF_M	-3.753*	-3.504	-3.842	-4.545	0.24	0.48	2009-10	2013-04
EXP_INF_Y	-3.929**	-3.504	-3.842	-4.545	0.79	0.86	2017-11	2018-12
GOLD_M	-12.988***	-3.504	-3.842	-4.545	0.53	0.55	2014-01	2014-05
GOLD_Y	-3.058	-3.504	-3.842	-4.545	0.38	0.84	2011-11	2018-07
Model C	LM	10%	5%	1%	$\lambda 1$	$\lambda 2$	BP1	BP2
EXP_INF_M	-7.79***	-5.320	-5.730	-6.320	0.82	0.84	2018-05	2018-08
EXP_INF_Y	-5.165	-5.320	-5.730	-6.320	0.72	0.86	2016-10	2018-12
GOLD_M	-14.907***	-5.270	-5.590	-6.160	0.19	0.37	2009-01	2011-08
GOLD_Y	-7.885***	-5.270	-5.590	-6.160	0.37	0.43	2011-08	2012-07

Note: The rejection of null hypothesis of nonstationarity, at 1%, 5%, and 10% significance levels, is denoted by *, **, and *** respectively. "Model A" and "Model C" can be defined, respectively, as a model with a break in intercept and a model with a break in intercept & trend. $\lambda 1$ ($\lambda 2$) denotes the location of the first (second) break and is used to determine the critical value. Similarly, the abbreviation BP1 (BP2) stands for the time location of the first (second) structural breakpoint.

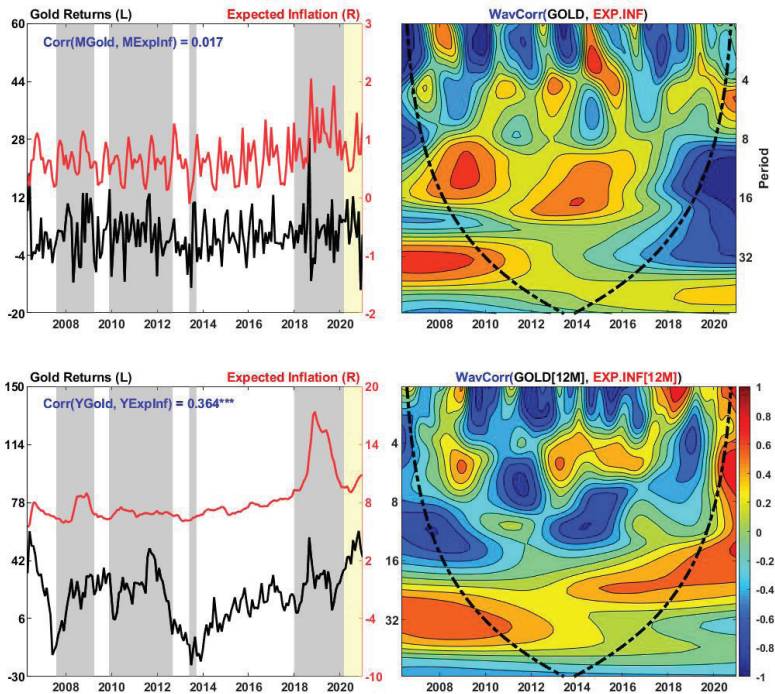


Figure 2. Time Path of Expected Inflation and Gold Returns from Rua Correlation Estimations (2010) between Time Series

Figure 2 depicts Rua's (2010) measure of cohesion between the monthly and annual growth rates during the tested period in the second column. Before proceeding further, it should be noted that the correlation relationship between our variables is positive, regardless of maturity. However, the direction of the relationship is positive, albeit not significantly, for monthly observations, whereas the annual returns are significantly positively correlated during the sample period, as expected and common in the existing literature. On the other hand, the results of wavelet-based correlation estimations show that the dynamics of the interdependence between variables are scale-independent, implying they are time varying and heterogeneous over time and across frequencies. It is observed that the monthly returns have intensive and significant negative co-movements before 2008 and over the periods of 2009–2010, 2011–2012, 2013–2014, and 2017–2018 on the highest scale with up to a period of 4 months. Further, a huge red island located on the 8–32 months band of scale at the right-hand side of the plot, between 2018 and 2020, is within the negligible area; therefore, it must be neglected, as indicated by the black dashed line called the cone of influence. However, part of this island located over the 2018–2019 period is within the acceptable area and shows that the variables move in the opposite direction in the 8–16 months band of scale (i.e., in the medium term). On the other hand, a visual inspection suggests a high degree of coherence between the variables during the period of 2008–2010 and in 2014 at the intermediate frequencies, corresponding to the 8–16 months band of scale, coinciding with the 2007–2009 GFC and the tapering of the QE3 launched by the Federal Reserve.

A similar but intensified pattern is observed at intermediate frequencies for the annual returns over the tested period. In particular, significantly negative cohesions identifiable as blue islands are observed at higher frequencies corresponding to the less than 4 months band of scale over the periods 2009–2010, 2012–2014, and 2015–2017; at 8–16 months band of scale before 2010; at 4–8 months band of scale over 2011–2013; at 6–14 months band of scale over 2013–2016; and 2–6 months band of scale over 2018–2019. Furthermore, a moderate level of wavelet cohesions ranging between 0.60 and 0.40 is clustered at the 6–7 months band of scale over the periods 2008–2009 and 2013–2014; at 20–24 months band of scale lasting from 2015 until the first half of 2018; and at lower frequencies with a 32 month scale over 2010–2011. Accounting for all of the results, the current study puts forward strong evidence for the validity of the expected inflation effect hypothesis in the long term during the crisis periods in Turkey. The results are consistent with the empirical findings of Ghazali et al. (2015), which explored a negative, but statistically insignificant association between expected inflation and gold prices in Malaysia in the short term. In agreement with our main findings, the results of Chua and Woodward (1982), Adrangi, et al. (2003), Erb and Harvey (2013), Le Long et al. (2013), and Bampinas and Panagiotidis (2015) lend further support for gold investments as an inflation hedge in the long term in the observed countries, including the USA, the UK, and Vietnam. Among these studies, Adrangi, et al. (2003) confirmed that inflation could cause a hike in the price of gold due to the hoarding demand for gold under inflationary pressures whereas the prices could be negatively affected by the industrial de-

mand, supporting the perception that gold can provide a reliable hedging effectiveness against inflation for US investors.

Following the suggestions of Kiviaho, et al., (2014), we investigated the impact of several financial variables on the co-movement of inflation and gold prices at different time frequencies by estimating a simple OLS regression:

$$Wsr_{ij,f} = a + b_1 COVID19_i + b_2 \Delta BOND_i + b_3 \Delta CDS_i + b_4 \Delta DLRZ_i + b_5 \Delta FPI_i + b_6 \Delta FX_i + b_7 \Delta M2_i \quad (19)$$

where $Wsr_{ij,f}$ denotes the wavelet squared cohesion between the variables at the same maturity at three different frequencies (f) with the changes in stationary domestic financial variables of the 2-year government bond yields (BOND), the 5-year CDS spreads (CDS), the dollarization rates (DLRZ), the foreign portfolio investments (FPI), the average of USD–TRY exchange rates (FX), and the M2 money base, as well as the COVID-19 pandemic, as a dummy variable, in Turkey. The results are reported in the following table.

Table 3
The Effects of Financial Returns on Gold-Inflation Movements

Monthly	Short		Medium		Long	
	T-Stat	Std. Error	T-Stat	Std. Error	T-Stat	Std. Error
C	-0.079***	[0.019]	0.131***	[0.033]	0.15***	[0.006]
COVID-19	0.193***	[0.063]	-0.842***	[0.105]	-0.059***	[0.018]
Δ BOND	-0.023*	[0.013]	0.011	[0.023]	0.003	[0.004]
Δ CDS	0.008	[0.14]	0.05	[0.238]	0.057	[0.041]
Δ DLRZ	NA		-1.969	[2.847]	-0.664	[0.496]
Δ FPI	-0.208	[0.246]	0.29	[0.504]	0.042	[0.088]
Δ FX	NA		0.221	[1.174]	-0.361*	[0.204]
Δ M2	-0.327	[0.945]	-0.712	[1.82]	0.616*	[0.317]
R2	0.0678		0.2989		0.1068	
F-Statistic	2.472**		10.234***		2.871***	
Yearly	Short		Medium		Long	
	T-Stat	Std. Error	T-Stat	Std. Error	T-Stat	Std. Error
C	-0.116***	[0.022]	0.05***	[0.016]	0.109***	[0.007]
COVID-19	0.699***	[0.071]	0.437***	[0.052]	-0.199***	[0.03]
Δ BOND	-0.009	[0.015]	-0.003	[0.011]	0.001	[0.007]
Δ CDS	-0.183	[0.16]	-0.148	[0.11]	0.01	[0.054]
Δ DLRZ	-0.59	[1.913]	0.218	[1.416]	-1.321*	[0.784]
Δ FPI	-0.779**	[0.338]	NA		NA	
Δ FX	-0.635	[0.789]	0.912*	[0.482]	NA	
Δ M2	0.753	[1.223]	-0.786	[0.906]	NA	
R2	0.404		0.315		0.219	
F-Statistic	16.29***		12.933***		11.994***	

Note: ***, **, and * indicate rejection of the null hypothesis at a 99%, 95%, and 90% level of confidence, respectively. Any variable that affects the significance of the others was excluded from the model (denoted with NA). The short, medium, and long term co-movements represent the average of high-frequency scales (less than 8 months), medium-frequency scales (corresponding to 8–32 months), and low-frequency scales (over 32 months), respectively (Kiviaho, et al., 2014).

The findings mentioned in Table 3 reveal that the effect of the ongoing COVID-19 pandemic on the co-movement of inflation and gold is significant at the 1% level of significance for two maturities, but the intensity decreases and the direction switches from positive to negative as the time scale increases. Notably, all financial variables, except the changes in CDS spreads, are significant in at least one case. The findings show that the change in USD–TRY, for example, is the most influential factor among the financial variables, being negatively significant on the monthly returns in the medium term and positively significant on the annual returns in the long term, at the 10% significance level. The changes in bond yields and FPI are statistically and negatively significant at the 10% and 5% significance levels for the monthly and annual return series in the short term, respectively. As expected, the coefficient for the money supply, M2, and the dollarization rate are positively and negatively significant at the 10% level on the monthly and annual returns in the long term, respectively. This implies that changes in these variables have different impacts on the co-movement of inflation expectations and gold returns. These results are partially in line with the findings of Batten, Ciner, & Lucey (2014), that discovered a significant negative correlation between the USD index and the time variation in gold's CPI beta, further confirming the role of gold as a monetary asset. Furthermore, Batten, et al. (2014) also found that past information on the USD index and T-bill and T-bond interest rate variations were useful in predicting gold's CPI beta with seven, six, and ten lags. Finally, the results of impulse response functions revealed a negative association between gold's CPI sensitivity and interest rate movements, implying that falling interest rates documented the increasing importance of inflation on gold prices. They argued that these observations were supporting the view that monetary easing fuels fears of higher inflation, which further produces positive co-movement with gold prices.

The CWT-based causality method proposed by Olayeni (2016) was utilized to discover the direction of causality, if any, between the series. The results of the same are given in Figures 3 and 4. It should be noted that the causal link between the aggregate, positive or in-phase, and negative or out-of-phase components are depicted in the top, middle, and bottom panels, respectively. Regarding the dependencies between monthly observations, weak bidirectional causality exists at the higher and intermediate frequencies, corresponding with less than 4 and between the 8–16 months cycle, respectively. A positive or in-phase, but unidirectional causal relationship from the expected inflation to monthly gold returns in 2009 emerges at the intermediate term, or 10–14 months cycle, by dividing the causal links into two components. A bidirectional and out-of-phase causal relationship between the variables arises in the bottom panel, evidenced by a small red island located at the higher frequencies after 2017 and by three red islands located in the short term before 2007 and over 2009–2010, and in the medium term over 2018–2019. The summary of all these findings mainly indicates that the causal relationship between the variables is largely driven by the predictive information contained in the negative inflation expectation movements on the gold returns in the short term and intermediate term during the 2007–2009 GFC and 2018–2020 currency crisis in Turkey.

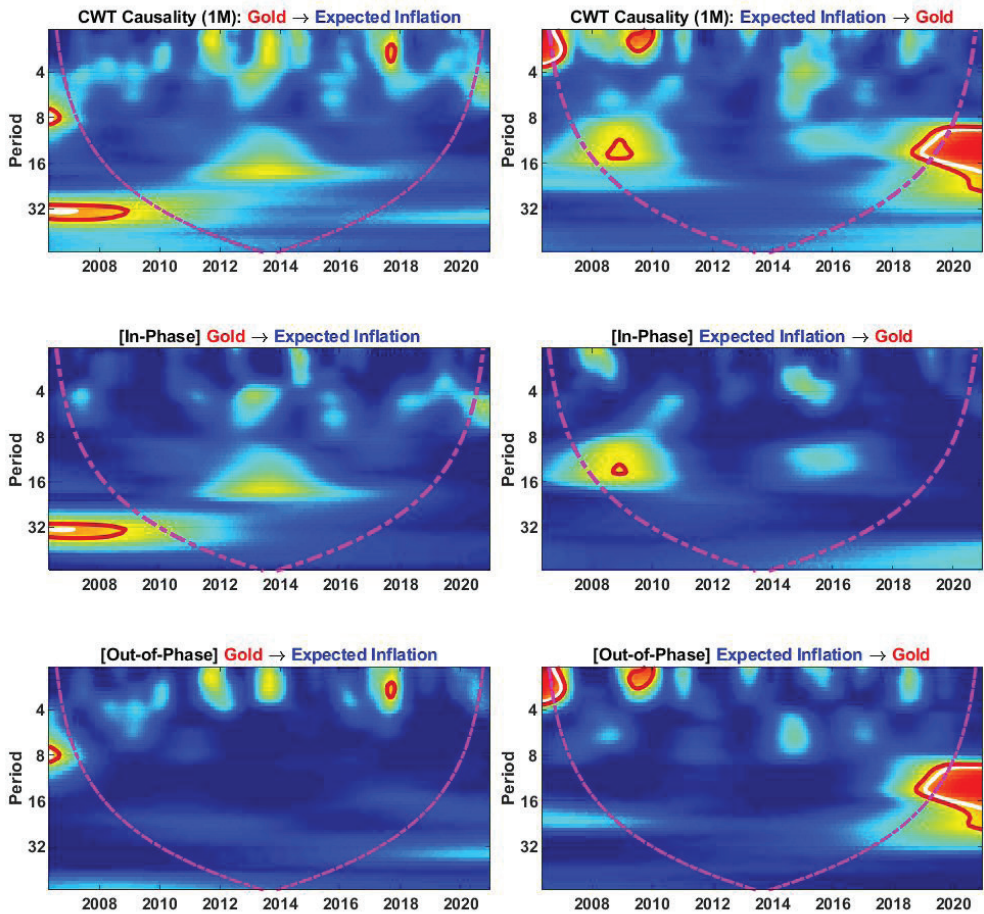


Figure 3. CWT Causality between Monthly Observations

Figure 4, on the other hand, indicates the presence of anti-phase causal impacts from the inflation expectations on the annual gold returns at higher frequencies around 2012, indicating that the annual inflation expectations from the Granger-causality test negatively impact the annual gold returns in the short term. These results largely reinforce the findings of Xu et al. (2019a), which document a negative, rather than positive, causality from the inflation expectations to the gold returns, contradicting the expected inflation effect hypothesis. The weak, but significant causality from the gold returns to the inflation expectations in the current study is in line with Xu et al. (2019a), indicating that the hedging ability of gold is valid only during certain periods.

We provided the results of preliminary tests for monthly and annual observations under linear and quantile regression models in Table 4. The null of non-normality hypothesis was

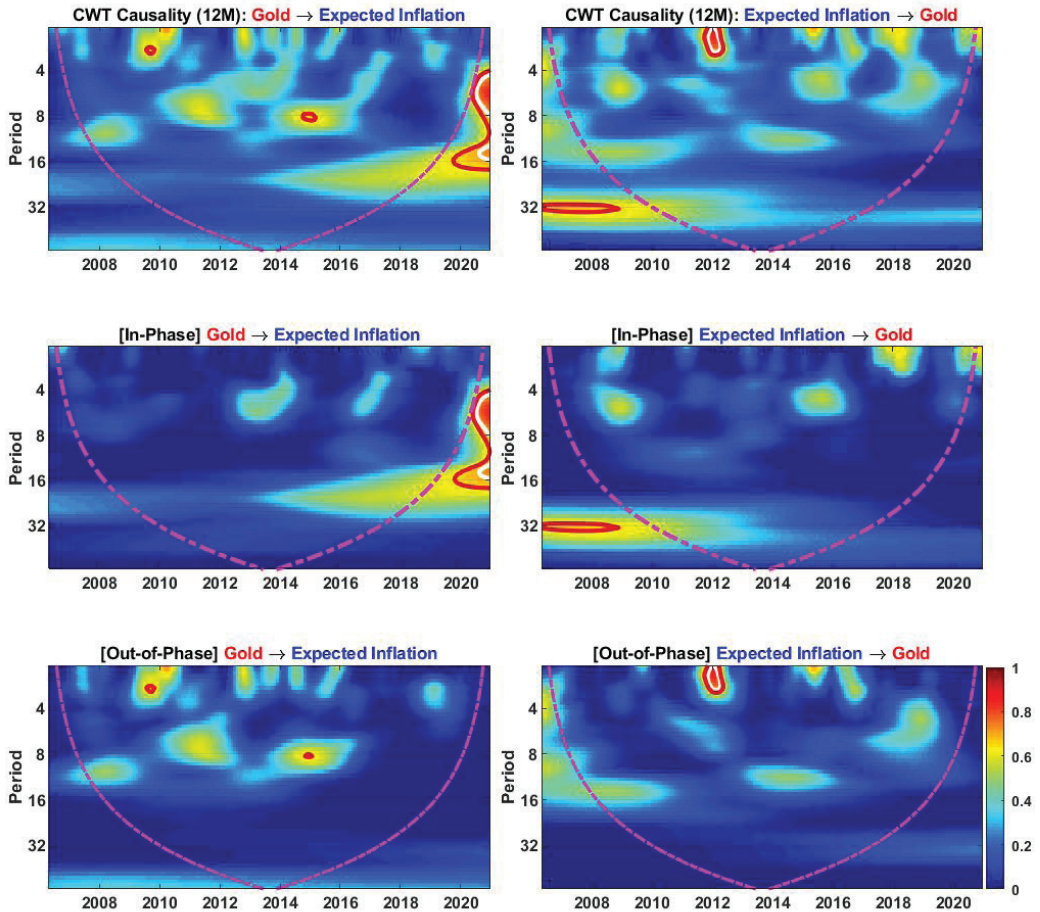


Figure 4. CWT Causality between Yearly Observations

strongly rejected for three models, except for “Gold_Y~Exp_Y”. The results revealed the existence of serial correlation up to 2 lags in the three out of four models, other than the pair of “Gold_M~Exp_M”. The heteroskedasticity test results implied that only the residuals of monthly series had a constant variance. All these results of residual diagnostic tests showed that the linear regression assumptions did not meet properly and, then, require us to study the relationship using nonlinear regressions. Indeed, the two stability diagnostic test—the parameter stability (Andrews, 1993) and breakpoint (Bai and Perron, 2003)—results highlighted the parameter instability and the presence of breakpoint in the three models, which justified the suitability of investigating the relationship at various quantiles.

Table 4

Preliminary Tests for Linear and Quantile Regressions

Dependent variable	GOLD_M	EXP_M	GOLD_Y	EXP_Y
Independent variable	EXP_M	GOLD_M	EXP_Y	GOLD_Y
<i>Linear Regression</i>				
Normality Test	22.68***	30.14***	0.3	264.55***
Serial Correlation LM Test (BG)	2.09	49***	131.87***	163.57***
Heteroskedasticity Test (BPG)	0.58	2.44	4.29**	11.03***
Max LR F-Statistic	1.698	25.054***	20.536***	160.508***
UDMax	4.055	33.372***	78.126***	113.775***
<i>Quantile Regression</i>				
Quasi-LR Statistic	0.829	0***	14.819***	19.361***
Slope Equality Test (Koenker and Bassett, 1982)	16.312	18.034	52.284***	58.407***
Symmetric Quantiles Test (Newey and Powell, 1987)	21.377	19.571	11.44	48.7***

Note: *** and ** indicate rejection of the null hypothesis at a 99% and 95% level of confidence, respectively.

We conducted three tests on the results (see Figure 6) of the quantile regression, which did not require strong distributional assumptions unlike linear regressions. The results showed that (i) the explanatory power of all three estimated models, with the exception for “Gold_M~Exp_M” model, was statistically significant at the 1% level of significance [Quasi-LR Statistic]; (ii) the evidence to suggest the rejection of the null hypothesis of slope equality for the annual observations, indicating that the slope coefficients differed across quantiles and thus the conditional quantiles were not identical; (iii) significant evidence of asymmetry in one case—where the annual gold returns were being selected as an independent variable—but not in the other cases.

Figure 5 visualizes the QQ based relationship between inflation expectations and gold returns, at monthly (top panel) and annual (bottom panel) frequencies. At first glance, we observed that the impacts of inflation expectations, in terms of absolute value of QQ coefficients, on gold returns were stronger than the other way around at both frequencies. For monthly observations, the effect of inflation expectations on gold returns was relatively positive (60 per cent of all quantiles) and peaked ($\beta = 17.27$) at the upper quantiles [0.80–0.90] when inflation expectations were at a high level and hit the lowest ($\beta = -33.12$) at the upper quantiles of the two series. The impact was positive at the vast majority of quantiles of inflation expectations—with the exceptions for the quantiles ranging from 0.14 to 0.33—when gold returns were at a low [0.05–0.23] and medium levels [0.57–0.76], but it turned negative at the medium and upper quantiles of gold returns as the quantile of inflation expectations increased. The effect of annual inflation expectations on gold returns was also positively strong with a higher percentage (0.756 vs. 0.65), albeit a weaker, than that of monthly observations across all quantiles. The positive effect was prominent at all quantiles of two variables from 0.05 to 0.48 and reached its peak of almost 14.65 at the quantile of (0.05) inflation expectations.

The same impact was shown to hold at the first two lower quantiles of inflation expectations through all the quantiles of gold returns. As the level of inflation expectation increased, the positive impact relatively diminished from the lower to medium quantile of gold returns, but started to strengthen at the remaining quantiles. Similarly, inflation expectations exhibited a positive impact at higher quantiles of gold returns when they were in the extreme lower ranges, however, the coefficients switched sign from positive to negative starting from the third [0.14] to the last quantile. The number of quantiles in which the negative effect was valid increased at the lower to medium quantiles [0.14–0.67], and it remained unchanged until the last quantile as the level of inflation expectation increased.

We presented the results of QQ regressions in the second column of Figure 5 where gold returns at both frequencies were chosen as an explanatory variable. When compared with the results aforementioned above, the effect of monthly gold returns on inflation expectations in terms of coefficients was considerably weaker at all quantiles. As the level of gold returns increased, the effect was slightly positive for the lower quantiles and strongly positive for the top quantile of inflation expectations. The results also showed a growing path of the negative coefficients for the normal and upper quantiles of inflation expectations and from the lower to the upper quantiles of gold returns. Turning our attention to the annual observations, we see that gold returns documented a kite-shaped pattern and positive impact on the inflation expectations across all quantiles, i.e., the effect was strengthening with the increasing of the quantile of two growth rates. However, this effect was negative for the lower quantiles of two variables; upper quantiles of inflation expectations when gold returns were at a low level; and at the upper four quantile of inflation expectations and the last quantile of gold returns.

We plotted the estimation results of two quantile approaches in Figure 6. The results suggested that both estimates were approximately the same in terms of direction of relationship, but slightly different in terms of strength for monthly observations. In the upper panel, we found that the average QQ estimates of the slope coefficients (QQR) and the quantile regression estimates (QR) for monthly observations varied moderately across all quantiles, whereas there were almost similar paths for the annual observations (see the bottom panel), that is, they converged nearly at all quantiles, exception for the last upper quantiles. Further, the findings revealed that the QR coefficients for annual observations were positively significant (depicted by a yellow circle) at all quantiles, except for the upper quantiles of expected inflations, whereas none of the p-values of the QR coefficients were less than a 10% significance level for the monthly observations. Accordingly, the results virtually validate the QQR regression estimations in Figure 5 and showed that the effect of monthly observations on each other was weak and heterogenous, i.e., the impact was negative or positive varied according to the distribution of returns. However, it was significantly positive through all quantiles for annual observations, and strengthened (declined up to the quantile 0.71, after which started to rise) as the quantile of gold returns (inflation expectations) increased. These results are closely in

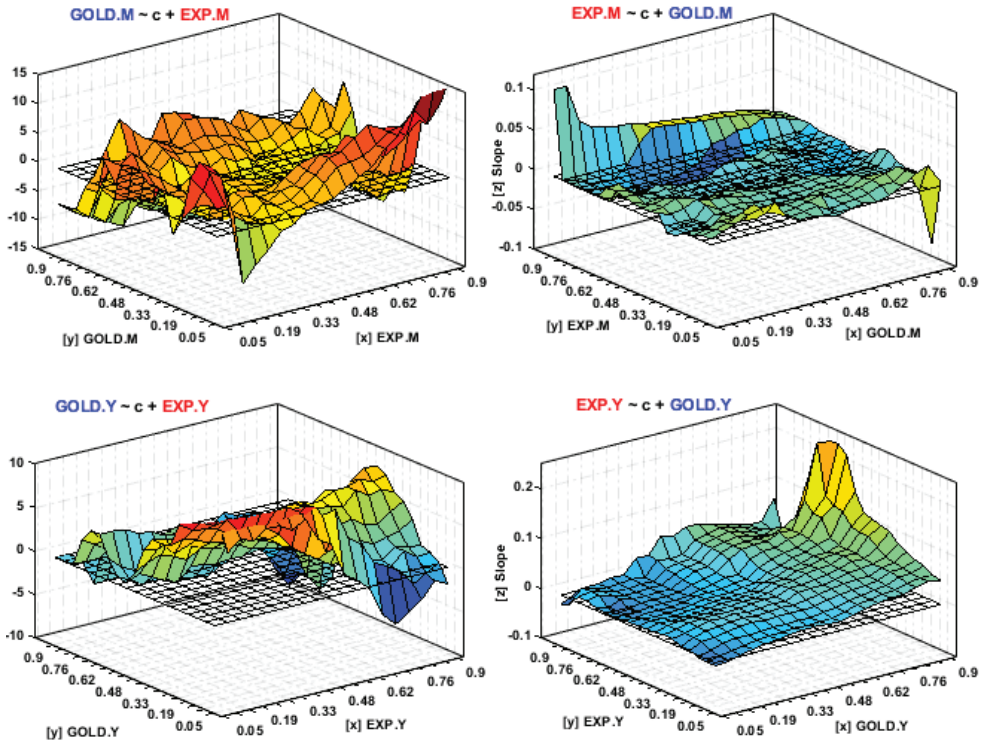


Figure 5. Quantile-on-quantile regression relationship between monthly and annual observations

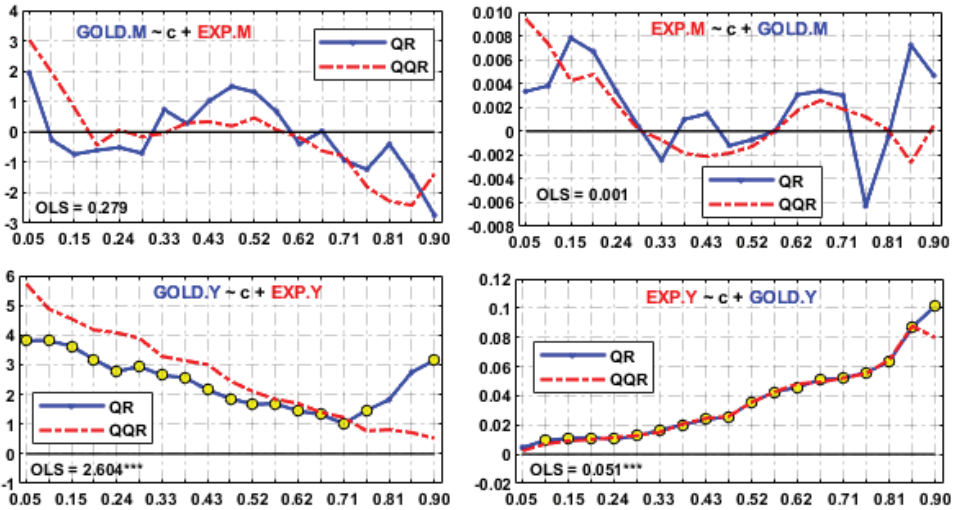


Figure 6. The comparison of QR and QQR estimates of the slope coefficients for monthly (top) and annual (bottom) observations

line with Wang, et al. (2011) and Shahzad, et al. (2019), who documented an asymmetrical inflation-gold linkage that depended on the size and sign of the inflation shocks. In accordance with our findings, Sui, et al. (2021) found that the hedging effectiveness of gold against inflation was strongly related to market condition (distribution of growth rates) and the nature of macroeconomic shocks in Turkey.

Conclusions

We investigated the relationship between inflation expectations and gold returns of monthly and annual maturities through the application of wavelet cohesion and causality tests as well as linear and nonlinear regression models, using data from Turkey over the period of 2006–2020 with a total of 177 observations. We further examined the relationship in terms of wavelet correlation at different time scales and identified the main factors among the selected macroeconomic and financial variables including interest rates, CDS spreads, dollarization rates, FPI, USD–TRY exchange rates, and the M2 money base in explaining the co-movements between gold prices per ounce in TRY and inflation expectations. The findings of Rua's (2010) wavelet cohesion revealed significantly negative cohesion in the short term and significantly positive cohesion in the long term, indicating that the hedging ability of gold prices exists only in the long term during the crisis periods. This further confirms the validity of the expected inflation effect hypothesis in Turkey. The results reinforced the conclusions drawn by Chua and Woodward (1982) and Adrangi, et al. (2003) in the USA and Le Long et al. (2013) in Vietnam. The OLS results, conversely, showed that the ongoing COVID-19 pandemic was the most prominent factor on the movement of inflation and gold at all scales for the two maturities whereas the changes in CDS spread were an insignificant factor for the same. By supporting the findings of Batten et al. (2014), the current study also discovered that the changes in interest rate and portfolio investments and the movements in foreign exchange rates and dollarization rates seem to have a significantly negative impact on the relationship between gold and inflation expectations in the short term and long term, respectively. The rise in the M2 money base produced a significantly positive impact on the gold-inflation co-movement in the long term, as expected, for Turkish investors seeking alternatives besides interest-bearing assets—which had prices implicitly controlled by policymakers—to buying gold, real estate (Gulseven and Ekici, 2020), and cars. The CWT-based Granger-causality test provided limited evidence for out-of-phase and unidirectional causal linkage, from inflation expectations to gold returns, in the higher and medium frequency intervals. This was corroborated by Xu et al. (2019a), which found that inflation expectations caused negative gold returns in the USA. These findings further suggested that a decrease in inflation expectations significantly leads to a decrease in gold prices in the short and intermediate terms in Turkey. The QQR results showed that the effects of inflation expectations on gold price changes were positive and stronger than the other way around at both frequencies and changed considerably

according to the return distributions. These results suggest that the hedging ability of inflation mostly hold, but varied under different economic conditions and data frequencies.

The implications of the results are significant for the monetary policies under an inflation-targeting regime that is aimed at managing inflation expectations and controlling inflation pressures in Turkey. Policymakers may monitor movements in bond and currency markets as well as dollarization rate and foreign portfolio investments to predict the direction of the gold-inflation co-movement, and thereby, comprehend investors' perceptions of inflation expectations for achieving sustainable financial stability and economic growth. Moreover, the findings regarding the gold and inflation expectation co-movements and causality relationship are important for portfolio and risk management during the normal market conditions as well as hedging and speculative activities during the crisis periods in the short and long term periods. This study accounts for the effects of the domestic financial variables on the gold-inflation relationship, but leaves the effects of global factors for future research in the field.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

Author Contributions: Conception/Design of study: R.G., A.K.T.; Data Acquisition: R.G.; Data Analysis/Interpretation: R.G.; Drafting Manuscript: A.K.T.; Critical Revision of Manuscript: A.K.T.; Final Approval and Accountability: R.G., A.K.T.

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Istanbul Business Research

Submitted: 11.03.2021

Revision Requested: 09.09.2021

Last Revision Received: 27.10.2021

Accepted: 27.03.2022

Published Online: 22.09.2022

RESEARCH ARTICLE

Does Tax Planning Affect R&D Expenditures? A Study of Borsa Istanbul (BIST) Manufacturing Sector

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Abstract

Tax planning, which has an important place in financial planning, is the systematic way of avoiding tax in accordance with the laws. In this process, R&D expenditures constitute a tax shield for firms to decrease their tax base. The purpose of this study is to examine whether tax planning affects R&D expenditures. The sample includes 564 firm-year observations over the period 2008-2019 for listed firms operating in the BIST-Manufacturing sector and spending R&D. As the past values of R&D expenditures have an effect on current period expenditures, the dynamic relationship between variables was analyzed by the Generalized Method of Moments (GMM) and System GMM. The findings show that tax planning has a positive effect on R&D expenditures. However, the change in firm size negatively affects R&D expenditures. The study focuses only on certain firms listed in the BIST-Manufacturing sector that made R&D and hence the results might have a limited explanatory capacity for the other sectors. Nevertheless, the findings highlight the need for firms to establish units to carry out tax planning practices that can reduce the tax burden through various means, especially R&D incentives.

Keywords

R&D, Tax planning, GMM, System GMM, Panel data

Introduction

R&D activities are a crucial factor of innovation. These enable firms to produce products that create added value and increase firms' profitability (Göçer, Kutbay, Gerede & Aslan, 2014). For this reason, firms mainly consider economic returns in the performance measurement of R&D investments with a high level of uncertainty. Expenditures made in the R&D process constitute R&D costs. In terms of accounting practices, expenditures made in the due course of *the research phase are being expensed*; expenditures made during *the development phase are capitalized depending on the fulfillment of all conditions in IFRS*. R&D tax incentives lay the groundwork for firms' strategic tax planning in that they minimize R&D costs and potential risks (Nar, 2015). In general, the firm's owner, shareholders, and board expect to profit as much as possible and have as little tax burden as possible. Tax planning represents the most important tax relief of the corporate income tax (Hodžić, 2013). This is the reason

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To cite this article: Bayraktar, Y., & Tutuncu, A. (2022). Does tax planning affect R&D expenditures? A study of Borsa Istanbul (BIST) Manufacturing Sector. *Istanbul Business Research*, 51(2), 563-581. <http://doi.org/10.26650/ibr.2022.51.995585>



why R&D tax planning is important for increasing R&D investments in SMEs as well as larger firms because R&D expenditures constitute a *tax shield* that decreases the firm's' tax base (Ernst & Spengel, 2011).

In this study, the relationship between tax planning and R&D expenditures is examined. In this context, the research sample includes 564 firm-year observations over the period 2008-2019 for listed firms operating in the BIST-Manufacturing sector and spending R&D. The remaining headings of the study are as follows: tax and tax planning, R&D, tax incentives, and Turkey's R&D ecosystem, literature review, data set and methodology and findings. The final part makes a general conclusion of the study and gives insights for future research.

Tax and Tax Planning

Taxes are the economic values that governments take from the income and wealth of individuals or institutions, based on unilateral taxation power, to meet public expenditures. They are taken directly or indirectly from sources such as income (*income tax, corporate tax*), wealth (*property tax, motor vehicle tax, etc.*), expenditure (*value-added tax, special consumption tax, etc.*), and transactions or documents (*stamp tax, etc.*). The main function of the tax system is to provide finance for public services. In addition, promoting economic growth by increasing savings and capital accumulation is another function of the tax system (İbiş, 2004). Although taxes are a source of financing for economic and social services, they are a burden for taxpayers. The tax policy implemented in states due to an increase in the tax burden of registered taxpayers may lead to a reduction in investment and employment. For this reason, taxpayers pay less or no tax either legally (*tax avoidance/tax planning*) or illegally (*tax evasion*) to alleviate or avoid the tax burden. To minimize this burden completely or partially, taxpayers benefit from tax loopholes by not causing taxable events and by staying within legal limits, or they act against the tax laws (Taşkın & Peker, 2019).

There are different concepts of tax avoidance, tax aggressiveness, tax risk, tax evasion, and tax planning in the literature regarding the reduction or complete elimination of tax burden. *Tax avoidance* is the process of taking legal action to decrease the tax payable amount based on tax provisions (Ünsal, Atabey Ertürk & Bıyık, 2019). It prevents tax debt from rising by benefiting from tax flaws/loopholes (Kirchler, Maciejovsky & Schneider, 2003). Excessive implementation of tax avoidance activities is called *tax aggressiveness* (Huang, Ying & Shen, 2018). There is no economic substance to a transaction made in this context. There is a complexity in these transactions, and taxpayers can make fictitious transactions with parties not related to tax. This type of planning adversely affects the fairness and efficiency characteristics of the tax system (Taşkın & Peker, 2019). In other words, aggressive tax planning means that taxpayers reduce the tax burden in a professional manner by taking the risk of facing a penal sanction (Kahrıman, Mastar Özcan & Tepekule, 2015). *Tax risk*

points out the uncertainty related to the business' future tax payments. Tax payments of a business vary depending on reasons such as changes in national and international tax law, the extent to which aggressive tax positions are fulfilled against businesses, or the firm's ability to pursue tax-preferential investments (Ünsal et al. 2019). *Tax evasion* is the deliberate failure of the taxpayer to pay the tax partially or completely by violating the tax laws through illegal practices, although the tax debt arises. Taxpayers can fraudulently use discounts and exemptions to hide their real tax liabilities and evade taxes through *illegal income-reducing* or *expense-increasing* activities (Amadasun & Igbinsosa, 2011). Factors such as (a) *attitude to the government* (b) *perception towards basic religious belief and taxation culture* (c) *the penalties deterrence* (d) *the availability and ease of tax evasion*, and (e) *the return on unpaid taxes* are effective in tax evasion (Feige, 1989). In addition, high tax rates, disproportionate distribution of the tax burden, and inequalities in the tax system can also be determinants of tax evasion (Wallschutzky, 1984).

Tax planning is a systematic planned study that transforms the organizational structures and business processes in accordance with the legal regulations in a way that minimizes the tax burden of taxpayers with the deductions, allowances, exemptions, and exceptions included in the relevant national or international legislation (Amadasun & Igbinsosa, 2011). In the literature, there are various simultaneously used phrases for legal tax liabilities reduction such as *tax planning*, *tax optimization*, *tax avoidance*, *tax minimization*, *tax management*, etc. (Vrzina, 2018). Tax planning is the research efforts and regulations aimed at collecting the financial needs of the state, stimulating economic growth, developing local/regional/national economic activities, increasing investments, and ensuring economic efficiency and productivity from the most appropriate sources at the *macro (state) level* (Nar, 2015) and reducing the tax burden by benefiting from exemptions, exception and allowances, tax incentives and privileges provided that they are not against the law at the *micro (individual/corporate) level* (Ünsal et al. 2019). Tax planning *is not tax evasion* but simply decreases the tax burden by using the rights recognized by the laws in a conscious and willing manner. In other words, tax planning is a systematic way of avoiding taxes (Taşkın & Peker, 2019). Therefore, it is a legal business process that aims to decrease the tax burden without causing tax incidence (Peker & Kılıçer, 2017). In this context, tax planning, which has an important place in financial planning, consists of transactions aimed at gaining tax advantage in accordance with the laws. Therefore, it is a legitimate and acceptable tax avoidance situation (Taşkın & Peker, 2019). Taxpayers have the right to decrease their tax burden, granted by the OECD. In this context, tax planning that allows the tax burden to benefit from discounts and exceptions within the legal framework is considered legitimate. From this point of view, the OECD (2013) regards tax planning as the only method of tax burden reduction adopted by governments. Therefore, it can be expressed as avoiding tax within legal limits (Eicke, 2008).

Factors such as simplicity and clarity of tax legislation, the efficiency of tax administration and tax auditing, the deterrence of tax penalties, accounting and consultancy services, the efficiency of public administration, tax ethics and awareness, lack of tax amnesties, and

the establishment of a modern and effective tax system that values the taxpayer lead to tax planning (Peker & Kılıçer, 2017). It can be implemented in ways such as restructuring of the company and its affiliated group of companies (*transfer, merger, and acquisition*), reviewing the production and sales cost structure and marketing activities, comparison of production and investment financing methods within the alternative financing methods, evaluation of general administrative expense policies, evaluation of incentives and discounts in financial legislation, evaluation of avoidance of double-taxation treaty, establishment of companies abroad, evaluation of free zone, technology development zone and offshore applications, review of collection and payment processes and cash flow status of the company (İbiş, 2004).

Firms can benefit from the law's loopholes in order to make complex and aggressive tax planning. Loopholes can provide a possibility for taxpayers to make tax planning without violating the rules. Hoffman's (1961) tax planning theory is about firms not being economically responsive to pay tax above what is required by tax law, because its effect is always a counter-effect on firms' performance. Therefore, Hoffman states the presence of loopholes as a reason for exercising tax planning practices. The loopholes and flaws in legislation have actually arisen due to the law complexity, which leads to an open interpretation/judgment and provides unexpected tax benefits (Slemrod, 2004). It represents an opportunity for tax planning. However, the tax planning effectiveness based on the loopholes is ensured only as long as it is not detected by the tax office (Ftouhi & Ghardallou, 2020).

However, the globalization process and the mobility of capital have paved the way for multinational businesses to transfer their activities to countries with lower tax rates or to make their profits in these countries. In this context, multinational firms use international tax planning strategies to decrease their tax burdens. Thus, multinational firms increase after-tax incomes by decreasing taxes. To be successful in international tax planning, multinational firms use particular techniques which require specialization and elaborative knowledge of the different tax systems such as *thin capitalization, transfer pricing, contract manufacturing, restructuring, treaty shopping, and tax havens* (Ftouhi & Ghardallou, 2020).

For firms, taxes reduce profits and cause cash outflows like costs and expenses. Therefore, taxes are considered a cost element (Taşkın & Peker, 2019) just like other operational expenses that increase profitability by decreasing when managed correctly (Garbarino, 2011). A firm's financial position, liquidity, operational results, performance, and cash flows can be adversely affected by corporate taxes (Taylor & Richardson, 2014). Corporate tax planning aims to minimize the taxes that cause cash outflow with practices within tax legislation, thus providing significant cost savings. It contributes to the tax burden reduction of the firm at the *national or international level* and thus to the maximization of profits with the reduction of costs (Eicke, 2008). In this process, taxes and other liabilities to be paid are alleviated by practices determined within the legal limits. Thus, the tax burden can be minimized without

facing any penal sanctions. As such, it is crucial to apply correct tax planning methods in minimizing the tax burden (Kahrman et al. 2015). Therefore, it is a complex and costly process and requires certain professional expertise.

Corporate tax planning is a way to increase a firm's expected after-tax cash flows. It consists of legal practices that decrease the resources' transfer from shareholders to the tax office. Corporate tax planning thus aims to achieve an optimal tax position. It involves the elaborative knowledge and application of tax policies such as incentives, tax allowance, tax exemption, and tax exception. As a result, corporate tax planning can be stated as a legal action of transferring economic value through tax liability minimization by benefiting from tax laws' loopholes. It is carried out in order to decrease the tax burden legally, transform tax savings into reinvestment, and achieve economic growth. Corporate tax plans are affected by the capital structure, firm size, accounting period, market structure, and policies (Fagbemi, Olaniyi & Ogundipe, 2019). Corporate tax policies are important in terms of investment and efficiency, and due to their increasing role in tax planning, *R&D tax incentives* have become important (Sterlacchini & Venturini, 2019).

R&D, Tax Incentives, and Turkey's R&D Ecosystem

Today, countries allocate more resources to high-tech R&D investments for economic growth and being competitive internationally. In this process, the success and efficiency of the commercial enterprise, qualified workforce, and R&D activities are important. In order to support these activities, countries and firms are provided with favorable conditional loans and grants, and direct or indirect incentives through tax implementations (Göçer et al. 2014). The fact that the increment of R&D expenditures enhances the total factor productivity growth is an important reason why governments give high priority to R&D (Hodžić, 2013). Besides, R&D activities are supported because net R&D spin-offs are beneficial for society. In other words, the private sector does not invest too much in R&D, as the social return of R&D investments is higher than its private return. In addition, firms allocate fewer resources to R&D investments, which include high uncertainty and risk, because they cannot predict the expected return. Therefore, government intervention is made with some incentive policies to increase R&D investments. (Warda, 2001).

R&D investments' social returns are greater than private returns due to the presence of positive externalities. In addition, these investments have a high level of risk and uncertainty compared to other investment types. Therefore, large firms are able to eliminate these risks and uncertainties in a wider investment portfolio compared to SMEs. However, most of the time, firms that invest in R&D use their own resources in project finance due to limited access to external finance. This situation may be caused by the information asymmetry, which increases monitoring costs between the creditors and the firm. Such problems systematically

reduce the firms' R&D investments (Sterlacchini & Venturini, 2019). To prevent this situation, governments develop R&D policies to increase the firms' R&D investments. At this point, many countries have started to give tax-related R&D incentives such as tax deduction, tax credits, tax exemption, accelerated depreciation on R&D assets, tax allowance, reduced social security contributions, income tax withholding incentives, loans, patent-related incentives, etc. (Ernst & Young, 2019).

Within the framework of R&D ecosystem in Turkey, a number of incentives are given to firms, technology development zones, and design and R&D centers regarding R&D and innovation activities with specific laws and regulations (*Income Tax Law, Corporate Tax Law, 5746-Supporting Research, Development and Design Activities, 6676-Supporting Research and Developing Activities, Law on Amending Some Laws and Decree Laws, 4691-Technology Development Zones, TUBITAK-Scientific and Technological Research Council of Turkey, etc.*). It can be said that these incentives increase R&D expenditures and intensity, which are macro and microeconomic R&D indicators. R&D intensity is calculated as R&D expenditures/GDP (Hughes, 1988) and R&D expenditures/Total Assets or Net Sales (Grabińska & Grabiński, 2017) respectively. Turkey's R&D intensity was calculated as 1.06% in 2019 and has increased since then. However, it is below the average (2.47%) of OECD and developed countries (OECD, 2020). In terms of R&D intensity, the private sector's ratio is higher than other sectors. The private sector's R&D expenditure was 37% in 2006, it reached 64.2% as of 2019 (TUBITAK, 2020).

Literature

Studies within the scope of tax planning literature deal with issues such as tax planning, tax avoidance, aggressive tax planning/tax aggressiveness or tax risk and evaluate them through various measurement methods. In empirical studies, tax planning, tax avoidance, aggressive tax planning, and tax risk are analyzed through models established with various variables. Empirical studies on tax planning in the literature are as follows chronologically.

Cheng, Guo, Weng & Wu (2021) examined whether patents have an incremental effect on tax planning beyond the R&D effect and income shifting is the underlying channel through which patents facilitate tax planning aggressively. The results showed a significant and positive relation between patents and corporate tax planning, and the effect is incremental to the R&D effects on tax planning. It was also determined that R&D facilitates tax planning via tax credits and deductions, whereas patents are used to avoid taxes aggressively.

Vu & Le (2021) examined the effect of tax planning on firm value by using the effective tax rate. The data was obtained from audited financial statements and other statistical documents of 513 non-financial firms listed in Vietnam for the period of 2015-2019. The results showed that tax planning affects firm value negatively.

Olurankinse & Mamidu (2021) examined the effect of tax planning on the Nigerian Development Banks' financial performance. The data was obtained from financial statements and reports of selected banks for the period of 2012-2019. Pooled regression analysis was used to examine the effect of ETR, tax savings, capital intensity, and firm size on the banks' financial performance. The results showed that tax planning has a significant effect on financial performance in terms of capital intensity and firm size.

Gayatri & Wirasedana (2021) analyzed the effect of tax planning, company size, and cash holding on earnings management for the infrastructure, utility, and transportation firms listed on the Indonesia Stock Exchange. The data was obtained from the financial statements of 27 firms for the period of 2016-2019. The results showed that tax planning has a significant negative effect on earnings management, while company size and cash holding have a significant positive effect on earnings management.

Chen, Chang & Lee (2020) analyzed the effect of the CFO (*chief financial officer*)'s accounting expertise on corporate tax avoidance. They empirically examined whether an expert CFO in accounting is more likely than a CFO without such expertise to exploit tax-planning opportunities, resulting in greater corporate tax avoidance. The study showed that expert CFOs in accounting are negatively associated with corporate effective tax rates. The study also suggested that the accounting expertise and compensation schemes of CFOs can have a significant effect on the aggressiveness of corporate tax planning.

Fagbemi et al. (2019) investigated the corporate tax planning and financial performance of systemically important banks (*SIBs*) in Nigeria by using *Pooled OLS*. Due to the overburdening and multiplicity of Nigeria's tax system, SIBs carry out the corporate strategies to determine the loopholes which postpone, minimize, or fully avoid tax payments in an effort to decrease their negative effect on a firm's financial performance. The study concluded that the effective tax rate (*ETR*) has a negative and thin capitalization positive effect on financial performance. However, lease options and capital intensity have an insignificant impact.

Ünsal et al. (2019) analyzed tax planning in the Turkish banking sector by performing binary logistic regression analysis through two different models, which were based on the cash effective tax rates (*Cash ETR*) and the GAAP effective tax rate. The study showed that asset profitability and sector shares increase the tax planning probability by 3.73% and decrease it by 36.1% respectively (*first model*). The asset profitability and leverage ratio decrease the tax planning probability by 10.9% and increase it by 5.6% respectively (*second model*).

Sterlacchini & Venturini (2019) examined the R&D tax incentives' effect on the manufacturing firms' research activity in Italy, Spain, France, and the United Kingdom. They investigated whether the R&D investment decisions are affected by the tax incentives and how effective the firm size is. The analysis was performed on data (2007-2009) for a cross-sectional

sample. The study showed that R&D tax incentives have a statistically significant effect on the R&D expenditure intensity over the sales in all countries except for Spain and the tax incentives are driven only by the small firms' behavior. In terms of the cost-benefit ratio, R&D tax policies have additional effects in the United Kingdom and Italy.

Vrzina (2018) examined whether tax planning affects the market value and profitability of Serbian firms by using OLS regression. The sample consists of 23 non-financial companies listed on the Belgrade Stock Exchange. The data set consists of 92 company-year observations for 2013-2016. The study showed that tax planning has a positive significant impact on profitability. However, it does not affect market value.

Lynch (2014) analyzed the timing and magnitude of tax avoidance, the effects of various costs on corporate tax (*preparation of tax returns, filing, planning, reporting, internal audit, etc.*) with a regression model. The study showed that the increases in the related costs in the current period increased tax avoidance. Besides, there was a two-year lag between costs and tax avoidance returns. The study also concluded that the internal audit complex increases the costs.

Neuman (2014) analyzed the determinants of tax strategies. Bivariate probit regression analysis was performed using 4,668 observations (*1,137 firms*) for the period 2000-2010. The study showed that tax incentives and practices affect the choice of tax planning decisions and strategies. Within the framework of the analysis, sustainability and minimization were discussed as tax planning tools. While sustainability in tax planning refers to the maximization of business value, minimization means the lowest possible tax burden.

Graham, Hanlon, Shevlin & Shroff (2014) investigated tax planning's incentives and disincentives by analyzing the survey responses (*nearly 600 participants-corporate tax executives*). The study showed that reputational concerns have an important effect on why firms do not implement tax-planning strategies. The study further concluded that the GAAP ETR and earnings per share are important indicators in terms of tax planning strategy.

Taylor & Richardson (2014) investigated the association between corporate tax avoidance and the firm's tax position, the directors' tax expertise, and the key management's performance-based remuneration incentives. The data set consists of 200 publicly listed Australian firms for the 2006-2010 period. The study showed that the firm's tax position, the directors' tax expertise, and the key management's performance-based remuneration incentives are positively related to corporate tax avoidance.

Göçer et al. (2014) examined the R&D tax policies' efficiency for Australia, Canada, Denmark, England, France, Netherlands, Spain, Turkey, and the USA for the period 1999-2013 through panel data analysis. The causality was determined from R&D expenditures to inno-

vation and from tax incentives to R&D expenditures. The study showed that tax incentives have a positive impact on R&D expenditures and innovation, respectively.

Hodžić (2013) examined tax incentives for R&D and calculated the B-Index in Austria and Croatia. R&D tax incentives provide tax relief within corporate tax. B-Index is a way to determine differences in tax systems in the private sector to invest in R&D. The study showed that R&D tax incentives were better in Croatia (1.09) than Austria (1.25) and emphasized that tax incentives encourage firms to invest in R&D.

Armstrong, Blouin & Larcker (2012) examined the relationship between the tax director's incentives and Cash ETR, GAAP ETR, the book-tax gap and tax aggressiveness' measures by using a data set which is detailed executive compensation information. The study showed that the tax director's incentive shows a strong negative association with the GAAP ETR.

Frank, Lynch & Rego (2009) examined tax and financial reporting aggressiveness. The study concluded that there is a strong positive association between them. Besides it was stated that firms could implement earnings management of financial profits via aggressive financial reporting (*book income managed upward*) and aggressive tax reporting (*taxable profits-taxable income managed downward*) simultaneously.

Elschner & Ernst (2008) measured the R&D incentive's impact on R&D cost and total tax payments. R&D tax incentives were analyzed by using different economic settings and models. The study showed that the specific R&D tax incentives' design, the interaction with the tax system and the firm's profitability relative to R&D expenditures level strongly affects the tax subsidy amount for R&D.

In the literature, most of the studies reported on tax incentives for R&D, R&D incentives' efficiency, R&D tax incentives' effect on investments, R&D incentive's impact on R&D cost and total tax payments, the determinants of tax planning strategies, the corporate tax planning and financial performance, profitability, market value relationship in terms of different sectors, tax and financial reporting aggressiveness. There is no study in Turkey or in international literature directly addressing the impact of tax planning on R&D expenditures by using GMM and System GMM. From this aspect, our study will contribute to tax planning literature by exploring its impact on R&D expenditures for Turkey.

Data Set and Methodology

This study examines the relationship between tax planning and R&D expenditures. In this context, the financial statements of 182 companies operating in the BIST-Manufacturing sector were examined and it was determined that there were 47 companies that regularly spend R&D. These companies have generally focused on R&D investments since 2008. For this reason, the sample includes 564 firm-year observations over the period 2008-2019 for listed

firms operating in the BIST-Manufacturing sector and spending R&D. The data were drawn from financial statements, comprehensive income statements, and annual reports available in the investor relations section of the firms' official websites. The findings determined that a significant portion of BIST-Manufacturing companies does not have "Development Costs" in their financial statements and there is no information about R&D expenditures in their footnotes. The fact that R&D expenditures are reported in the comprehensive income statement indicates that the firms within the scope of the analysis have adopted the *R&D expensing approach*.

The previous literature about tax planning presents several tax planning measures. Slemrod (2004) and Frank et al. (2009) measure tax planning by *aggressive tax returns* and *tax savings*, which are identified as downward manipulation of taxable profit. The other one is the *Cash Effective Tax Rate (Cash ETR)* which measures the current cash outflows for income taxes as a percentage of pre-tax book income (Dyreg, Hanlon & Maydew, 2008; Armstrong et al. 2012). It expresses the permanent and temporary differences between the taxable and the accounting profit. By focusing on current taxes paid, Cash ETR prevents overestimating the current tax burden (Hanlon & Shevlin, 2002). Another tax planning measure is based on *tax litigation*, which is a direct measure of tax evasion (Graham & Tucker, 2006). Graham, Raedy & Shackelford (2012), and Armstrong et al. (2012) used the difference between taxable and accounting income as a tax planning measure. The Generally Accepted Accounting Principles Effective Tax Rate (GAAP ETR) captures the change in corporate tax planning. It is the ratio of total tax expense to pre-tax book income. GAAP ETR indicates the cumulative effects of various tax incentives and the neutrality level of the tax system in firms (Dyreg et al. 2008). However, the comparison of the R&D tax incentives across the tax jurisdictions is measured through the B-Index, which is calculated as the present value of before-tax income (Warda, 2001). Among the tax-planning methods briefly explained above, **Cash ETR** and **GAAP ETR** are frequently used in the literature (Blouin, 2014). Therefore, the tax planning calculations in this study will be made by considering these two variables. Table 1 contains detailed information about the measurements and definitions of the variables used in the research models.

Table 1
Variables

Variables	Definitions	Measurement and References
R&D1	R&D Intensity	R&D/Total Assets (Grabińska & Grabiński, 2017)
R&D2	R&D Intensity	R&D/Net Sales (Grabińska & Grabiński, 2017; Ullah, Akhtar & Zaefarian, 2018)
CASH ETR	Cash Effective Tax Rate	Cash Tax Paid/ Pre-Tax Book Income (Dyreg et al. 2008)
GAAP ETR	Generally Accepted Accounting Principles Effective Tax Rate	Total Tax Expense/Pre-Tax Book Income (Dyreg et al. 2008)
ROA	Return on Assets	Net Profit/Total Assets (Ullah et al. 2018; Lanis & Richardson, 2011)
LEV	Financial Leverage	Total Liabilities/Total Assets (Stickney & McGee, 1982)
SIZE	Firm Size	Logarithm of Total Assets (Stickney & McGee, 1982)

Variables	Definitions	Measurement and References
CAPINT	Capital Intensity	Net Property, Plant and Equipment/Total Assets (Taylor & Richardson, 2014)
INVENINT	Inventory Intensity	Inventory/Total Assets (Taylor & Richardson, 2014)
AUDT	Big 4 Audit Firms	If the firm employs a Big 4 external auditor equals to 1 otherwise 0 (Taylor & Richardson, 2014)

The study includes several control variables such as return on assets (*ROA*), financial leverage (*LEV*), firm size (*SIZE*), capital intensity (*CAPINT*), inventory intensity (*INVENINT*), and Big 4 audit firms (*AUDT*). The calculation methods for the variables are shown in Table 1. There is no sign prediction for ROA because of the conflicting results in prior research (Graham et al. 2014; Lanis & Richardson, 2011). In terms of SIZE and LEV, larger firms that achieve scale economies via tax planning strategies and have higher debt-to-equity ratios, are more inclined at minimizing the tax burden (Rego, 2003). CAPINT, however, is positively associated with tax planning due to depreciation while INVENINT is associated negatively (Stickney & McGee, 1982). AUDT is included to control audit quality and firm monitoring. There is no sign prediction for AUDT because of the conflicting results in prior research (Taylor & Richardson, 2014; Rezaee, 2005). Table 2 contains detailed information about the descriptive statistics of the variables used in research models.

Table 2
Descriptive Statistics

Variables	Mean	Std. Dev.	Minimum	Maximum
R&D1	0.006636	0.01083	-0.000043	0.143094
R&D2	0.006599	0.010945	-0.000043	0.142276
CASH ETR	3.148922	72.13203	-5.06628	1713.039
GAAP ETR	1.500865	37.73894	-90.899	883.3666
ROA	0.046977	0.08219	-0.28436	0.406006
LEV	0.548658	0.229784	0.06061	1.588400
SIZE	8.890889	0.67514	7.527012	10.74438
CAPINT	0.322542	0.156128	0.037485	0.768199
INVENINT	0.184810	0.106558	0.031166	0.744297
AUDT	0.654255	0.476033	0	1

Since the past values of R&D expenditures affect the current period, the relationship between R&D expenditures and tax planning is considered dynamically. However, the fact that the lag of the dependent variable is included in the model as an explanatory variable causes Ordinary Least Squares (*OLS*) estimators to be biased and inconsistent (Baltagi, 2014). In addition, the fixed effect panel data (*FE*) method does not take into account the endogeneity problem¹, and the time period must be large in order to obtain consistent estimators in this method (Baltagi, 2014). However, the Generalized Method of Moments (*GMM*) allows for obtaining accurate and consistent estimators in cases where the number of individuals (*N*) is

1 The endogeneity problem is that the lags of the dependent variable are included in the model as an independent variable. This situation causes a correlation between the dependent variable and the error terms (Yerdelen Tatoğlu, 2020).

larger than the time period (Şen, 2020). GMM produces more consistent and accurate estimators than OLS and FE models by taking into account the endogeneity problem with the help of instrumental variables (Ullah et al. 2018).

The number of instrumental variables, validity of instrumental variables and autocorrelation tests test the consistency of GMM. According to Roodman (2009), the number of instrumental variables must be equal to or less than the number of individuals. When the number of instrumental variables exceeds the number of individuals, the obtained estimators will be biased (Roodman, 2009). The validity of the instrument variables is tested using the Sargan test under the null hypothesis “*over-definition constraints are valid*”. Sargan tests whether the econometric model is valid and the over-definition constraints on whether the instrumental variables are specified correctly. Instrumental variables will cease to be valid when they are determined exogenously (Ullah et al. 2018). In addition, the efficiency of the coefficients is examined with the autocorrelation test proposed by Arellano & Bond (1991). Autocorrelation tests the null hypothesis, which suggests that there is no second-order autocorrelation.

In light of these explanations, the relationship between tax planning and R&D expenditures has been examined by GMM. In this context, research models are as follows:

$$\text{Model 1: } R\&D1_{i,t} = \beta_0 + \beta_1 R\&D1_{i,t-1} + \beta_2 CASH\ ETR_{i,t} + \beta_3 ROA_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} \\ + \beta_6 CAPINT_{i,t} + \beta_7 INVENINT_{i,t} + \beta_8 AUDT_{i,t} + \varepsilon_{i,t}$$

$$\text{Model 2: } R\&D1_{i,t} = \beta_0 + \beta_1 R\&D1_{i,t-1} + \beta_2 GAAP\ ETR_{i,t} + \beta_3 ROA_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} \\ + \beta_6 CAPINT_{i,t} + \beta_7 INVENINT_{i,t} + \beta_8 AUDT_{i,t} + \varepsilon_{i,t}$$

$$\text{Model 3: } R\&D2_{i,t} = \beta_0 + \beta_1 R\&D2_{i,t-1} + \beta_2 CASH\ ETR_{i,t} + \beta_3 ROA_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} \\ + \beta_6 CAPINT_{i,t} + \beta_7 INVENINT_{i,t} + \beta_8 AUDT_{i,t} + \varepsilon_{i,t}$$

$$\text{Model 4: } R\&D2_{i,t} = \beta_0 + \beta_1 R\&D2_{i,t-1} + \beta_2 GAAP\ ETR_{i,t} + \beta_3 ROA_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} \\ + \beta_6 CAPINT_{i,t} + \beta_7 INVENINT_{i,t} + \beta_8 AUDT_{i,t} + \varepsilon_{i,t}$$

In these models β_0 shows the constant term; β_n the slope parameters; $\varepsilon_{i,t}$ the error term. The subscripts indicate the value of the variable of time t for firm i . ROA, LEV, SIZE, CAPINT, INVENINT, and AUDT are control variables in models as aforementioned.

GMM, introduced into the literature by Arellano & Bond (1991), is based on the transformation of Anderson & Rubin’s (1950) first differences model with instrumental variables. The model obtained from this transformation is estimated with Generalized Least Squares (GLS) (Yerdelen Tatoğlu, 2020). Thus, besides the error term being autocorrelated, appropriate results can be obtained in the case of constant and heteroscedasticity (Çağlayan Akay, 2018). In cases where this method is weak, the System GMM developed by Arellano & Bover

(1995) and Blundell & Bond (1998) generates strong estimators. The System GMM is based on the use of instrumental variables generated by considering orthogonal deviations. These instrumental variables are created by averaging the possible future values of each variable (Yerdelen Tatoğlu, 2020). One-step and two-step² estimation results can be obtained using both methods. However, Hwang & Sun (2018) argue that two-step GMM predictions are asymptotically stronger in their studies. At the same time, the two-step GMM offers more effective and consistent coefficients by preventing unnecessary data loss (Ullah et al. 2018). Therefore, step two of the study discusses GMM. In addition, since Windmeijer (2005) suggested the use of robust standard errors in the two-step GMM, the models were solved with robust standard errors.

Findings

In the study, two different solutions were made with GMM and System GMM. The results obtained were compared. GMM results made under two-step and robust standard errors are shown with diagnostic test results in Table 3 and Table 4.

Table 3
GMM and System GMM (R&D1) Results

Variables	GMM		System GMM	
L.R&D1	0.4366705***	0.4369478***	0.63989009***	0.6387732***
Cash ETR	0.00000257***	-	0.00000300***	-
GAAP ETR	-	0.00000491***	-	0.00000560***
ROA	-0.0029019	-0.0029097	-0.0012923	-0.0013321
LEV	-0.0005172	-0.0004735	0.0003717	0.0003866
SIZE	-0.0040479*	-0.004022*	0.0001581	0.0001584
CAPINT	0.0034098	0.0034377	0.0090622	0.0090582
INVENINT	0.0065074	0.0064855	0.0007277	0.0007029
AUDT	-0.0002104	-0.0002089	-0.0013694	-0.0013616
Wald Test Statistics	442.12***	495.09***	5287.09***	5139.17***
Number of Firms	47	47	47	47
Number of Instrumental Variables	17	17	27	27
Sargan Test Statistics	7.06 (0.57)	7.07 (0.63)	21.64 (0.26)	21.63 (0.30)
AR (1)	-1.07 (0.29)	-1.09 (0.27)	-1.13 (0.26)	-1.13 (0.26)
AR (2)	-1.06 (0.29)	-1.05 (0.29)	-1.09 (0.27)	-1.09 (0.27)

Note: ***, * denotes 1% and 10% statistical significance, respectively. Values in parentheses show probability values of diagnostic tests.

According to the empirical findings in Table 3 where the R&D1 value is considered as the dependent variable, it has been determined that *tax-planning (Cash ETR and GAAP ETR) has a positive effect on the R&D expenditures*. Similarly, Sterlacchini & Venturini (2019), Göçer et al. (2014), Hodžić (2013), and Elschner & Ernst (2008) although not directly, revealed that

2 For detailed information on the difference between one-step and two-step GMM estimates, see: Windmeijer (2005).

R&D tax incentives and related tax planning strategies have a positive effect on the R&D investments and expenditures. In addition, R&D expenditures are positively affected by their past value. However, according to the result obtained from the GMM, the SIZE has a negative effect on the R&D1 variable. In addition, the other control variables had no statistically significant effect on the dependent variable.

Table 4

GMM and System GMM (R&D2) Results

Variables	GMM		System GMM	
L.R&D2	0.4568091***	0.4570419***	0.726343***	0.722649***
Cash ETR	0.0000185***		0.00000179***	
GAAP ETR		0.00000301***		0.0000315**
ROA	-0.0071826	-0.0071917	-0.0113066	-0.0113043
LEV	-0.0018642	-0.0018379	0.0019343	0.001969
SIZE	-0.0022695	-0.0022692	-0.0001248	-0.0001261
CAPINT	-0.0005609	-0.0005431	0.0081333	0.0081222
INVENINT	0.0043792	0.0021673	-0.0057007	-0.0057152
AUDT	0.0011181	0.0011171	0.0000494	0.0000474
Wald Test Statistics	738.78***	494.86***	11202.96***	10683.07***
Number of Firms	47	47	47	47
Number of Instrumental Variables	17	17	27	27
Sargan Test Statistics	7.89 (0.53)	7.92 (0.54)	7.10 (0.42)	7.06 (0.42)
AR (1)	-0.95 (0.34)	-0.95 (0.34)	-1.06 (0.29)	-1.05 (0.28)
AR (2)	-1.09 (0.28)	-1.09 (0.28)	-1.14 (0.25)	-1.15 (0.25)

Note: ***, ** denotes 1% and 5% statistical significance, respectively. Values in parentheses show probability values of diagnostic tests.

According to the empirical findings in Table 4, where the R&D2 value is the dependent variable, the study showed that *tax planning (Cash ETR and GAAP ETR) has a positive effect on the R&D expenditures*, as in the R&D1 model. Similarly, Sterlacchini & Venturini (2019), Göçer et al. (2014), Hodžić (2013) and Elschner & Ernst (2008) stated that R&D tax incentives and related tax planning strategies have a positive effect on the R&D investments and expenditures as previously mentioned in the R&D1 model. In addition, R&D expenditures are positively affected by its past value. However, according to the result obtained from the GMM and System GMM, the control variables do not have a statistically significant effect on the dependent variable.

The diagnostic tests in Tables 3 and 4 reveal that the number of instrumental variables detected is smaller than the number of firms. In addition, considering the Sargan test statistics, the null hypothesis cannot be rejected. In this case, it can be stated that the instrument variables are determined correctly and the over-definition constraint is valid. AR (1) and AR (2) values, which show the first and second-order autocorrelation test statistics, respectively, show that the null hypothesis, which suggests that there is no autocorrelation problem, cannot be rejected. Therefore, it was determined that there is no autocorrelation problem in the analyzed models. In addition, Wald statistics show that the models are statistically significant.

Conclusions

Tax planning, which is the natural right of taxpayers, is not resisting taxation, but complying with it in order to reduce the tax burden within legal limits. Tax incentives (*discounts, exceptions, exemptions, etc.*) provided for R&D and innovation activities minimize the tax burden as expense and deduction items in terms of corporate tax. Therefore, it can be stated that tax planning has an important role in increasing R&D expenditures. This study examines whether tax planning affects R&D expenditures. The results show that *tax planning has a positive effect on R&D expenditures*. The high fixed investments and production costs of the firms in the BIST-Manufacturing sector, together with high technology R&D expenditures, can affect the competitive level of the firms. At this point, it can be said that firms tend to increase their R&D expenditures in order to reduce the impact of an important cost element such as *tax* by taking advantage of tax incentives for R&D activities in terms of tax planning. However, *the change in firm size negatively affects R&D expenditures*. The negative impact of firm size on R&D expenditures in terms of tax planning is related to strategic sustainability for small firms operating in the BIST-Manufacturing sector, because, small firms tend towards R&D activities in order to minimize their production costs, increase their productivity and provide competitive advantage. As such, their tendency to benefit from R&D incentives at the maximum level in this process increases. Contrary to this situation, the decrease in R&D expenditures in terms of tax planning for large firms operating in the BIST-Manufacturing sector is possible due to the R&D capacity reaching a sufficient level. The study contributes to the literature by investigating the tax planning effect on R&D expenditures within the dynamic relationship between variables.

Tax is a cost that firms have to manage. This cost can be reduced through effective and successful tax planning. In this context, it is necessary to know and analyze the legal legislation well and to implement practices that can reduce the tax burden. In fact, while firms adopt an R&D expensing approach, tax planning contributes both to income smoothing and minimizing the tax burden. In addition to firms' increasing their R&D investments and benefiting from the discounts, exemptions and exceptions offered within this scope also bring tax savings. Therefore, it may be beneficial for firms to establish units to carry out tax planning practices that can reduce the tax burden of firms through various means, especially incentives for R&D investments.

The study is subject to several limitations. First of all, the data were drawn from the annual reports and financial statements, hence the possibility of errors in hand-collected data can be stated as a limitation. The study focuses only on certain firms listed in the BIST-Manufacturing sector that made R&D. Hence, the results might have limited explanatory capacity for other sectors. In order to generalize the findings, it may be useful to conduct the research in different sectors and analyze it comparatively. In future research, the tax planning

effect on R&D expenditures or firms' financial performance can be investigated in different sectors by making comparisons.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

Author Contributions: Conception/Design of study: Y.B., A.T.; Data Acquisition: Y.B., A.T.; Data Analysis/Interpretation: Y.B., A.T.; Drafting Manuscript: Y.B., A.T.; Critical Revision of Manuscript: Y.B., A.T.; Final Approval and Accountability: Y.B., A.T.

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Istanbul Business Research

Submitted: 11.03.2021

Revision Requested: 09.09.2021

Last Revision Received: 27.10.2021

Accepted: 27.03.2022

Published Online: 22.09.2022

RESEARCH ARTICLE

Will Outbreaks Increase or Reduce Income Inequality? the Case of COVID-19

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Abstract

The effects of economic contractions experienced during pandemic periods on different income sectors and country groups in terms of income inequality are not homogeneous. Due to the fact that COVID-19 has deeply affected the lives of the poor, immigrants, refugees, the homeless, seasonal workers and people with no health insurance, the relationship between the pandemic and income inequality is of great significance. This study aims to find an answer to the question of whether the recent pandemic increased or decreased income inequality. In the study, the effect of COVID-19 on income inequality in 38 countries with different income levels is analyzed with the Artificial Neural Networks (ANN) and Linear Regression (LR) method. In this context, Gini index values for 2020 were estimated using unemployment, inflation and growth data, which are determinants of income distribution, for the periods 2000-2019. According to the analysis findings, while COVID-19 reduces income inequality in some countries, it increases it in others. However, in general, the results of our study show that the overall effect of COVID-19 on income levels in both developed and developing countries has been to increase income inequality.

Keywords

COVID-19, Pandemic, Income inequality, Gini, Artificial neural networks, Linear regression

Introduction

Covid-19, which emerged in China's Hubei province in December 2019 and which has shown its impact all over the world, continues to deeply shake both public health and the economic contraction which it has caused. With the effect of strict isolation policies, the social consequences of the pandemic became quite asymmetrical and its negative effects, especially on low socio-economic groups, continued to increase (O'Donoghue et al., 2020).

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To cite this article: Isik, E., Ozyilmaz, A., Toprak, M., Bayraktar, Y., Buyukakin, F., & Olgun, M. F. (2022). Will outbreaks increase or reduce income inequality? the case of covid-19. *Istanbul Business Research*, 51(2), 583-605. <http://doi.org/10.26650/ibr.2022.51.895431>



COVID-19 has brought about a human development crisis. With the pandemic, some dimensions of human development, such as health, education, individual economy, housing, social participation, human security, social justice, environmental sustainability and social life have regressed, and some of these parameters have fallen to the low levels seen in the mid-1980s. This is because the crisis caused by the pandemic has badly affected all elements of human development. The main affected areas are income (which has seen the biggest contraction in economic activity since the Great Depression), health (the pandemic that has already killed over 1 million 500 thousand people is expected to cause more deaths with the effect of a second wave) and education (which has been affected in regards to restriction of access to the internet, increasing inequality of opportunity in education, and the decline of primary education to the levels of the mid-1980s). The scale of the effects of the outbreak is expected to be yet more devastating, given the deterioration in many parameters, including an increase in gender-based violence (UNDP, 2020).

To control the spread of COVID-19, governments are implementing different degrees of isolation policies that can lead to a sharp contraction in economic activity, a decrease in employment and income, and an increase in poverty and inequality (Lustig et al., 2020). The mentioned income inequality is an issue that needs to be discussed because income inequality and the pandemic are closely related. In this framework, the pandemic, which determines income inequality, is also directly affected by income inequality. The vicious circle between the pandemic and inequality can be explained as follows: With the onset of a health crisis, economic contractions can trigger chronic diseases due to insufficient care and treatment, and this process, which affects productivity in all aspects, increases health care costs and poverty, and this subsequently brings more diseases.

Countries with relatively higher income inequality are likely to report more COVID-19 cases and deaths (Bonacini et al., 2020; Fisher & Bubola, 2020; Clarke & Whiteley 2020). Moreover, disadvantaged groups, which are exposed to high income inequality, have to work to survive, making them vulnerable in terms of the risk of developing the disease and making them more exposed to high treatment costs. This situation is even more brutal for low-income groups which are employed informally without health insurance to survive.

Although many factors act as a driving force in the relationship between the pandemic and income inequality, the prominent factor is the labor markets. This is because, with the COVID-19 crisis, human beings, the dominant factor of the production process, are under a global health threat (Campello et al., 2020). The effect of the pandemic on the workforce differs depending on the parameters of the workforce, such as age, income, gender, and education, and this is determinant in income inequalities. While the majority of the highly skilled workforce has the opportunity to work from home, there is not much opportunity to work remotely for low skilled workers (Neidhöfer, 2020). In addition, the strict isolation policies

implemented to control the pandemic have led to a decrease in employment and a significant increase in unemployment rates. This effect is expected to be more devastating, especially in low-income countries. In low-income countries, poor individuals who can only meet their basic needs have had to choose between the pandemic and hunger. For example, although very drastic measures were not taken in Kenya, as a result of the current practices, most of the informal workers who make up more than 80% of the workforce remained unemployed. Recently, Ebola in West Africa, Hurricane Iday in Mozambique, the Desert Grasshopper invasion in Somalia and Ethiopia, and migration waves in these geographies have further weakened these countries economically. Therefore, the expansion of the pandemic in these countries means that poverty and inequality affect the whole society more deeply (Maffioli, 2020). The extent of informal employment in low-income countries also plays an important role in affecting the labor market's income distribution. In these countries, particularly the poor living in rural areas are employed informally, and percentages of informal employment exceed 90 in the agricultural sector. Informal employment mostly means excluding these individuals from social aid and allowances. Therefore, the pandemic is expected to play a significant role in increasing inequality by further affecting the living conditions of these people (FAO & UN, 2020; FAO, 2020; ILO, 2018). However, due to the employment of the poorest in the agricultural and daily life services sector, and due to these sectors being relatively less affected by the pandemic, the poorest households face lower levels of unemployment. On the other hand, it is expected that many households with middle and middle-high income levels who do not have the opportunity to work from home will be deeply affected by the pandemic through the unemployment channel. Therefore, although the pandemic shakes the living conditions of the poorest more deeply, the issue of which households have the greatest income loss differs. Therefore, it remains uncertain how the pandemic will affect inequality through the labor channel.

As important as employment conditions, another factor which plays a part in the pandemic's impact on income inequality is the sectoral effect of the pandemic. In this context, the wealth of billionaires, who are owners or shareholders of digital giants and large pharmaceutical companies, has increased several times due to the increase in stock prices (Van Barneveld et al., 2020). For example, between 1st January, 2020 and 10th April, 2020, 34 of the USA's 170 richest billionaires increased their fortunes by tens of millions of dollars, and eight of these billionaires - Jeff Bezos (Amazon), MacKenzie Bezos (Amazon), Eric Yuan (Zoom), Steve Ballmer (Microsoft), John Albert Sobrato (Silicon Valley real estate), Elon Musk (Tesla and SpaceX), Joshua Harris (Apollo Global Management) and Rocco Commisso (Mediacom) saw a huge increase in fortunes. The wealth increase of Amazon founder and CEO Jeff Bezos is particularly unprecedented in the history of modern finance and is increasing day by day. His wealth has increased by an estimated \$ 25 billion since January 2020, as of April 15, which is greater than the Honduras GDP, which was \$ 23.9 billion in 2018.

However, although the pandemic has increased the wealth of some billionaires, there was a slight decrease in the total number of billionaires on Forbes' global billionaires' list published on 7 April 2020 (Collins et al., 2020). This situation shows that in countries where companies with relatively high technological power are clustered, income inequality will deepen further.

With the pandemic, working from home has become widespread and the limited opportunity to work from home on an individual or sectoral basis affects inequalities. Compared with high-income individuals, low-income individuals have limited opportunities to work remotely. Also, while high-income individuals can earn a wage bonus by working from home, the earnings of low-income workers are much more limited. For example, in European countries, 74% of employees in the highest wage quintile can work remotely, but this rate is 3% in the lowest quintile. In the UK, 60% of high-income people are able to work from home, but this rate is only 20% for low-income people. Similarly in the USA, the potential for working from home increases as the wage distribution goes up. Therefore, if the rise and spread of working from home becomes the norm, it could be a new vector of inequality (Stantcheva, 2021; Adams-Prassl et al., 2020; Sostero et al., 2020; Bonacini et al., 2020; Van Barneveld et al., 2020).

One of the prominent parameters in explaining the relationship between the pandemic and income inequality is productivity. In this framework, the pandemic affects income inequality by affecting the productivity of different income groups in different dimensions. For example, Etheridge et al., (2020) suggested that women and individuals in low-wage jobs experienced the greatest declines in productivity in the United Kingdom. In the study, the way in which income inequality through productivity was affected by working from home during the pandemic was also discussed. In the study, they found that the level of productivity of homeworkers during the lockdown was related to the intensity of working from home and how it changed from the previous period. Those who used to work at least occasionally from home and then increased the intensity of work from home experienced an increase in productivity. Those who did not increase their frequency of working from home or who had never worked from home before the pandemic reported significant decreases in productivity.

Remittances, another factor in the relationship between the pandemic and income inequality, are an important source of income in low- and middle-income countries, especially in rural households. Although most rural residents have relatively safe access to land, livestock or natural resources, they rely on various sources of income, including wage labor and non-agricultural activities, to survive. For example, about 40% of poor households in Nigeria receive either domestic or international remittances. Therefore, fluctuations in remittances will create a serious income shock for these households. In addition, given the share of remittances, particularly in education spending, a sharp decline in these is expected to reduce investment in human capital development, which is usually financed by remittances (FAO & UN, 2020; World Bank, 2020).

The cost of accessing healthcare is a factor which illustrates how the pandemic will change the income distribution. Particularly in countries where access to healthcare services is costly, healthcare bills can further deepen inequality due to large-scale borrowing on the part of the poor which leads to greater poverty. Individuals with the lowest income do not have health insurance, as they mostly work in the informal employment sector. Hence, high healthcare costs increase income inequality by cutting into a larger share of the budgets of poor households.

COVID-19 is expected to affect inequalities between countries as well as domestic inequalities. For example, Maffioli (2020) emphasized that poor countries could be more affected by the pandemic due to the insufficient infrastructure as well as to insufficient resources to strengthen public health policies. The fact that low-income countries direct their limited resources to health expenditure may further deepen the income differences between developed and underdeveloped countries. FAO & UN (2020) emphasized that COVID-19 could worsen inequalities both between countries and within the country. It is also possible that the consequences of inequalities from the pandemic are long-term because greater inequality weakens the impact of economic growth on poverty reduction. This causes growth to have less impact on the poor and other marginalized groups, and hence the economic recovery is reflected only on a certain part of society. Consequently, the process can lead to greater inequality in society as a whole (FAO & UN, 2020).

In the literature, the effect of the pandemic on income distribution is mostly discussed in developed countries. However, one of the questions waiting to be answered is how the pandemic affects the distribution of income in countries with different levels of development. What is the power of the social support policies implemented by the countries to affect this trend? It is expected that this study will contribute to the literature in this sense. In this study, the effect of COVID-19 on income inequality in 38 countries with different income levels is investigated using ANN and LR simulation methods. The plan of the study is as follows: In the section following the introduction, the literature review is discussed and in the third and fourth sections, the methodology and analysis findings are presented.

Literature

COVID-19 affects society in many ways, but undoubtedly one of the most controversial issues is its effect on household income. How is the pandemic affecting the income of wealthy households or poor households? It is impossible to talk about a single direct effect on this subject. The epidemic, which affects households with high income levels in some sectors, may affect poor households more strongly in others. It is important to know how the pandemic is affecting households with different income levels. This is because the effectiveness of social assistance policies to be implemented depends on a knowledge of how the epidemic,

which has already greatly affected social discontent, has changed income distribution. At this point, public support can minimize the impact of the pandemic, but knowing how it affects or will affect the incomes of households with different incomes can both bring an effective public policy and play an important role in reducing income inequalities by supporting the segment most affected by the epidemic.

Studies focusing on the relationship between COVID-19 and income inequality are mostly limited to specific countries, so this study, which includes both developed and developing countries, is expected to contribute to the literature by showing the trend of income inequality to be caused by the pandemic in both developed and developing countries.

Some studies on how COVID-19 will affect income inequality suggest that the pandemic will increase this inequality (Komatsu & Menezes-Filho, 2020; Van Barneveld et al., 2020; Bonacini et al., 2020; Kyyrä et al., 2021). However, other studies emphasize that income inequality will tend to decrease (Lustig et al., 2020; O'Donoghue et al., 2020; Grabka, 2021).

Studies suggesting that the pandemic will affect income distribution deal with the fact that the opportunity to work from home is not offered to the educated and low-educated workforce at the same rate (Bonacini et al., 2020) and with the fact that the lockdown restrictions affect households at different rates (Perugini & Vladisavljević, 2020). Other studies cover the distribution of social support benefits and tax reductions (Kyyrä et al., 2021; Almeida et al., 2021) and the fact that the pandemic affects women and low-income individuals more deeply (Etheridge et al., 2020).

Considering the studies suggesting that the pandemic will increase income inequality, Delaporte et al. (2020) in their study of 20 Latin American and Caribbean (LAC) countries argued that the social distance applied to the pandemic led to an increase in income inequality in many of these countries. Perugini & Vladisavljević (2020) argued that restriction policies applied to control the pandemic in 31 European countries will increase inequality and poverty, and the magnitude of change will be greater in more unequal countries. Bonacini et al. (2020) argued that working from home has increased with the pandemic in Italy, and this practice, which benefits upper-middle income people, may deepen income inequalities. According to Van Barneveld et al. (2020), a skilled and high-wage workforce that can work from home in the Information Technology (IT) field is more advantageous than the millions of low-wage workers in the low-wage retail and service sectors, and thus the unskilled workforce may be more affected by the pandemic. Therefore, according to the authors, COVID-19 will increase income inequality. Aina et al. (2021) investigated the effect of Covid-19 on wage distribution in Italy. According to the findings of the study, the pandemic affects the wages of all workers, but this effect is higher for those at the lower end of the wage distribution.

In addition, the fact that the fortunes of billionaires affiliated to digital giants and large

pharmaceutical companies increase more and more as the stock prices increase is one of the determining factors in the deepening of inequalities. Duman (2020) suggested that isolation policies due to Covid-19 can increase wage inequality depending on supply shocks in Turkey. Similarly, Bayar et al. (2020), in their study of labor market indicators in Turkey due to Covid-19, reached the findings that low-income groups lost more income than high-income groups. In summary, the findings are based on the argument that the rich lose proportionally less income than the poor.

However, looking at studies suggesting that inequalities will tend to decrease with the pandemic, O'Donoghue et al. (2020) mentioned that the pandemic could play a balancing role in income inequality with the effect of social assistance and taxes in Ireland. According to the study, they claimed that with the pandemic, the highest income losses were seen in high-income individuals, and the poorest part of the society received the least damage from the process with the introduction of tax cuts and social assistance. According to Grabka (2021), income inequality decreased in Germany with the pandemic. According to the study, the reason for the decrease in relative income inequality in Germany is directly related to the income losses suffered by the self-employed because self-employed people in Germany are richer than other labor force groups.

In some studies, the effect of the pandemic on income distribution was examined by including the process of public support policies. For example, Lustig et al. (2020) argued that the devastating impact of COVID-19 in Argentina, Brazil, Colombia and Mexico was stronger on middle-income households than on the poorest segment of society. In this framework, the study, in which the expanded social assistance provided by governments in response to the crisis was included in the analysis, revealed that the aid had a low level impact in Colombia and a large balancing effect in Brazil and Argentina. Almeida et al. (2021) investigated the impact of the pandemic in 27 European countries and the effects of the policies implemented due to the pandemic. Accordingly, the pandemic is expected to increase income inequality, but support policies are expected to reduce this effect relatively. According to Angelov & Waldenström (2021), Covid-19 has increased earnings inequality in Sweden because the epidemic has affected low-paid individuals more in the country. In the study, it was emphasized that public support had a positive effect on income distribution, but could not completely eliminate inequality. Kyyrä et al. (2021) suggested that the pandemic increased income inequality in Finland. According to the study, it was emphasized that tax support played a balancing role in these inequalities, otherwise inequality might be much higher.

Methodology

In the study, firstly, missing Gini values in 102 countries were calculated based on the available UTIP data, and the values obtained by both the UTIP data and the simulation met-

hod are given in Table 2 and Table A1 (see appendix). While the light-colored Gini values in Table 2 and Table A1 show the UTIP data, the dark-colored values are the values obtained by the ANN simulation method based on the UTIP data. The graphics showing the trend and deviation of the real and simulated values of these calculations are also given in Annex 2.

In this study, how the COVID-19 epidemic will affect income inequality in 38 countries is examined using ANN and LR methods. The Gini values for 2020 were estimated using growth, unemployment and inflation data which affect income inequality. For this, the Gini index for 2020 was predicted by using unemployment, growth and inflation for the 2000-2019 period. Here, the effect of the change that these variables will cause in the Gini index is utilized. The inputs and outputs used in the model are given in Table 1.

Table 1
Input and output variables for ANN and LR Method

Inputs	Outputs
lnGDP, Inflation, Unemployment and Year	Gini index for 2020

The development of artificial neural networks (ANN) was formed by combining many simple computing elements, namely neurons, in a highly interconnected system. And so the ANN emerged from an attempt to simulate biological nervous systems, hoping that an “intelligence” would give rise to complex phenomena as a result of self-organization. While artificial neural networks rarely have a few hundred or more than a few thousand neurons, the human brain has about a hundred billion neurons. Resembling a complex human brain, these networks are still far beyond the fastest, highest-capacity parallel computers in existence (Warren, 1995). ANN consists of neuron-like elements which are called nodes. These nodes are arranged in layers as shown in Figure 1. Generally, ANN is used to approximate a nonlinear mapping between system inputs and outputs (Willis et al., 1992).

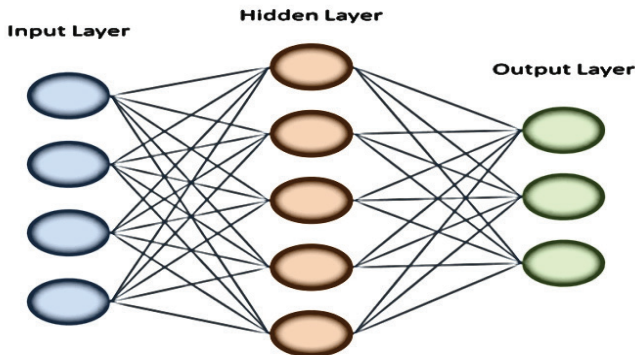


Figure 1. Artificial neural network.

The basic unit of a multilayer perceptron is the neuron, which has the function of subject-

ting the weighted sum of signals to the input to a transfer function (Kubat, 2017). Where Σ is the weighted sum of the inputs, calculated using the formula:

$$f(\Sigma) = \frac{1}{1+e^{-\Sigma}} \tag{1}$$

The Artificial Neural Network in Fig. 1 is known as the multilayer perceptron, input, output and hidden layers represented by neurons. For two-layer perceptron the formula is as given,

$$y_i = f\left(\sum_j W_{ji}^{(1)} f\left(\sum_k W_{kj}^{(2)} x_k\right)\right) \tag{2}$$

The j-th hidden neuron takes the weighted sum, $\sum_k W_{kj}^{(2)} x_k$, as input and subjects it to the sigmoid function $f\left(\sum_k W_{kj}^{(2)} x_k\right)$, with the values x_k multiplied by the weights included with the links. The i-th output neuron then obtains the weighted total of the hidden neurons' values and applies the transfer function to it once more. This is how the i-th output is obtained. Forward propagation is the process of propagating attribute values from the network's input to its output in this manner (Aggarwal, 2018). Artificial Neural Networks are the most well-regarded and widely used machine learning techniques.

Machine learning (Er et al., 2021; Farsad & Goldsmith, 2018; Kubat, 2017) is widely utilized in a variety of fields to address complex issues that are difficult to solve using traditional computer methods. One of the most basic and widely used machine learning methods is linear regression. It is a method for performing predictive analysis that is based on mathematics. Linear regression (LR) allows for projections of continuous/real or mathematical variables. Linear regression (Chen et al., 2019; Maulud & Abdulazeez, 2020) is a typical mathematical research tool that allows you to test and estimate anticipated effects versus numerous input variables. It is a data analysis and modeling technique that develops linear relationships between dependent and independent variables. From the quantitative perspective, machine learning such as ANN and LR often consists of optimum combinations which permit better prediction and more accurate estimations than occur with other types of models. One of the benefits of using ANNs is that it may make models from complex natural systems with massive inputs easier to use and more accurate. The artificial neural network (ANN) has been discovered to be a very new and valuable model for problem-solving and machine learning (Abiodun et al., 2018; Isik et al., 2021).

In the simplest terms, Linear Regression is a supervised Machine Learning model that identifies the best fit linear line between the independent and dependent variables, i.e. it discovers the linear relationship between the two variables. There are two forms of linear regression: simple and multiple. Only one independent variable is present in simple linear regression, and the model must identify a linear relationship between it and the dependent variable. Multiple Linear Regression, on the other hand, uses more than one independent

variable to find a relationship. In the equation of simple linear regression, b_0 is the intercept, b_1 is the coefficient or slope, x is the independent variable, and y is the dependent variable.

$$y = b_0 + b_1x \quad (3)$$

Multiple Linear Regression Equation, where b_0 is the intercept, $b_1, b_2, b_3, b_4, \dots, b_n$ are the coefficients or slopes of the independent variables $x_1, x_2, x_3, x_4, \dots, x_n$, and y is the dependent variable.

$$y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_nx_n \quad (4)$$

The basic goal of a Linear Regression model is to determine the best-fit linear line and the appropriate intercept and coefficient values such that the error is minimized. The discrepancy between the actual and predicted values is called error, and the goal is to reduce it (Chen et al., 2019; Maulud & Abdulazeez, 2020).

ANN and LR models have the ability to learn and can learn with different learning algorithms (Kubat, 2017). They can produce results (information) for unseen outputs. There is unsupervised learning. They can make pattern recognition and classification. They can complete the missing patterns. They have fault tolerance and can work with incomplete or ambiguous information (Chen et al., 2019; Wang et al., 2018). In faulty cases, they show graceful degradation and can work in parallel and process real-time information so are used in this study.

All data is statistically compared for training and testing results once all estimated values are produced with ANN and LR models. To compare the results, the coefficient of determination (R^2) and Mean squared error (MSE) approaches are used. The following equations show how to calculate Formulation of MSE and R^2 .

$$MSE = \frac{\sum_i (Real\ Data_i - Sim_i)^2}{N} \quad (5)$$

$$R^2 = 1 - \frac{\sum_i (Real\ Data_i - Sim_i)^2}{\sum_i (Sim_i)^2} \quad (6)$$

Real data, Sim and N denote to the value of real data, the value of simulated results, and the number of samples in the suggested model, respectively. The coefficient of determination and the MSE are proposed to become around 1 and 0 correspondingly. Although R^2 values for the model's training and testing outcomes are around 1, MSE values are greater than 0, notably for the model's testing section (Hecht-Nielsen, 1989). The similarity between experimental and simulation results is 99 % for all of the glow curve data (Lee, 2004; Basheer & Hajmeer, 2000; Willis et al., 1992).

Results

In this study, ANN and LR models were used to estimate the Gini index for 2020 using Gini index of 38 countries. The growth, inflation, unemployment, which are determinants of income inequality, and years are chosen as input and the Gini index of all years is selected as output for the prediction of the Gini index of 2020. The model findings obtained using these variables are presented in Table 2. The table also includes simulated Gini values based on both UTIP Gini data and UTIP data for the 2000-2019 periods in order to see past trends. The change in the Gini index is analyzed on the basis of the previous year's data and if the change is positive, a (+) sign is placed in front of the value, and a (-) sign is placed in front of the value if it is negative, thus indicating the direction of the change.

Table 2

Gini index for 38 countries

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020-ANN	2020-LR
Australia	40.77	41.55	40.75	41.84	41.79	42.08	42.76	43.37	42.50	42.52	-42.11	-42.44
Austria	36.36	36.86	36.97	36.81	36.61	36.49	35.95	35.64	36.59	36.58	+36.61	+36.84
Belgium	41.27	41.10	42.46	42.84	42.63	42.64	42.96	42.02	42.02	41.52	+41.74	+41.80
Canada	39.30	38.34	38.76	38.75	38.83	38.85	38.34	38.13	38.53	38.27	+41.27	+41.82
Cyprus	36.18	36.81	35.56	36.94	36.98	36.91	36.80	36.98	35.28	36.18	-35.09	-35.45
Czech Rep.	31.94	31.14	31.96	32.01	31.74	30.87	32.57	31.51	31.82	31.61	-31.24	-31.38
Denmark	37.14	36.15	34.16	34.08	34.31	34.18	34.01	33.96	34.15	33.55	+34.48	+34.26
Finland	36.04	35.88	36.03	35.86	36.41	35.96	35.26	36.45	36.26	36.86	-36.84	+36.87
France	38.15	37.57	37.33	38.03	38.00	37.94	37.91	37.46	37.78	37.13	-36.23	-36.14
Germany	38.51	38.86	38.31	38.37	38.29	38.22	38.44	37.54	38.55	38.25	+40.14	+39.37
Greece	41.23	40.88	45.11	45.51	45.47	45.44	45.41	45.41	45.51	45.91	-45.75	-44.96
Israel	44.37	44.69	44.27	43.88	43.47	43.41	43.04	43.79	43.58	43.28	+43.98	+43.82
Italy	37.08	37.06	37.37	37.36	37.33	37.23	37.16	37.23	37.42	37.62	-36.19	-37.00
Japan	43.88	46.50	43.45	43.83	43.02	43.87	44.91	43.79	43.38	43.78	+44.45	+44.30
Latvia	42.50	42.62	41.84	41.04	40.93	40.67	40.81	40.71	40.60	41.70	+41.94	+41.81
Lithuania	44.25	43.21	42.48	41.43	41.11	40.69	40.62	41.92	41.23	41.83	-41.17	-41.59
Netherlands	38.42	39.65	39.16	39.13	38.89	38.88	39.56	39.39	37.38	37.58	+38.43	+38.70
Norway	36.81	36.79	37.24	37.15	34.42	37.16	38.35	38.81	39.08	39.20	+39.57	+39.42
Portugal	43.11	42.77	42.76	42.83	42.57	42.45	42.62	42.46	42.21	42.14	-41.56	-41.99
R. of Korea	38.90	39.19	39.02	39.80	39.07	39.54	39.25	39.21	39.06	39.37	+39.68	+39.88
Singapore	39.02	39.81	39.14	39.20	40.42	40.84	40.35	40.44	39.50	39.93	-39.82	-39.11
Slovakia	36.85	36.67	36.89	37.36	37.03	36.4	37.08	37.56	37.72	38.00	+39.58	+39.69
Slovenia	34.70	34.55	34.10	34.46	33.39	33.36	33.59	32.35	31.34	32.04	+32.76	+32.37
Spain	40.90	40.9	41.52	42.04	42.35	42.21	42.00	41.83	40.92	40.81	+41.93	+42.49
Sweden	33.77	33.11	34.28	34.46	34.44	32.82	33.48	33.40	33.10	33.20	-33.13	-32.83
UK	38.42	40.33	38.53	41.27	39.81	39.87	40.68	38.87	37.30	37.08	+38.69	+40.14
USA	42.20	42.31	42.08	42.02	42.00	41.98	41.94	41.93	41.93	41.93	+42.08	+42.46

	Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020- ANN	2020- LR
Developing Countries	Brazil	47.70	47.48	47.15	47.06	47.16	47.58	47.39	47.51	47.12	47.22	+47.28	+47.40
	Bulgaria	43.12	42.18	42.69	42.45	41.88	41.56	41.37	42.35	41.85	42.15	+42.31	+42.18
	China	38.78	38.99	37.68	37.53	37.42	38.26	38.47	38.94	38.25	38.56	+41.20	+41.38
	Colombia	42.44	41.76	41.47	45.15	44.81	44.8	44.84	44.73	44.99	43.73	+43.87	+43.83
	Croatia	42.29	42.37	42.73	42.82	41.68	41.76	42.01	42.01	42.01	42.03	-39.73	-39.07
	Hungary	41.45	41.11	40.86	40.43	40.49	39.87	40.34	39.42	40.42	40.42	-38.27	-39.63
	Malaysia	39.70	39.38	39.31	39.29	39.62	39.42	40.47	40.67	40.87	39.07	+39.85	+39.73
	Philippines	47.68	47.63	48.46	49.74	49.68	49.67	49.84	49.91	50.02	50.42	-50.34	-50.06
	Poland	40.32	40.49	40.27	39.97	39.73	39.43	38.41	37.75	37.35	37.18	+38.00	+38.02
	Romania	42.56	42.66	42.35	44.09	41.78	42.52	42.78	43.86	43.90	43.52	-42.92	-43.19
	Turkey	47.16	46.61	45.74	45.13	44.78	44.70	45.91	46.97	46.67	46.07	+46.57	+46.65

Note: Light colored values show UTIP data, while dark-colored values show Gini values obtained by a simulation method based on UTIP data.

When the Gini index values and changes estimated by the ANN and LR simulation method in Table 2 are examined, it is seen that the results vary from country to country. Therefore, it becomes difficult to make a preliminary judgment that the pandemic increases or decreases income inequality. However, in general, it can be said that the pandemic increases the income inequality mainly in developed countries and in developing countries, but this effect is more uncertain.

It is observed that inequality is increasing, especially in countries such as the USA, Germany, UK and China, where leading vaccine producing countries are located. In these countries where digital giants and large pharmaceutical companies are strong, inequality is expected to increase. The lack of strong transnational companies in sectors with increased profit margins in developing countries with the pandemic and the deterioration in living conditions of households with middle-income levels are the main parameters that can lead to a decrease in inequalities. According to Forbes's list of billionaires for 2021 (Dolan et al., 2021), it can be seen that the pandemic has led to a significant increase in the number of billionaires. According to the report, the USA is the country with the most billionaires with 724 and China comes second with 698 billionaires. As can be seen from Table 2, the mentioned countries are among the countries where inequalities have increased. Similarly, inequalities are expected to increase in Brazil, which has the highest number of billionaires in Latin America. According to the Forbes report, the USA ranks first in the number of billionaires emerging with the pandemic in the world, followed by Canada. As can be seen in Table 2, the increase in inequalities is expected to be higher in Canada.

The size of social assistance programs is undoubtedly as important as the sectoral shares of the countries in the formation of these results. For example, is the support provided by governments mostly to the poor or to big companies? However, when the social assistance policies of these countries are examined, it can be seen that, contrary to expectations, the-

se policies are limited in most of these countries. On the other hand, it is expected that the relative inequalities will decrease or show a slower increase in countries that implement a relatively strong and fairer social policy. For example, Germany is one of the countries where the big global technology companies and the vaccine-pharmaceutical industry that benefit from the pandemic are strong, and therefore the number of billionaires is increasing rapidly. However, the increase in inequality is expected to be lower than expected. Because Germany has been successful in its social aid policies, it provides for the society in general. According to the ILO (2020) report, the main social support policies implemented by Germany to reduce the effects of COVID-19 are: i) continuation of benefit for workers from short-term work allowance even if they work in additional jobs, ii) support for single parents who are caring for children, iii) reduction of VAT rates , iv) suspension of bankruptcy applications due to excessive indebtedness, v) provision of privileges to seasonal workers in addition to the support provided in the agricultural sector, vi) income support for low-income households and individuals working alone, vii) Family Premium Payment per child for all parents, viii) free one-off support payment to those who have a profession, ix) provision of financial support to companies that are particularly severely affected by the pandemic (ILO, 2020). All of this has allowed support against the effects of COVID-19 to be distributed throughout the entire community.

France and Italy, which are among the countries with the highest number of COVID-19 cases, are expected to balance inequalities by maintaining support for low-income households and by implementing policies to prevent unemployment. For example, France mostly prioritizes employment sustainability in its policies to reduce the effects of the pandemic. Some of these policies include cash assistance within the framework of unemployment guarantees, solidarity funds provided to companies in the sectors that experience a very sharp decline in their activities, and giving a certain percentage of monthly turnover as compensation. Italy, on the other hand, has focused directly on low-income individuals. For example, bonus supports for low-income workers, mortgage repayment (for residency house) for low and middle-income households, income support to companies during periods of temporary or permanent interruption of production (80% of gross salary and full social security contribution) to minimize unemployment. Support provided to low-income households, such as the provision of services, and policies to reduce unemployment may be effective (ILO, 2020).

When we look at Turkey, which has a relatively high number of cases, inequalities are expected to show an increasing trend. Some of the support provided in Turkey included a delay in payment of taxes, configuring the taxes and interest owed, a delay for trade credit, and low income cash assistance to households. The strongest policy used by the government in minimizing the impact of the epidemic on households was the prohibition of layoffs for a certain period of time and support of this with short-time work allowance. Thus, it is aimed to partially control unemployment.. However, the higher level of benefits provided to medium

and large-scale companies caused small tradesmen to be more severely affected by the epidemic. Therefore, an improvement in income distribution is not expected. On the other hand, the sharp increase in exchange rate and gold prices led to a significant increase in the wealth of households with foreign currency and gold deposits in their accounts. This is one of the determining parameters in income inequality. In summary, although the aim was to minimize the destructive effect of the epidemic, the effect of the increase in gold prices in exchange rates in addition to the economic contraction experienced all over the world, has meant that the support provided in the country was insufficient to mitigate the impact of the epidemic.

Conclusions

Income inequality is an important area of discussion within the framework of the effects of the COVID-19 crisis, which has affected the whole world with its health and economic dimensions. Countries that want to reduce the number of pandemic-related cases and patient and mortality rates due to the pandemic turn to strict isolation policies. This situation leads to problems such as a serious decrease in the production process and the loss of employees' jobs and income. COVID-19 affects all segments of society, albeit in different forms and degrees. The pandemic has caused changes in the income level of the skilled workforce as well as the unqualified workforce. Again, the continuation of the employment of a significant portion of the unskilled labor force who work in the agricultural sector and daily casual jobs, and the opportunity to work from home to the educated qualified workforce, makes it difficult to reveal which segment is affected relatively more by the pandemic. Thus, the pandemic affects the employment of both the qualified and unqualified workforce in multiple ways. Every segment of society is affected by this process, though in different dimensions.

In this study, an ANN and LR simulation method was used to study the effect of COVID-19 on income inequality in 38 countries. The results obtained in this study, which deals with the effects on income inequality of parameters such as unemployment, inflation and growth, differ by country. According to this study, inequality is generally expected to increase in developed countries and this effect is more uncertain in developing countries. Although the pandemic has deeply affected the living conditions of the poor, the relative decline in the wealth of individuals in middle and upper-income levels may be higher. Because there are rich people whose wealth has increased exponentially due to the pandemic, there is also a segment whose wealth is rapidly disappearing. Therefore, a single argument that suggests that inequality will decrease or increase around the world would not be realistic. At this point, many parameters, from the social assistance policies of countries to the shares of sectors in the national economy, will be decisive in how far the pandemic will affect inequality.

Another parameter that determines inequalities is the number of billionaires in the country increasing with the pandemic, because in countries where the number of billionaires has inc-

reased due to the pandemic, inequalities are expected to increase. When Table 2 is examined, it is seen that inequalities have increased in most of the countries that are at the forefront in the number of new billionaires after pandemic in the Forbes list (for example USA, Canada, Germany, Japan and Spain, Brazil).

Our findings show that inequalities may show an increasing trend, especially in developed countries where billionaires have increased after the pandemic. In addition, the findings also support the limited number of studies that focus on the impact of the pandemic on inequalities, mostly in developed countries. (Kyyrä et al., 2021; Adams-Prassl et al., 2020; Almeida et al., 2021; Brewer & Tasseva, 2020; Clark, 2021)

In conclusion, it is important to design social policies in a way that prioritizes basic rights to life such as housing, nutrition and health. In this context, the following policies are important to reduce income inequality: (i) Providing access to free health services for those who have to work informally in order to survive and who are not under the umbrella of social security. (ii) Providing tax cuts to companies, tax restructuring, financial assistance to sectors directly affected by COVID-19 in order to prevent income losses due to unemployment. (iii) Additional taxation of companies whose profitability has increased due to the pandemic process, to be transferred to the households most affected by this process. (iv) In order to prevent isolation policies from locking the economy, arrangements should be made for flexible and different time schedules such as shift systems and different working hours so as to reduce human density.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

Author Contributions: Conception/Design of study: A.Ö., E.I., Y.B., M.T., F.B.; Data Acquisition: M.F.O., E.I.; Data Analysis/Interpretation: E.I., M.F.O.; Drafting Manuscript: A.Ö.; Critical Revision of Manuscript: M.T., Y.B., F.B., A.Ö., M.F.O., E.I.; Final Approval and Accountability: A.Ö., E.I., Y.B., M.F.O.

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Countryname	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
Algeria	39.793	42.836	46.468	49.883	53.019	55.944	58.673	61.208	63.651	65.999	68.254	70.417	72.490	74.474	76.367	78.169	79.880	81.499	83.026	84.462	85.807	87.062	88.226	89.307	90.307	91.224	92.056	92.804	
Algeria	34.1394	33.8425	35.0975	35.851	35.7785	45.1265	42.7434	43.0651	44.0403	44.9719	45.9879	46.9820	48.0056	48.7146	47.5152	47.1012	47.8125	46.6599	46.2744	47.0919	47.2200	47.1342	47.9237	42.9555	42.2010	42.3200	42.3200	42.3200	
Algeria	38.4770	39.1817	39.5240	39.4666	41.1511	39.3661	39.6514	40.0611	41.0933	42.3248	44.2444	44.5668	44.9039	45.0337	38.6526	39.1419	39.4997	39.7311	40.1747	40.3493	40.2835	39.7020	38.9953	38.1157	38.9216	38.2031	38.2031	38.2031	
Argentina	47.231	46.506	46.720	46.841	47.000	47.150	47.300	47.450	47.600	47.750	47.900	48.050	48.200	48.350	48.500	48.650	48.800	48.950	49.100	49.250	49.400	49.550	49.700	49.850	49.950	50.050	50.150	50.250	50.350
Armenia	47.875	45.264	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	47.237	
Australia	35.978	35.964	36.566	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	37.285	
Australia	41.2134	42.751	42.970	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	43.004	
Bangladesh	45.739	40.224	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	40.879	
Bangladesh	38.241	38.100	38.209	38.091	38.055	38.495	39.095	38.835	38.817	38.996	39.872	39.065	40.039	40.097	40.452	40.030	40.751	41.390	41.74	41.815	42.461	42.854	43.610	42.942	42.942	42.942	42.942	42.942	
Bolivia	50.869	50.755	50.909	50.668	51.084	50.937	50.853	50.675	50.831	51.207	51.683	51.243	51.869	51.513	51.245	51.984	52.571	53.047	53.008	48.538	48.173	48.786	46.347	45.925	51.958	52.001	51.869	51.869	
Bolivia	48.309	48.858	48.571	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	
Bolivia	48.309	48.858	48.571	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	49.951	
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35.774	35.959	39.574	40.514	40.917	41.059	41.458	42.578	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958	42.958
Burkina Faso	32.917	34.918	35																										

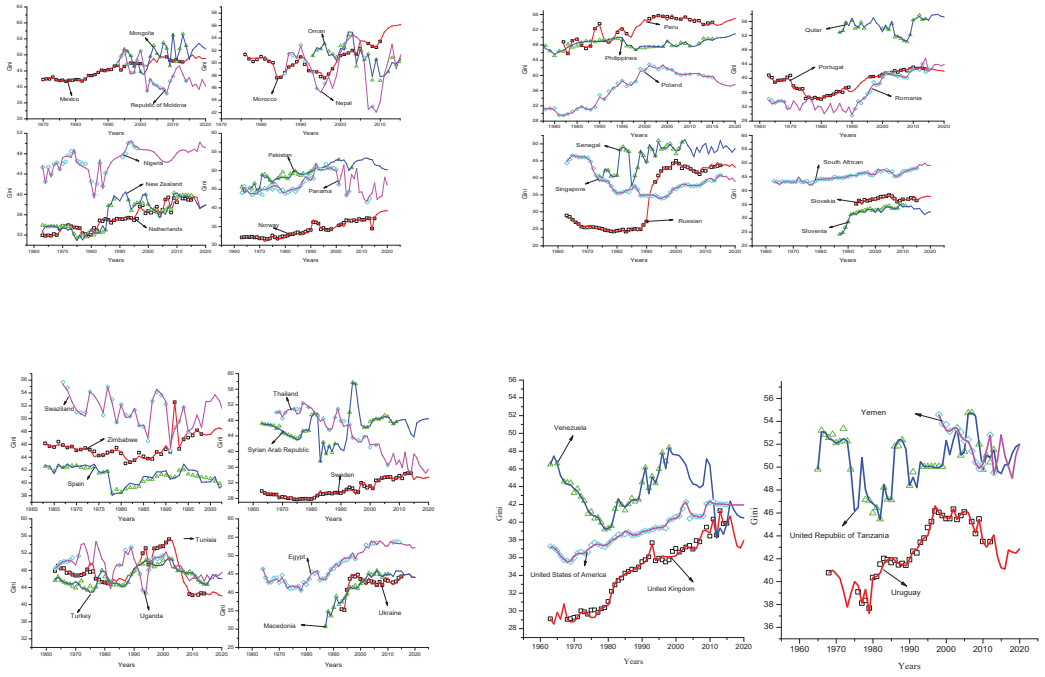


Figure A1. Continued



Istanbul Business Research

Submitted: 06.10.2020

Revision Requested: 15.01.2022

Last Revision Received: 02.04.2022

Accepted: 28.04.2022

Published Online: 22.09.2022

RESEARCH ARTICLE

Ready or Not, Here Comes the Digitalization: Assessment of Workforce Readiness and Change Perception

Ezgi Yıldırım Saatçi¹ , Ceyda Ovacı² 

Abstract

The digital world is an indispensable reality of the new century. While technical aspects for transformation are heavily evaluated, the readiness of human resources for digital transformation is not handled as a basic change management principle. This study aims to enrich the literature by determining the perception of the readiness for a digital change of individuals. The purpose of the study is to investigate the factors that have a direct association with the readiness of the workforce during the digitalization process. The vast majority of the digital integration efforts are aimed at increasing digital maturity levels. However, in order to ensure human resources' participation in a digital transformation, it will be useful to measure their perception of readiness for digitalization and develop strategies that will enable participation. Therefore, this research will be a guide in the journey of digital change management of the workforce. Structural Equation modelling has been used to analyse the data. The research sample consisted of 460 participants that implement a digital restructuring process in companies. The results of the research evaluated, indicate that an individual's readiness for digital transformation is related to their perceived self-efficacy, need for change, management support and the benefit for the organization, and they are all like wheels in a machine wheels working for a successful digital transformation of workforce.

Keywords

Digital Transformation, Digital Human Resources, Readiness for Change, Need for Change, Organizational Benefit, Self-Efficacy

Introduction

The profuse possibilities that arose from the industrial revolutions have already started to exploit themselves through different contexts from business life to social life. Specifically, the so called - 4th Industrial revolution- era raised the importance of digitalization in consequence to an advance in manufacturing related technologies. A considerable number of companies that aim to compete globally in the high demanding context of business rivalry, and that adapt

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To cite this article: Yıldırım Saatçi, E., & Ovacı, C. (2022). Ready or not, here comes the digitalization: assessment of workforce readiness and change perception. *Istanbul Business Research*, 51(2), 607-626. <http://doi.org/10.26650/ibr.2022.51.806691>



processes of digital integration are increasing frequently. Most of the works accomplished so far are related to the investment in new manufacturing technologies, the consideration of relevant design processes, the technology maturity level and the augmentation (Matt, Hess, & Benlian, 2015). Especially with the pandemic that the world has witnessed in recent years, the need to increase the level of digital maturity has emerged so that organizations can be less susceptible to changes and transformations. In other word, digitalization has become an obligation rather than an option (Fletcher & Griffiths, 2020). At this point companies direct the workforce towards those efforts only for the purpose of increasing their competencies in the usage of newly adopted technologies. However, it is mostly considered to be more useful to measure their readiness and acceptance level of digitalization, and then develop strategies accordingly that follow technical competencies (Cetindamar, Abedin, & Shirahada, 2021). Some researchers have paid attention to the effects of digital transformation at the workforce level (Kozanoglu & Abedin, 2021; Warner & Wäger, 2019). Respectively, the literature lacks the depth of this specific research to depict the human resources' readiness for, and acceptance levels of, sustainable digitally oriented change in the organizations.

For sustainable digitalization, not only the technology but also the management of the change imposed from this technology are crucial and needed. Organizational culture, management style and business processes have key effects on human resources' adaptation to digital transformation, and hence need to be designed and strategized accordingly. In total, those factors mentioned constitute the general framework of organizational change. Organizational changes cover both reactive and proactive moves to environmental changes such as technology, politics, economics etc. for a larger transformation during which the success of the change requires a common structure accepted by all the organizational functions (Hanelt, Bohnsack, Marz, & Marante, 2021). Specifically, during the digitalization if companies do not go beyond the investment and integration of manufacturing related technologies, a real organizational change may not flourish. Digitalization is more than a fixed technology investment that covers internal competencies development for sustainable advantage. Digital competencies serve companies in developing a technology-based business model, an efficient and effective use of resources in an agile manner, differentiating customer experiences, and innovating new products and services. Therefore, a narrow understanding of digitalization solely as a technological change will impede an organizations implementation of those competencies. To better establish the structure of digitalization and competencies, all the factors affecting these changes through human resources' readiness and acceptance levels, need to be clarified.

In that respect, this study covers quantitative analysis of the factors that affect human resources perceived readiness during digital transformations. A pilot industry with a moderate level of digital maturity can be stated as the interest area of the research to develop a scale to measure the perceived readiness of human resources. A quantitative analysis was imple-

mented through a questionnaire to the human resources of the companies. In the light of the quantitative analysis, a thorough interpretation of the findings is aligned to the literature on human resources roles in digital transformation.

This study makes an original contribution to the field by measuring the perception of the new generation of working principles of human resources. This further adds value to the increase in socio-economic value of digitalization by identifying proposals to create a communication network using the combination of technology and human factors and a flexible production /service environment in companies.

Literature Review

Change Management and Digitalization

In the dynamic environments, firms like all organizational actors, need to keep up with the rivalry and manage change continuously and repeatedly. According to Kotter (1995) technological developments, globally integrated economies, maturation of markets in developed countries create more competition with bigger markets and fewer entry barriers therefore causing shifts in the perception and application of organizational elements such as strategy, structure and culture (Pettigrew, Woodman, & Cameron, 2001).

Technological developments in particular create a cycle of change in which businesses regularly try to adapt innovation to survive. The reiteration of such changes, either incremental or radical changes within short time periods, plays an important role in achieving competitive advantage (Lewis, 2000).

Organizational change is “*adoption of new idea or behaviour by an organization*” (Pierce & Delbecq, 1977, p. 64). From other angles “change is to reveal some differences even if they are not new” (Robbins & Judge, 2012, p. 312). Prediscan and Roiban (2014) define change as “doing something apart from the initial condition that threatens the current forces and pushes organizations to face the unknown” (p. 280).

Change management comes with change process and change agents. The main process starts with the recognition of the need for change and initiation. Reasoning and explanation to all actors and planning for how to intervene to achieve the desired change are followed by implementation and follow-ups to produce a loop of feedback (Moran & Brightman, 2000). Therefore, it is crucial for organizations to assess and handle the change agents and change processes concurrently.

According to Lunenburg (2010); “*The individual or group that undertakes the task of initiating and managing change in an organization is known as a change agent. Change agents*

can be internal, such as managers or employees who are appointed to oversee the change process. In many innovative-driven companies, managers and employees alike are being trained to develop the needed skills to oversee change” (p.1).

Hence, the argument stressing that one of the critical factors in the successful completion of change is the attitude of employees towards change can be underlined (Miller, Johnson, & Grau, 1994). From this point of view, readiness for change is expected to have a positive effect on employees’ attitudes. Beliefs, attitudes and intentions that the need for change and organizational capacity are prerequisites to explain the readiness for change (Armenakis, Harris, & Mossholder, 1993; Rafferty, Jimmieson, & Armenakis, 2013).

Various factors that affect the employees’ perceptions of readiness for change are:

- Self-efficacy in technological change,
- Perceived senior management support,
- Perceived organizational benefit,
- Need for technological change (Kwahk & Lee, 2008; Holt, Armenakis, Feild, & Harris, 2007; Oreg, 2006).

In this context, organizational change emphasizes the need for the system logic of the organization to be considered as strategy, structure, culture, technology, shared values, leadership style and personnel in relation to its environment, the upper system and its sub-systems and their interaction and communication (Garvin, 1993). It is not possible for businesses to avoid changes in the digital age. Therefore, in order to achieve transformation, organizational change structure should be established.

Kurt Lewin’s Power Field Analysis, which is the most cited model of organizational change in the literature, emphasizes the aim of equilibrium over supporting propulsive forces and restricting forces in change and clarifies this equilibrium with the unfreezing-action-re-freezing system. According to Lewin (1939) change / transformation occurs when there is an imbalance between limiting and driving forces, and this leads to dissolution in the first stage through behavioural patterns. Under this model, it is aimed to identify the institutional power resources in the dissolution phase and to reveal them at a level that will protect the existing structure, until the change in the action phase is realized and the improvement and the restraining forces are in balance, the desired change and innovation in the re-freezing phase are stereotyped and institutionalized.

For digital transformation, these processes have similar driving and limiting forces and have shortened the intervals of the processes in the applications that put technology at the forefront of organizational change models and put the change in a centre that constantly renews itself.

Marcon, Marcon, Le Dain, Ayala, Frank, & Matthieu (2019) states that *“Digitalization, is understood as the process of using digital technologies to create and obtain value in new ways. It has been enabled by the miniaturization of hardware, powerful microprocessors and wide access to the internet. The use of digital technologies can increase firms’ performance and competitiveness. In a product-service system context, digital technologies can improve both the innovation process, by facilitating the orchestration and collaboration, and the outcome, since they can offer new functionalities and deliver value through a digital solution”* (p.255).

The majority of the research on digital change includes what kind of changes in the fourth industrial revolution will lead to future job descriptions, measuring the level of digital maturity of enterprises, analysis of the current situation and competence on the basis of country, sector and enterprise (Rüßmann, Lorenz, Gerbert, Waldner, Justus, Engel, & Harnisch, 2015; Forschungsunion & Acatech, 2013; TUSIAD, 2017; Trends, 2017). A few studies were found that measure employee perceptions during the digital transformation process (Kumar, Renjith, & Nimal, 2019; Schneider and Sting, 2020). Academic interest of the digital transformation of workforces focusses on digital literacy measurements (Kozanoglu & Abedin, 2021), evaluations of employee satisfaction, the perceived use and easiness (Kumar, Renjith, & Nimal, 2019) measurement of employees’ feelings (Schneider and Sting, 2020), resistance of employees to digital changes (Frick, Mirbabaie, Stieglitz, & Salomon, 2021; Stam, Stanton, & Guzman, 2004). However, employees’ beliefs and perceptions, which are one of the important stakeholders of the change, influence the completion of the process (Cunningham, Woodward, Shannon, MacIntosh, Lendrum, Rosenbloom, & Brown, 2002; Eby, Adams, Russell, & Gaby, 2000). Because it is possible to encounter employee resistance in organizations where radical changes such as digital transformation are experienced. Therefore, transformational leadership is important in order to provide involvement of employees by understanding the benefits and purposes of the transformation (Riasanow, Setzke, Böhm, & Krcmar, 2019).

Organizational change is the most striking element in digital transformation and it can be said that this change is accepted by organizational employees and corporate culture (Kilmann & Covin, 1988; Lundberg, 1996; Schein, 2010). The attitude towards machinery and equipment in the first industrial revolution is similar enough to guide attitudes towards digitalization in the information age (Hitt & Sirmon, 2009).

“Changes in the environment in which the organization is located begin to affect the organization through its inputs and disrupt the balance of the organization. When changes in the environment of the organization reach great dimensions, the organization has to change according to the demands of the environment in order to continue its vital activities. Every change leads to an interaction and as a result of this interaction, it may change the organization, work, business, technology and group structures and significant changes in the existing relationships, habits, ways and methods may have to be made” (Yeniçeri, 2002, p.102).

The expectation of the need for human beings will decrease with the integration of production technologies into more business processes, and the implications that developments are perceived as a threat to employees constitute bias against change in digital transformation. However, it is argued that digitalization will create new job descriptions and competency-based employment will come to the fore in the industries. Employees are expected to take on tasks such as solving complex problems, following processes, and improving production processes rather than using machines in the production line and in the processes (Hecklau, Galeitzke, Flachs, & Kohl, 2016; Huws, 2018; Friedman, 2018) Therefore, the uncertainties experienced by employees in digital transformation should be examined to prepare them for digital working conditions. It is necessary to involve employees to prevent the transformation within the organization from being solely technology investment and to ensure the continuity of digital transformation. Besides, technology should be evaluated as an individual growth opportunity and competency development process (Solberg, Traavik, & Wong, 2020).

All stakeholders in the value chain, especially employees, should be involved to achieve horizontal and vertical integration in the transformation process (Lai & Ong, 2010; Schumacher, Erol, & Sihn, 2016). As it has been stated, employees must be aware of the need for change, know the reasons for the change, be prepared for and be open to the idea of change, and accept change (Backer, 1995; Eby et al., 2000; Madsen, Miller, & John, 2005). Thus, readiness to change is expected to have a positive effect on the attitudes of employees towards digitalization. Employees as individuals'; their readiness is related to their willingness to support change and feel confident about their competencies in the change process (Vakola, 2012).

The scope of technology acceptance model, which is has been widely applied to measure individuals' perceptions of technology acceptance, is aimed at determining the behavioural intentions of technology users. The model argues that technology acceptance depends on two main factors: the perceived ease of use and the usefulness (Yucel & Gulbahar, 2013; Ma & Liu, 2004). However, the research model of this study differs from the technology acceptance model as it is aimed to measure individual perceptions of readiness, needs, self-efficacy etc. in the transformation process rather than technology acceptance in digital transformation.

Research Methodology

Research Design

In this research, it is aimed to create the future projection by determining the perception of readiness for change of human resources that will create the greatest added value in the production/service environments of the future towards the new generation of working principles. It is aimed to formulate suggestions for creating a communication network and flexible production/service environment with the combination of technology and human factors.

The research was designed to enable the human resources to be interpreted according to their readiness and the factors that affect readiness in the digital transformation process. The research consists of different phases. The phases of the study are explained in detail below.

The research question of the study is “What is the perception of human resources readiness for digital transformation and what are the factors affecting this perception?”. The research was conducted in companies in the automotive sector that aim primarily to adapt to digitalization due to the nature of the sector. The attendances were voluntary in giving support to conducting the research.

Initially, the adaptation of technologies, which are the basic requirements of digitalization, is questioned. It is expected that the organizational structure (investment, design and skill development activities) related to digital technologies within the value chain will be implemented. It is important for firms to reach a certain level of maturity in order to determine the readiness of the human resources regarding the subject of digital transformation subject through research. For this reason, a preliminary assessment was made with the attendees regarding the digital structuring activities of their company. Within the framework of this research, 5 main constructs were emphasized to measure the readiness of the employees, and the factors that are supposed to affect their readiness for the digital structuring process (Kwahk & Lee, 2008; Oreg, 2006).

Research Model

Digital transformation is an emerging phenomenon that carries concerns related to causing unemployment and the changing role of human beings in business life. Therefore, companies should make an effort to prepare human resources for digitalization to avoid such discussions in during the process of change. Even though previous theories and measurement models exist to understand the change reaction of HR, the content of this study is relatively new due to focusing on their perceived readiness. An exploratory approach was necessary to provide adequate insights into an individual’s perception of digital transformation (Venkatesh, Brown, & Bala, 2013). Therefore, a quantitative survey was used.

Within the framework of this research, 5 main elements were focused on to measure the readiness of employees in the digital structuring process. In accordance with the content and objectives of the study, the following hypotheses were tested; (Armenakis et al., 1993; Bandura & Adams, 1977; Choi & Ruona, 2011; Holt et al., 2007; Jimmieson, Terry, & Callan, 2004; Kwahk & Lee, 2008; Oreg, 2006; Rafferty et al., 2013; Van den Heuvel, Schalk, & Van Assen, 2015).

Readiness for Digital Change: Digital transformation should be considered a long-term organizational change. It is important that employees are ready for this change process. Rea-

diness plays an important role in accepting technological changes and reducing the resistance to change by shortening the familiarization period. For this reason, various expressions were directed to measure the readiness of the employees for the change process.

Perceived Need for Digital Change: How much individuals need change is closely related to accepting the change process. For this reason, the short-term and long-term need for digital solutions was questioned.

H₁: A perceived need for change has a positive effect on individual's readiness for digital transformation.

Perception of Self-Efficacy in Digital Change: The fact that individuals feel competent in change is a motivating factor in performing the necessary actions for change. Expressions about whether they perceive their knowledge and skills as sufficient about digitalization/technology are directed.

H₂: The self-efficacy of an individual has a positive effect on an individual's readiness for digital transformation.

Perceived Senior Management Support: The justification for change and the right flow of information to individuals in the process reinforces the belief in change. Top management is expected to build trust and support the change within the organization. Therefore, the level of perceived support and trust in senior management was measured.

H₃: The perceived senior management support has a positive effect on an individual's readiness for digital transformation.

Perceived Organizational Benefit: In addition to the individual benefit of change, it is expected that the change will be beneficial within the organization, especially in the case of a high employee portfolio. Therefore, it has been measured whether the employees have expectations to gain an organizational benefit during the change process.

H₄: A perceived organizational benefit has a positive effect on an individual's readiness for digital transformation.

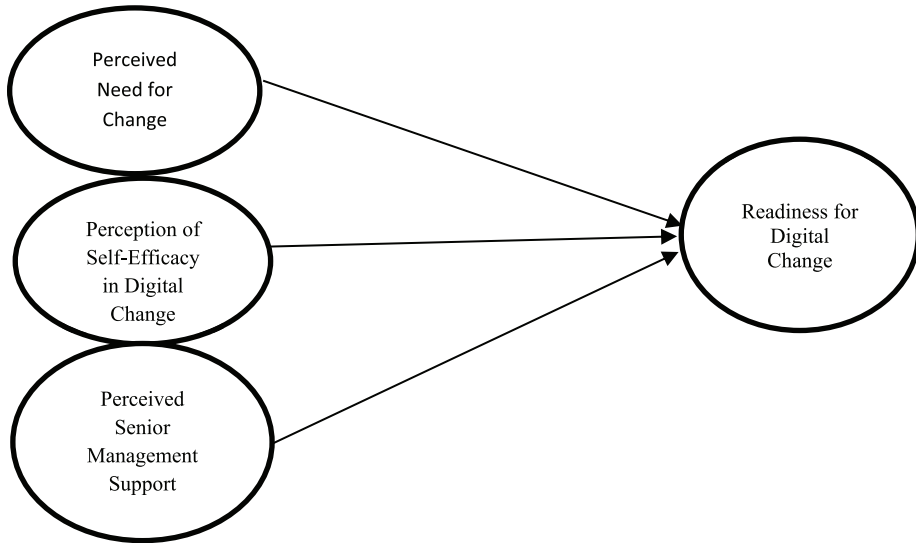


Figure 1. Research Model

Instrumentation

For the factors that affect individuals' perception of readiness for digital transformation, some variables were determined based on a theoretical basis. A structured questionnaire was developed in order to evaluate the variables obtained as a result of the literature review in accordance with the measurement rules. The definitions and scopes of all the variables related to the study are examined. As a second step, possible scale items of the variables obtained from the literature were determined. The instrument consists of 5 constructs and sub-items of the constructs in addition to a demographic characteristics part.

The perceived readiness of individuals constructs included 7 items that were adapted from Kwahk & Lee (2008) to capture employees' attitudes towards technological improvement. The need for change (10 items) and self-efficacy (6 items) were assessed with the scale adapted from Holt et al. (2007). Management support is another factor that is assumed to have effect on readiness. Therefore, 8 items were found from the previous studies (Holt et al., 2007; Oreg, 2006). Perceived organizational benefits from digital transformation as an indicator of the research were measured by a 6 item scale that was adapted from (Holt et al., 2007). However, the original language of the scale was in English. The items were translated back and forth between English and Turkish (Brislin, 1986). In the last part of the questionnaire, some statements were formed in order to determine the demographic characteristics of the participants. All constructs of the study were measured on five-point Likert type scales (From 1= Strongly disagree to 5= Strongly agree).

In order to measure the variables of the study, the correlation between the scale developed and the one that is to be measured should be consistent. Therefore, the scales used in the models in the literature were scanned and an item pool was formed with the ones suitable for the purpose of the research. Afterwards a pilot test was conducted by a random sample and 9 items were eliminated due to insufficient factor loadings.

Table 1
The Items of Scale

Construct	Number of items	Cronbach Alpha
Readiness for Digital Change	7	,894
Perceived Need for Digital Change	5	,751
Perception of Self-Efficacy in Digital Change	6	,817
Perceived Senior Management Support (ManSup)	5	,822
Perceived Organizational Benefit (Orgben)	5	,893

Data Collection and Sampling

The research sample consisted of 460 full-time white or blue colour employees working in different companies and organizations. Participation in this research was on a voluntary basis and respondents joined the research via an online survey. A snowball sampling method was used as a sampling procedure. As suggested by Marsh, Balla & Macdonald (1988) the appropriate minimum sample size of a study that has a structural equation model should be around 200. Considering this, it was decided that the number of samples was sufficient.

The majority of participants were male (92%) while female comprised 8% of the sample. Participants were distributed in terms of age; 21% of them 35-44, 69% 5-34, 4% 18-24, and 4 % above 55. Added to this, 80% of the participants were field workers while the rest were office workers.

Results

Structural Equation Modelling was used as the data analysis method in order to explain the causality relationship between the variables constructed in the research model. Structural equation modelling was preferred because it is a technique that demonstrates the power and direction of the relationship between the dependent and independent variables by taking into account possible measurement errors in the model that is based on the literature (Simsek, 2007). In structural equation modelling, it is possible to perform analyses regarding the relationship between different but related dependent variables in addition to this relationship (Hair, Black, Babin, & Anderson, 2010). Therefore, in this research, it is aimed to test the relations between the variables which are thought to exist theoretically by structural equation modelling.

Measurement Model

Initially, a measurement model was assessed as recommended by Segars & Grover (1993). The validity of the measurement model was ensured by conducting an exploratory factor analysis and a confirmatory factor analysis that specifies the relationships of the constructs (Selim, 2007.)

The KMO value should be higher than 0.60 and the Bartlett sphericity test should be significantly significant ($p < 0.05$) for the data to be compatible with factor analysis (Tabachnick & Fidell, 2007). In this study the KMO value was .933 and the Bartlett sphericity test found was to be significant. Furthermore, the constructs of the study exhibited a normal degree of internal consistency. The composite reliability of the items exceeded 0.70 as recommended by Nunally and Bernstein (1994).

The range of factor loadings of the measures was 0.47- 0.77. Only the self-efficacy Q2 was below the suggested level. However, it was decided not to drop the item. Each item loaded significantly on the underlying construct.

Table 2

Assessment of the Measurement Model

Construct	Mean	Std. deviation	Loadings	Composite Reliability
Readiness Q1	3,93	,958	,709	0,85
Readiness Q2	3,76	1,015	,763	
Readiness Q3	4,34	,825	,641	
ReadinessQ4	3,98	1,031	,698	
Readiness Q5	4,09	,823	,624	
ReadinessQ6	4,19	,839	,654	
ReadinessQ7	3,97	1,034	,692	
NFCQ1	3,72	1,245	,684	0,70
NFCQ2	3,22	1,196	,624	
NFCQ3	3,84	1,214	,685	
NFCQ4	3,60	1,191	,742	
NFCQ5	3,02	1,282	,602	
SelfefficacyQ1	3,71	1,094	,523	0,79
SelfefficacyQ2	3,32	1,159	,470	
SelfefficacyQ3	3,80	1,009	,747	
SelfefficacyQ4	3,88	,933	,771	
SelfefficacyQ5	4,21	,884	,745	
SelfefficacyQ6	4,19	,937	,782	

Construct	Mean	Std. deviation	Loadings	Composite Reliability
ManSupQ1	3,15	1,101	,678	0,72
ManSupQ2	3,32	1,120	,692	
ManSupQ3	3,57	,988	,649	
ManSupQ4	3,40	1,098	,748	
ManSupQ5	3,38	1,090	,716	
OrgBenQ1	3,85	,958	,760	0,71
OrgBenQ2	3,96	,922	,759	
OrgBenQ3	3,58	,971	,635	
OrgBenQ4	3,90	,992	,653	
OrgBenQ5	3,93	,988	,609	

*All loadings were significant based on t-values.

Afterwards, a confirmatory factor analysis (CFA) was carried out by using Lisrel. The chi-square degree of freedom in determining the goodness of fit of the measurement model, as well as multiple fit indexes of the Goodness of Fit Index (GFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), Standardized Root Mean Square Residue (SRMR) and Root Mean Square Error of Approximation (RMSEA) fit indices were used. The criteria of GFI, NFI, CFI being above 0.90 and SRMR below 0.08 and RMSEA below 0.10 were used to evaluate compliance (Bentler & Bonnet, 1980; Hoelter, 1983; Hooper, Coughlan, & Mullen, 2008).

Table 3
Goodness of Fit Index for SEM

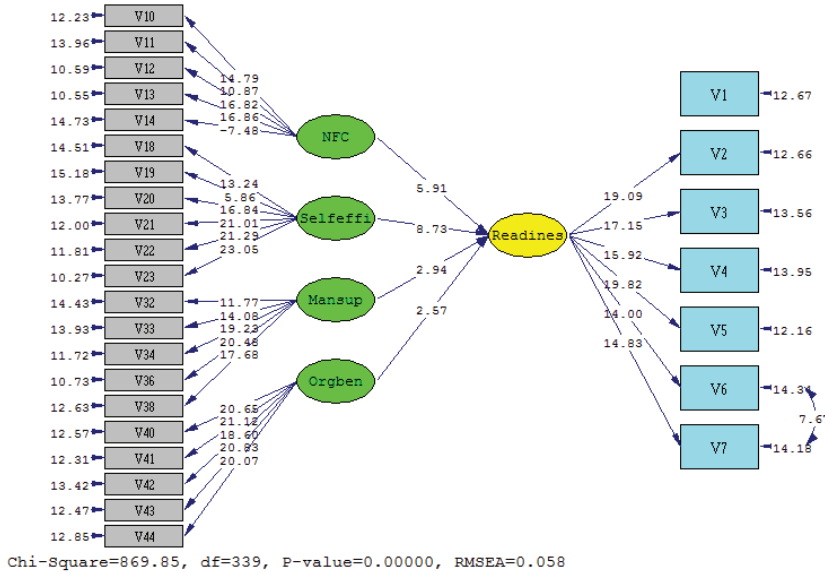
Goodness of Fit Index	Measurement Mode Values	Recommended Value
c2	869.85	p>0.05
c2 /df	2.56	≤ 3
RMR	0.06	< .05
RMSEA	0.058	< .10
GFI	0.88	> .90
AGFI	0.86	> .90
CFI	0.98	> .90
NFI	0.96	> .90
NNFI	0.98	> .90
CN	208.12	> 200

Overall, the model exhibited a good fit. Assessing all measures, the model provides satisfying evidence that ensures the structural model fits the data adequately, as the indices are shown above in table 3.

The Structural Model

The structural model was examined whether the parameter values are abnormal. The value of χ^2 ($\chi^2 = 869.85$; df: 339; p = 0.0) was found to be significant. Added to this, $\chi^2 / df = 2.56$

is interpreted as being very close to a perfect fit and thus representing a good model. RMSEA value (0.058) and RMR value (0.064) show good agreement. GFI (0.88), AGFI (0.86), NNFI (0,98) and CFI (0,98) values also show acceptable fit values.



All dimensions need for change, self-efficacy, management support and organizational benefit had significantly influenced an individual’s readiness for digital transformation and explained 67% of the variance in Readiness. Table 4 presents the estimation results for the structural model.

Table 4
Estimation Results of Structural Model

Structural Relations	Standardized Path Coefficients	T-Values*	Results of Hypotheses
Variables affecting the perception of readiness for digital transformation (R2= 0,67)			
H ₁ : Need for Change Perceived Readiness	0,26	5,91	Supported
H ₂ : Self-Efficacy Perceived Readiness	0,43	8,73	Supported
H ₃ :ManagementSupport Perceived Readiness	0,18	2,94	Supported
H ₄ : Organizational Benefit Perceived Readiness	0,19	2,57	Supported

In order to determine whether the implicit variables of the model predict each other in a meaningful way, t-values should be examined. The T-values provide information about whether the predicted relationships are as expected and are meaningful (Hair et al., 2010). Thus, all the hypotheses were supported.

Conclusion

The purpose of the study was to investigate some factors that have a direct association with readiness during the change process. This study introduced a model of perceived individual readiness for digital transformation that is affected by four dimensions. Overall, the findings supported that individuals' readiness for digital transformation is related to perceived self-efficacy, the need for change, management support and organizational benefits in support of H₁, H₂, H₃ and H₄. The contribution of this study is that the results obtained from the quantitative analysis underline the significance of 3 levels of change namely, organizational elements, individual elements and managerial aspects.

From the perspective of organizational elements, the perceived need for change and organizational benefits came to prominence. The results of the study demonstrated that a perceived need for change has an important role in explaining the readiness for digital change. The urgency of the change as perceived and placed as a need of the organization plays a crucial role in the digital transformation. Therefore, it is necessary for companies to put more emphasis on explaining and creating awareness of digital solutions to attract employees to give support for transformation. If employees recognize the need for digital transformation in business processes and believe in change, it would be easier to manage the attitudes of employees towards the change process. The communication of the change and its perceived need has to be managed in a way to ensure acceptance rather than be protected from resistance. Senior management needs to walk through with all levels both at strategic level and functional level for employees to internalize the transformation and accept being a part of it. These findings support the previous studies that confirmed the relationship between a perceived need for change and readiness (Eby et al., 2000; Oreg et al., 2011; Vakola, 2012).

The findings also lend support to the view that having a perceived organizational benefit has an effect on the readiness for change. The perceived organizational benefit can be considered to be the employees positioning of the organization within the competitive context. These aspects came to light specifically during the training as the majority of the participants expressed the objective of the firm-thus the benefit- to be superior to the competitors so that the economical and societal paybacks of the organization can be felt at all levels. One possible explanation for this could be an employee's commitment to organization may lead them to consider the benefits of the organization as transferable to individual benefits and have also valance on it.

Once the structural flow of the transformation is obtained, then individual level variables can be managed properly to be successful in the change process. For instance, in the light of the findings of the study, it is found that self-efficacy was associated with the readiness for change. Self-efficacy is an important indicator that provides self-motivation to cope with

digitalization and adapt to changing competencies. As Bandura (1994) stated in Social Motivational Theory, the higher level of self-efficacy provides an active learning process during change. Therefore, individuals may feel confident in learning and adapting to changes. For that reason, self-competency assessments of the employees supported the theory of self-motivation which further led to the results of readiness for digital transformation. Besides, previous research has also demonstrated that if employees are confident about their abilities, they would be able to cope with the unexpected part of changes (Vakola, 2012).

Last but not least, as predicted, the results showed that perceived senior management support is connected to individual readiness for digital change. It is important for corporate executives to be guiding and sharing in the digitalization process in order to ensure employee participation. It is recommended to take action with the motto of creating value together in the whole transformation process from strategy determination to implementation. It is considered that increasing the participation of the workers in the decision processes with their suggestions, especially in the creation of a technology road map, will create positive results. The employees' role as a practitioner in digitalization will lead to a narrow vision of the technologies they will need in the future. Therefore, the technology roadmap or digital transformation strategies of companies should be shared with the whole organization. In this way, both employees will be able to follow future technologies and increase their awareness in their fields of activity. Added to this, individuals may feel responsible for following new trends and perceiving a greater need for the integration of new technologies. In order for the intellectual capital of the companies to create value in digital transformation, it is necessary to establish a culture of digital transformation spread across all units of the institution.

Digital transformation is seen to be new era fact and organizations by their will or on-demand of the market will adapt themselves to this new verity sooner or later. Results of the present research led to the conclusion that digital transformation is more than just the digital component and change needs to be considered from both the technical aspects and the soft sides of the organization. The inclusive part of the digital transformation with a humanistic approach can also accomplish the technical objectives intended in the first place. Employees need to be transformed with new digital competencies and should be transformed along with the organizations. It is essential to consider human-technical interface more than an efficiency related phenomenon but rather than total machine wheels.

The study has a number of limitations. An important limitation of this study is even the construct was derived from a literature review and the research was conducted with limited participants. At least, the findings of the study present a starting point to explore individuals' feelings towards and perceptions of digitalization.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The author has no conflict of interest to declare.

Grant Support: The author declared that this study has received no financial support.

Author Contributions: Conception/Design of study: xx.; Data Acquisition: xx.; Data Analysis/Interpretation: xx.; Drafting Manuscript: xx.; Critical Revision of Manuscript: xx.; Final Approval and Accountability: xx.

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Istanbul Business Research

Submitted: 25.01.2022

Revision Requested: 21.04.2022

Last Revision Received: 25.04.2022

Accepted: 29.04.2022

Published Online: 22.09.2022

RESEARCH ARTICLE

Research on the Role of Self-Efficacy in the Effect of Workplace Envy on Intention to Quit*

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Abstract

The aim of this study is to examine the mediating role of self-efficacy (SE) on the relationship between workplace envy and intention to quit. We expect that feelings of envy will be among the factors affecting the intention to quit that are frequently discussed in Organizational Behavior (OB) literature. In addition, to the best of our knowledge, the effects of SE on the relationship between envy and intention to leave have not been examined in the literature. In this study, we aim to fill the gap in the literature by revealing the possible effects of SE from a behavioral perspective.

We conducted a survey of the academics of ten universities, randomly selected from five different geographical regions of Turkey. A total of 237 academics working at both state and foundation universities participated in the study. The SmartPLS package program, which is a multi-level structural equation modeling (SEM) application, was used in the analysis of the data. As a result of the analyses, we find that self-efficacy partially mediates the relationship between workplace envy and intention to quit. We expect that the results of the study will help researchers and managers who are interested in the subject to understand and manage the effects of workplace envy.

Keywords

Workplace envy, Self-efficacy, Intention to quit, Academic staff

Introduction

Today, the intention of employees to quit is closely related to many factors. According to a study conducted on 3,578 academics across Turkey, it was found that those working at foundation universities had a higher intention to quit their jobs than their colleagues working at state universities (Doğan et al., 2020: 352). These results are similar to those reported by Taşkın and Yıldız (2020: 27) regarding the annual report of a foundation university operating in Istanbul in which the employee turnover rate of its academic staff is 30.13%, whereas the turnover rate of its administrative staff is 14.3%. Similarly, HESA (Higher Education Statis-

* This article was derived from the doctoral thesis titled "A Research on the Role of Self-efficacy in the Effect of Workplace Envy on Intention to Quit", which was prepared by Gamze Aydın under the supervision of Assoc. Prof. Dr. Serdar Bozkurt at Yıldız Technical University Social Sciences Institute.

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To cite this article: Aydın, G., & Bozkurt, S. (2022). Research on the role of self-efficacy in the effect of workplace envy on intention to quit. *Istanbul Business Research*, 51(2), 627-642. <http://doi.org/10.26650/ibr.2022.51.1062932>



tics Agency) (2022) data reveals that the average employee turnover rate of 162 university academic staff in England in the 2019-2020 academic year was 16.16%. Moreover, many other studies (e.g. Günalan and Ceylan, 2014; Erdil and Muceldili, 2014; Doğan and Vecchio, 2001; Vecchio, 2000) show that workplace envy affects the intention to quit positively.

Academics may consider quitting their jobs for various reasons, especially in universities, where hierarchy is considered to be strict; the more unpleasant emotions experienced in the workplace are suppressed, the more employees think about quitting their jobs (Côté and Morgan, 2002). Therefore, one of the ways to continue working in such work environments, where hierarchical order is high and emotions are suppressed, is to control emotions. Although management of emotions is of such vital importance, management of emotions in particular was relatively ignored in organizational theory until the 1990s because rationality and performance issues were more prominent (Günalan, 2019: 324). On the other hand, since the mid-1990s, neuroscientists have revealed that emotions effectively weigh our options and shape our decisions, and those emotions underlie even our most rational-seeming ideas (Watt Smith, 2018: 101). One of these hidden emotions is envy. The concept of envy is rooted in the desire to be superior. We constantly compare ourselves with people we find close or equal to us (Adrianson and Ramdhani, 2014: 2). These social comparisons can be upwards or downwards. Envy is an emotion arising from upward comparisons (Wu and Srite, 2021: 2).

In business life, which covers a large part of our lives, we can sometimes see our colleagues as our friends and sometimes as our competitors, which allows us to approach workplaces with a mixture of competition and solidarity. While our managers encourage us to collaborate and share, we may soon find ourselves being compared to our colleagues (Watt Smith, 2020: 125). Since only a limited number of employees have achieved promotions and rewards, there is a competitive business environment among employees (Eslami and Arshadi, 2016). Therefore, employees are constantly competing for limited organizational resources and rewards, such as wage increases, training opportunities, promotions, and office space (Sun et al., 2021: 3). Unlike most other sector workers, the visibility of the work of academics, and the fact that this visibility has become more and more transparent with different technological possibilities, allows social comparison and paves the way for feelings of jealousy.

Some individuals who target jealousy at work may feel more confident and prouder of their abilities or feel energized to work harder. However, others feel more anxious, cannot focus on their work, and may even consider quitting their job (Lee et al., 2018: 182). At this point, the role of individuals' self-efficacy (SE) levels can be considered important. It has been observed that academics with high SE have similarities in strengths and weaknesses despite being in different fields of expertise (Hemmings et al., 2012). They can cope with difficult situations in the business environment more efficiently (Stenmark et al., 2021) and can contribute to the implicit knowledge sharing behaviors within higher education institutions

(Rahman et al., 2018). Determining the SE levels of academics in the relationship between feelings of workplace envy and intention to quit will benefit the experts working in the fields of organizational behavior and human resources in the effective management of the qualified workforce.

Although a huge body of studies regarding envy in the workplace has been conducted on Western employees, there are very few studies about this feeling in Turkish ones. Therefore, the lack of systematic information on the subject draws attention (Lee et al., 2018: 182). Within this scope, the purpose of this research is to determine the role of SE in the effect of workplace envy felt among academics on their intention to quit. In this study, which is based on Festinger's (1954) social comparison theory, the interrelationships between workplace envy, SE, and intention to quit are examined both theoretically and empirically. Then empirical results are explained and the study's limitations are discussed by presenting suggestions for future studies.

Literature Review and Hypothesis Development

Workplace Envy

Jealousy is a versatile concept that has been the subject of research from different perspectives, such as philosophy, theology, sociology, psychology, economics, marketing, and management (Cohen-Charash and Larson, 2016: 1). The terms envy and jealousy are often used interchangeably, but there is a philosophical consensus that they are different emotions. Envy is about something that a person does not have, but wants to have. On the other hand, jealousy is about protecting something one already has from others who are or are thought to be trying to get it (Ricci and Scafarto, 2005: 24). Envy is between two people. The envious person wants something that belongs to someone else and does not want the other person to have that thing. The object of envy can be anything someone else has, such as success or popularity. The concept of jealousy concerns three people (Pines, 2003: 24). Unlike envy, which means wanting something that is not ours, jealousy is the fear of losing someone or losing someone's love to someone else (Watt Smith, 2018: 148).

While malicious envy is generally regarded as representing the socially unacceptable, dark side of jealousy, benign envy is constructive (Yusainy et al., 2018: 204). While benign envy enables the envious person to develop productive strategies to improve him/herself, malicious envy is associated with aggressive and destructive efforts to extinguish the success of the envied person (Navarro-Carrillo et al., 2017: 220). When people feel benign envy, they view their superiors through relatively positive lenses. They desire to gain their advantage and intend to put more effort into improving themselves by imitating their success. However, when they feel malicious envy, they become hostile towards those they deem superior and tend to harm the superior's position (Crusius and Lange, 2021: 4).

From the etymological point of view, it is seen that there are two different words to express the feeling of jealousy in many languages. For example, the Dutch have the words “*beneijden*” and “*afgunst*.” In German, the words “*beneiden*” and “*missgönnen*” are parallel to this. The first word expresses benign envy, while the second word denotes malicious envy. The most explicit expression of this etymological difference is envy in Russian: “*white*” and “*black*” (Lange and Crusius, 2015: 285). In a similar vein, the words “*gıpta*” and “*haset*” are used in Turkish. One of the reasons these terms are used interchangeably is because jealousy contains a piece of envy. The other reason is that since envy has a more negative meaning than jealousy, what is meant to be expressed with the word envy is described in the spoken language with the more socially acceptable word of jealousy, which is softer in the spoken language (Gülen, 2006: 91).

Likewise, Toohey argued that (2016: 146-147) jealousy is also common among academics. Academics often adopt a particular subject for individual research and personally identify with their interests. When they reach a specific title or status, instead of helping the young academics who follow them, they may become jealous and try to maintain their position. In addition, expressing jealousy in the business environment may be socially unacceptable or perceived as selfish (Günerergin, 2017: 37).

Long-distance runners who experience benign envy of their rivals set more challenging goals and run faster. Similarly, employees who experience benign envy of their colleagues increase their work efforts (Van de Ven, 2005: 348). For instance, Hilal’s (2021) research on doctors argues that physicians with high SE can resist envy and tend to see situations in which they are compared negatively as learning and development opportunities. In addition, Çelebi et al. (2021) found that gender did not have a significant effect on workplace envy and that professors felt more envious compared to research assistants.

Some academics struggle for years to complete their doctoral education. In contrast, others complete this process in a shorter time and with less effort, which may cause them to become the target of jealous feelings (Reyna, 2021: 358). For instance, Utz and Muscannel (2018) examined the research-gate profiles of academics and showed that seeing the success of others triggers one’s jealousy. In another study, jealous academics are perceived by their colleagues as having low self-esteem, greedy, unfair, pessimistic, immature, selfish, complex, and lacking in personal empathy (Kiral and Ödemiş-Keleş, 2019). Accordingly:

H1: Workplace envy effects self-efficacy.

Self-efficacy (SE)

SE is a concept discussed in different fields, such as sports, medicine, health, media, psychology, and international relations (Erseven, 2016: 69). SE, defined as an individual’s

perception of their ability to fulfill their task, is an essential component of social learning theory (Bandura, 1977). SE refers to an individual's self-belief or confidence in his or her ability to take action by determining the motivation, cognitive resources, and ways required to successfully carry out a particular task (Stajkovic and Luthans, 1998: 66). Individuals' levels of SE affect the way they approach new jobs, goals, and challenges. Individuals with high SE are more likely to perform complex tasks and persevere in the face of difficulties. In contrast, individuals with low SE tend to refrain from engaging in tough situations (Stenmark et al., 2021: 301).

SE is a determinant of self-perception and is also an essential element of intrinsic motivation (Wang et al., 2015: 752). In addition to the fact that SE directly affects performance, SE can also mediate other factors such as motivation to influence performance (Hemmings et al., 2012: 294). Demographic and contextual factors, such as the educational environment and various career opportunities or stages, also affect performance, and, as a result, the satisfaction individuals gain from their professional lives (Ismayilova and Kalsen, 2019: 56). Employees with low SE are more likely to believe that their efforts will not be successful (Jafri, 2020: 9). It has been determined that employees with high SE tend to show high performance at work and persevere in the face of setbacks (Tai et al., 2012: 115).

It has been observed that research assistants, especially in the early stages of their careers, tend to make social comparisons above the average and mostly compare with colleagues who are above their level (Aydoğan et al., 2017: 27). Although many studies argue that academics have high SE regardless of title, department, or gender (Uysal, 2013; Başarer and Başarer, 2019), the SE of research assistants was found to be moderate (Gün and Büyükgöze, 2015). According to another study, the SE of single, younger, lower-level employees in terms of working time and total work experience was lower than the average (Büyükebeşe et al., 2018). However, in other studies, it has been found that teachers with high SE have less intention to quit (Pfitzner-Eden, 2016; De Neve and Devos, 2017). Accordingly:

H2: Self-efficacy affects intention to quit.

Intention to Quit

From an organizational point of view, turnover intention means that a well-trained and expert employee leaves the job, and the time spent and all the costs incurred for his training are wasted. Quitting a job leads to the loss of intellectual capital, which is very important from an institutional point of view. Moreover, organizations have to face the orientation and training costs caused by rehiring. In addition, for the individuals who continue to work, high turnover causes many negative feelings and attitudes such as the sadness of losing their colleagues. Furthermore, the remaining employees also experience anxiety arising from the uncertainty of the relationship they try to build with the new employees (Demirbaş and Hasit, 2016: 141).

Job satisfaction and organizational commitment are the most critical factors affecting employees' intention to quit (Firth, Mellor, Moore and Loquet, 2004: 179). Other factors that affect the intention to quit the job can be divided into three groups: age and education (demographic factors) are in the first group, organizational commitment and job satisfaction of employees (individual determinants) are in the second group, and the working environment of the organization, co-worker relations, and wages (organizational determinants) are in the third group (Albaqami, 2016: 51-52).

Personal reasons that lead employees to quit include moving, starting a family, illness, retirement, or resuming school. Other reasons include low wages, lack of benefits, imbalances between performance and rewards, lack of confidence in the organization's vision, unethical behavior, distrust of the leader, poor relationships in the workplace, and poor communication. (Hana and Lucie, 2011: 89-90).

The high turnover rate of academics can be attributed to various reasons, such as unfair promotion policies, non-competitive reward systems, and lack of adequate research funding. In addition, they are more likely to quit their current positions due to the lack of a robust performance management system and unfair remuneration policies (Fahmi and Mohamed, 2020: 2).

Whereas it was seen that academics at a university in Ethiopia considered leaving their jobs due to a bad working environment (in terms of insufficient wages and lack of facilities such as internet, offices, chairs, and toilets) (Yimer et al., 2017), academics at African University considered quitting due to the rigid management style, the lack of career development incentives, the unfair distribution of awards and resources, or the unfairness of the performance evaluation system (Bigirimana et al., 2016: 97). In another study, Özdemir and Erdem (2020) observed that there was jealousy among lecturers for reasons such as academic promotion, not wanting their colleagues to be promoted, and not being able to obtain a title or staff. In those cases, it was determined that jealous people are quite unhappy and restless. These people experience a decrease in their performance and productivity and may even do something as negative as quitting their jobs. Accordingly:

H3: Workplace envy affects intention to quit.

Based on the research results mentioned above, we observe a gap in the extant literature regarding the mediation mechanism of SE on the relationship between workplace envy and turnover. Accordingly:

H4: Self-efficacy mediates the relationship between workplace envy on intention to quit.

Methodology

The aim of this study was to examine the mediator role of SE on the relationship between workplace envy and intention to quit. The mediation model created according to Barron and Kenny’s (1986) procedure is shown in Figure 1.

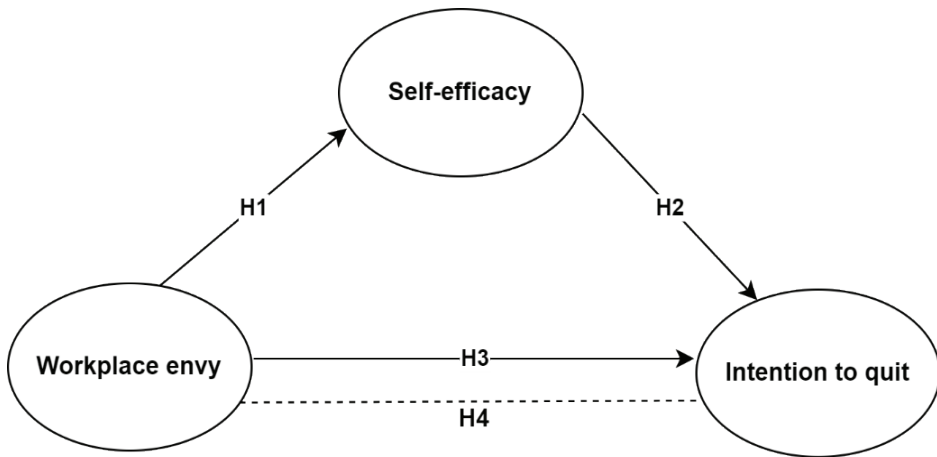


Figure 1. Conceptual model.

Sampling

For this study, ethical permission was obtained from Yıldız Technical University Ethics Committee (dated 07.03.2021 and numbered E.2103070018). Informed consent was obtained from the participants before the questionnaire was filled in, and all participants declared that they participated in the questionnaire voluntarily. Ten Turkish universities with similar employee numbers and sizes were randomly selected, without distinguishing between public and foundation universities. The online survey form was sent to 1,310 lecturers from ten universities randomly selected via e-mail between 18.01.2021 and 31.01.2021. The e-mail addresses of the lecturers were obtained through the database found at <https://akademik.yok.gov.tr/AkademikArama/>, and only those who could be reached at corporate e-mail address extensions with “*edu.tr*” were included. The research includes the pilot study data to understand the effects of the feelings of jealousy experienced by academicians on their intention to leave. A total of 237 questionnaires were returned. Informed consent was obtained from the participants before the questionnaire was filled in, and all participants declared that they participated in the questionnaire voluntarily. The participants were also given sufficient information about who carried out the research and about the aims of the research. A control question (“*If you are reading this question, please tick two.*”) was added to the survey questions. Responses from participants who mismarked the control question were excluded from the analysis.

When the demographic characteristics of the 237 academics participating in the study are examined, the majority of them were male (51.9%), between the ages of 25-35, married (64.1%), lecturers (29.5%) with less than three years of experience (45.9%), and working at public universities (76.4%). More than half of them did not have any administrative duties (55.3%) or SCI-SSCI or equivalent publications (46%). The top three departments with the highest participation were Vocational School (17.7%), Faculty of Engineering (11.4%), and Faculty of Economics and Administrative Sciences (10.8%), respectively.

Scales

A questionnaire consisting of 31 items was directed to the participants, and 8 of these questions were designed to reveal their demographic characteristics. Each item in the questionnaire was evaluated with a 6-point Likert scale, ranging from “*strongly disagree*” to “*strongly agree*.” Neutral scores were not included, and all answers were collected anonymously. The scales used in the question form are shown in Table 1.

Table 1
Sources of the Measures Used in the Research

Name of the measure	Source
Benign and Malicious Envy Scale (BeMaS)	Lange & Crusius (2015)
General Self-Efficacy Scale (GSE)	Schwarzer & Jerusalem (1992)
Intention to Quit	Mobley, Horner & Hollingsworth (1978)

Data Analysis

When evaluating the study’s data, the SPSS package program was used for descriptive statistics and exploratory factor analysis. The Smart PLS-SEM program was used to determine the validity and reliability of the scales with confirmatory factor analysis. Partial least squares (PLS) is a variance-based structural equation modeling (SEM) technique widely applied in social sciences (Henseler et al., 2016). To test the research model, composite reliability, discriminant validity-divergent validity, and convergent validity were evaluated.

Results

The factor loadings, Cronbach’s alpha values, composite reliability, and mean-variance values of the latent variables are shown in Table 4. Indicators 1, 3, 4, and 5 belonging to the BEMAS scale were excluded from the analysis since their factor loadings didn’t meet the threshold level. Table 2 shows the Cronbach’s alpha, Composite Reliability (CR), Average Variance Extracted (AVE), and rho_A values for the model proposed in this study. We see that the reliability values of the Malicious Envy scale, which is only one of the subscales of the BEMAS scale, are below 0.70. There are various arguments in the literature about which criterion values AVE and CR values should be. According to Psaila and Roland (2007), an

AVE value above 0.40 and a CR value above 0.70 indicate convergent validity. According to another view, AVE values greater than 0.50 show that the relevant model is valid (Bagozzi and Yi, 1988). The Cronbach’s alpha values of the scales used in the study ranged from 0.678 to 0.925. Lyberg et al. (1997) also consider that the Cronbach’s alpha value above 0.60 in the Partial Least Square (PLS) method is sufficient to ensure reliability. Therefore, we conclude that our scales are valid and reliable.

Table 2
Reliability and Validity

Latent Variables	Cronbach’s α	CR	-AVE	rho_A
Benign envy	0.735	0.824	0.541	4.430
Malicious envy	0.678	0.790	0.667	0.801
Intention to quit	0.829	0.891	0.733	0.947
Self-efficacy	0.925	0.935	0.594	0.946

The values related to the factor loads obtained as a result of the analyses are presented in Table 3. It is seen that the factor loads of the three scales used vary from 0.585 to 0.996.

Table 3
Factors Loadings

	Benign envy	Malicious envy	Self-efficacy	Intention to quit
Bemas7	0.996			
Bemas9	0.585			
Bemas2		0.813		
Bemas6		0.753		
Bemas8		0.691		
Bemas10		0.677		
Selfefficacy1			0.794	
Selfefficacy2			0.828	
Selfefficacy3			0.561	
Selfefficacy4			0.753	
Selfefficacy5			0.744	
Selfefficacy6			0.803	
Selfefficacy7			0.810	
Selfefficacy8			0.804	
Selfefficacy9			0.831	
Selfefficacy10			0.742	
Quit1				0.910
Quit2				0.764
Quit3				0.887

Discriminant validity analysis was performed to evaluate how the tested structure differs from other structures. To ensure discriminant validity of latent variables, divergence value obtained from the square root of the AVE should be greater than the other values in the same rows and columns, and it also exceeds 0.70 (Fornell and Larcker, 2007). Both Fornell-Larcker Criterion (1981) and Heterotrait-Monotrait Ratio (HTMT) values were examined to en-

sure discriminant validity. We found that there was no value of 0.90 and above in the HTMT ratios of the variables (Table 4). Therefore, it is possible to say that the variables in the model are not similar to each other, and discriminant validity is ensured.

Table 4
Fornell-Larcker Criteria and Heterotrait-Monotrait Ratio (HTMT)

		Benign envy	Malicious envy	Intention to quit	Self-efficacy
Fornell-Larcker Criteria	Benign envy	0.817			
	Malicious envy	0.252	0.735		
	Intention to quit	-0.068	0.178	0.856	
	Self-efficacy	0.043	-0.230	-0.264	0.771
		Benign envy	Malicious envy	Intention to quit	Self-efficacy
HTMT	Benign envy				
	Malicious envy	0.397			
	Intention to quit	0.070	0.193		
	Self-efficacy	0.074	0.236	0.248	

For the path suggested between any two variables in the SmartPLS program to have a meaningful value, the “t” value must be greater than 1.96 (Dülgeroğlu and Başol, 2017). Table 5 shows that all of the t values of the proposed hypotheses are higher than 1.96.

Table 5
Results of Hypothesis Testing

		Path coefficients (β)	t-values	P values	Result
H1	Malicious envy → Self-efficacy (direct effect)	-0.258	4.211	0.000***	Supported
H2	Self-efficacy → Intention to quit (direct effect)	-0.227	3.133	0.002***	Supported
H3	Malicious envy → Intention to quit (direct effect)	0.150	2.743	0.041*	Supported
H4	Malicious envy → Intention to quit (indirect effect)	0.058	2,273	0.006*	Partially supported

β: Path coefficients *p<.05, **p<.10, ***p<.001

The effect of malicious envy on SE (β= -0.258), p<0.01) was negative and statistically significant, supporting H1. The impact of SE on the intention to quit (β= -0.227), p<0.05) was negative and statistically significant, supporting H2. The effect of malicious envy on intention to quit (β= -0.150), p<0.05) was positive and statistically significant, supporting H3. The indirect effect of malicious envy on intention to quit (β= 0.058), p<0.05) was positive and statistically significant, partially supporting, H4.

Conclusion and Discussion

The aim of this study was to examine the mediator role of SE on the relationship between workplace envy and intention to quit. As a result of the research, a positive and significant relationship was found between workplace envy and the intention to quit. In other words, feelings of envy in the workplace push individuals to quit their jobs, but individuals with high SE change this result. This finding is in line with similar research results in the literature (Günalan and Ceylan, 2014; Pfitzner-Eden, 2016; De Neve and Devos, 2017).

It is a challenge to change one's emotions, yet it is possible to control or change the behaviors caused by those emotions (Navaro, 2011: 29). Workplace envy, an emotion that is difficult to control due to its complex structure, also affects academics. However, academics with high SE can better tolerate malicious envy, which represents the destructive aspect of jealousy. They prefer to persevere in their studies rather than leave the work environment. This result is akin to some studies in the literature (e.g., Stenmark et al., 2021; Tai et al., 2012).

The majority of the academics who participated in this research are employed at public universities (76.4%). Considering that the performance criteria, institutional incentives, and shared organizational culture applied in foundation universities differ from public universities, the results obtained in the research mainly reflect the academics employed at public universities. The literature review for studies on workplace envy conducted in Turkey reveals that there are quite a few and more qualitative studies (Kıral and Ödemiş-Keleş, 2019; Özdemir, 2018; Günerergerin, 2017). As one of the limited number of studies (Çelebi et al., 2021, Aydın Küçük, 2019; Günalan, and Ceylan, 2014) that try to measure workplace envy with quantitative methods, this study contributes to the expansion of the existing literature.

As a result, jealousy is a secretly forbidden emotion among people, often rejected and hidden in shame and reluctance. Individuals do not like to talk about their feelings of jealousy, referring to incomplete, biased, or unreliable sources (Annoni et al., 2016: 484). The fact that jealousy is widely considered a kind of social taboo in the workplace complicates the work of researchers interested in the subject. It causes the suppression, prevention, or normalization of feelings of inferiority associated with jealousy (Elçi et al., 2021: 210). In this context, we expect this study to make an essential contribution to the organizational behavior literature for understanding and managing feelings of jealousy in the workplace.

Kwiatkowska et al. (2020) revealed that the average scores obtained from BEMAS are higher in countries with individualistic cultures, such as Germany and America. On the contrary, they are lower in countries with collectivist cultures, such as Poland and Russia. Therefore, it can be suggested that future studies should be conducted using a mixed-method research design in different cultures and sectors.

Limitations

As McGrath (2011) stated, it is difficult to measure jealousy's acceptance in the organizational context with direct expressions. Participants may adjust their answers in accordance with their subjective experiences and may give socially acceptable responses instead of genuine responses. In this context, the first limitation of this study is social desirability bias. The second is the small sample size of the study. The last limitation of the study is that the data was collected through an online survey. As Akbulut (2015: 135) states, virtual platforms in online surveys give people the opportunity to hide their real identities. They can lead to different results in research due to reasons such as individual differences.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

Grant Support: The authors declared that this study has received no financial support.

Author Contributions: Conception/Design of study: G.A., S.B.; Data Acquisition: G.A.; Data Analysis/Interpretation: G.A., S.B.; Drafting Manuscript: G.A.; Critical Revision of Manuscript: S.B.; Final Approval and Accountability: G.A., S.B.

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The Dark Side of Firm Diversity: An Empirical Examination of the Impact of Firm Diversity on Resource Allocation Efficiency in Multidivisional Firms

Mehmet Nasih Tağ¹

Abstract

There is a renewed debate about whether multidivisional firms allocate resources efficiently across their divisions. This paper contributes to the literature on this debate by developing and testing a conceptual framework that links resource allocation efficiency to three forms of firm-level diversity: diversity in industry-specific knowledge, diversity in industry-specific investment opportunities, and diversity in operations. Regression analysis of a large sample of multidivisional firms shows that resource allocation efficiency tends to decrease as diversity in either industry-specific knowledge or industry-specific investment opportunities increases. Moreover, it appears that the negative relationship between the diversity in industry-specific investment opportunities and allocation efficiency weakens and may even turn positive when the diversity in industry-specific knowledge is low. On the other hand, the diversity in operations does not appear to affect allocation efficiency. These results are robust to the potential bias due to sample selection. Combined with related theory, the results suggest that firm diversity could have either a detrimental or a positive effect on a firm's performance.

Keywords

Resource allocation efficiency, Firm diversity, Capital allocation, Internal capital markets, Multidivisional firms

Introduction

Ample evidence shows that most diversified multibusiness firms actively reallocate their capital resources across their business units (e.g., Lovallo, Brown, Teece, & Bardolet, 2020). In fact, capital resource allocation is a central managerial task because strategies such as investment in additional capacity and product or market development are implemented through decisions of resource allocation (Bower & Gilbert, 2005; Burgelman, 1983; Chandler, 1990; Levinthal, 2017; Maritan & Lee, 2017). Moreover, these decisions of resource allocation involve substantial amounts of capital expenditures. For instance, according to a survey of 2000 firms by Standard & Poor's, total global capital expenditures are expected to reach \$3.7 trillion in 2021 (Williams, 2021, p. 4). These investment expenditures are made primarily by diversified firms with multiple divisions, each facing investment opportunities with hetero-

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To cite this article: Tağ, M. N. (2022). the dark side of firm diversity: An empirical examination of the impact of firm diversity on resource allocation efficiency in multidivisional firms. *Istanbul Business Research*, 51(2), 643-668. <http://doi.org/10.26650/ibr.2022.51.904514>



genous potential for value creation. Hence, resource allocation decisions also involve critical trade-offs: allocating more to one division often means allocating less to other divisions (Sengul, Costa, & Gimeno, 2019; Stein, 1997). As such, the way multibusiness firms allocate their capital resources is critical to their ability to generate value. Thus, it is crucial to understand the conditions under which diversified multidivisional firms allocate resources efficiently, i.e., the conditions under which multidivisional firms direct capital resources toward high-yield divisions and away from low-yield divisions.

Extant research on the efficiency of resource allocation in multibusiness firms may be split into two factions. One faction emphasizes top decision makers' (i.e., a headquarters') expedient access to critical information about investment (i.e., resource allocation) alternatives. This ability enables the headquarters in a multibusiness firm to pick winner projects, i.e., channel resources from projects with poor prospects toward projects with brighter prospects of value creation (Gertner, Scharfstein, & Stein, 1994; Stein, 1997; Williamson, 1975). Some empirical works have shown that multidivisional firms in general tend to channel resources towards more profitable investment opportunities (e.g., Khanna & Tice, 2000; Maksimovic & Phillips, 2002; Matvos, Seru, & Silva, 2018) especially when external sources of capital are limited (Hann, Ogneva, & Ozbas, 2013; Kuppuswamy & Villalonga, 2016). This finding has been questioned by researchers in the other faction on the ground that agency cost, influence activity, and cognitive biases severely limit a headquarters' ability to identify and properly fund potentially valuable investment projects (e.g., Arrfelt, Wiseman, & Hult, 2013; Bardolet, Fox, & Lovallo, 2011; Bardolet, Brown, & Lovallo, 2017; Gertner, Powers, & Scharfstein, 2002; Glaser, Lopez-de-Silanes, & Sautner, 2013; Ozbas & Scharfstein, 2010; Rajan, Servaes, & Zingales, 2000). Overall, it appears that there is a debate about whether and when resource allocation in multidivisional firms is efficient.

This paper contributes to this literature by developing a conceptual framework that shows the conditions under which the limit on a headquarters' ability to pick 'winners' becomes binding. Specifically, the conceptual framework posits that i) diversity in industry-specific knowledge, ii) diversity in industry-specific investment opportunities, and iii) diversity in operations determine the extent to which a headquarters can benefit from its informational and control advantage. Thus, the efficiency of resource allocation in multidivisional firms would tend to vary with these modes of diversity. While there have been a few studies examining the relationship between one of these diversity modes and resource allocation efficiency, so far, there has not been any attempt to analyze their simultaneous impact on resource allocation efficiency in a multivariate framework.

I examine this framework by exploiting division-level capital expenditures data on a large sample of multidivisional firms obtained from Standard & Poor's. The empirical results contribute to the current debate on the efficiency of resource allocation in diversified firms by

empirically showing that resource allocation efficiency tends to decrease as diversity in either industry-specific knowledge or industry-specific investment opportunities increases. Moreover, it appears that at lower levels of diversity in industry-specific knowledge, the negative relationship between resource allocation efficiency and diversity in industry-specific investment opportunities weakens. These results are robust to sample selection bias that has been present in much of the extant empirical literature on the strategy-performance relationship in the context of diversified firms. Overall, these results suggest that focused or related-diversified firms tend to allocate resources towards divisions with brighter investment opportunities.

Background Literature

Resource allocation by a headquarters generates costs as well as benefits. The Property Rights View (Grossman & Hart, 1986; Hart & Moore, 1990; Hart, 1995) provides a framework for understanding these costs and benefits. This view assumes that the financial structure of a firm determines decision rights over the assets of the firm. Unlike debt, equity provides its owners with control rights over assets. Thus, as the agent of equity owners, the headquarters of a firm enjoys complete control over assets, providing them with superior access to critical information about the profit potential of alternative resource allocation strategies. Moreover, unlike external capital providers, a headquarters has the authority to act upon its information on behalf of equity owners. Thus, the headquarters of a multidivisional firm has also stronger incentives relative to a debt financier to invest in collecting further information regarding the profitability of the current and potential asset deployment strategies (Gertner et al., 1994).

The preceding argument suggests that a headquarters, relative to external capital providers, is better equipped to channel resources towards divisions with brighter prospects. Several empirical studies provide evidence consistent with this argument. In one of the earlier large-sample studies, Maksimovic and Phillips (2002) found that multidivisional firms in the manufacturing industry increase investment in larger and more productive divisions faster than they do in smaller and less productive divisions. Studies using data from such specific settings as the pharmaceuticals (Guedj & Scharfstein, 2004), the discount retailing (Khanna & Tice, 2000), a large conglomerate in Europe (Glaser et al., 2013), and developing countries (Almeida & Wolfenzon, 2006; Almeida, Kim, & Kim, 2015), have also provided results suggesting that multidivisional firms allocate resources efficiently. Finally, Kuppuswamy and Villalonga (2016) show that the efficiency of resource allocation in diversified (multidivisional) firms increased significantly during the years surrounding the 2008 global financial crisis, a period characterized by limited sources of external capital. Most empirical evidence is nevertheless limited to specific industries or environment with underdeveloped institutions constraining external sources of capital.

While resource allocation in multidivisional firms has significant economic potential, it nonetheless creates a context for a costly influence activity—a lobbying process in which middle-level managers (i.e., divisional managers) with private information engage in costly quests for organizational rents, which may sway top managers' decisions toward inefficiency (Dean & Sharfman, 1996; Duchin & Sosyura, 2013; Milgrom, 1988; Meyer, Milgrom, & Roberts, 1992; Pfeffer, 1981). In the process of resource allocation, divisional managers compete with each other for resources because they have incentives to increase the size of their divisions, as a larger size increases their private benefits (Scharfstein & Stein, 2000). Therefore, they engage in all sorts of political maneuvering, including horse-trading, excessive lobbying, and selective communication of private information to increase their chances of obtaining more resources (Bower, 1970; Inderst & Klein, 2007; Ozbas, 2005; Wulf, 2009), engendering the so-called influence cost in the resource allocation process. Thus, divisional managers' incentives and actions could create a constraint on the effectiveness and efficiency of a headquarters' exercise of their control rights, i.e., the headquarters' "winner-picking" function. Empirical works provide evidence consistent with this argument. Examining resource allocation decisions at S&P 500 firms, Duchin and Sosyura (2013) found that CEOs favor divisional managers with whom they have social connections. Moreover, a few studies have shown that allocation to a division is associated with the division's influence and power within the firm (e.g., Glaser et al., 2013; Vieregger, Larson, & Anderson, 2017). These allocation inefficiencies are likely to increase in diversified firms operating in industries that are either unrelated or face various levels of investment opportunities (Gertner et al., 2002; Lamont & Polk, 2002; Ozbas & Scharfstein, 2010; Rajan et al., 2000).

Influence activity may not be the only source of inefficiency in the process resource allocation. Some researchers have suggested that as uncertainty surrounding a decision of resource allocation increases, managers may tend to use subjective and simplifying decision heuristics in their evaluations of alternative investment proposals (Jehiel, 2018; Shapira & Shaver, 2014). Using archival data on firms' resource allocation decisions, Arrfelt et al. (2013) found that simple cues, such as performance levels below and above aspirations, affect resource allocation decisions and the resultant efficiency of these decisions. Several recent studies have also found that decision makers' bias toward allocating resources evenly among investment alternatives is related to underinvestment in profitable divisions and overinvestment in unprofitable divisions (Bardolet et al., 2017; Bardolet et al., 2011; Gupta, Briscoe, & Hambrick, 2018). Overall, the preceding evidence suggests that the headquarters' informational advantage could be severely limited in environments characterized by high levels of uncertainty and complexity.

Hypotheses Development

The main proposition of this paper is that resource allocation efficiency is a function of the quality and efficacy of relevant information at the disposal of headquarters, everything else equal. To be precise, what is limited may not be information but rather the capacity of a firm to bring its information to bear on decisions of resource allocation (Simon, 1973). In other words, it is what Simon (1997) calls procedural rationality in the decision process which determines the efficiency of resource allocation decisions. In a similar vein, Chandler (1990) argues that modern diversified firms had rarely maintained their competitive positions unless the visible hand of their management permitted rapid entry into growing markets and divesting out of declining markets. Chandler maintains that this process of investment and divestment demanded the constant—yet limited—attention of management. Note that there may be relatively complete and high-quality information dispersed across lower levels of a firm's hierarchy. However, influence activities in a process characterized by bargaining for resources among divisional managers may limit the firm's capacity to process information, reducing the quality and efficacy of information at the top management level.

Mapping this abstraction to an empirically observable framework is challenging as neither the level of information asymmetry between managers nor influence cost are easily quantifiable. Given these challenges, the empirical literature has tended to link firm diversity (which creates fertile grounds for influence activities) to decisions of resource allocation. In this paper, I develop an empirical framework that links resource allocation efficiency to three modes of firm-level diversity: diversity in industry-specific knowledge, diversity in industry-specific investment opportunities, and diversity in operations. Below, I argue that each of these modes of diversity creates an organizational climate that encourages political behavior by divisional managers and spawns informational problems in the process of resource allocation, leading to inefficient resource allocation.

Diversity in Industry-Specific Knowledge

Industry-specific knowledge may be defined as the know-what and the know-how required to insightfully analyze and act upon information from a particular industry environment. This knowledge is instrumental in recognizing and ranking investment opportunities according to their potential profitability within an industry. Diversity in industry-specific knowledge (hereafter, K-diversity) refers to the differences in industry-specific skills, knowledge, and managerial logics held by the top and middle managers. In the process of resource allocation, top managers process information contained in divisional investment proposals, and then make judgments regarding the contribution of proposed investments to the overall corporate goal. Top managers usually have experience in various industrial environments. In general, however, they are less knowledgeable than middle managers about a specific industry

(Bower, 1970; March & Simon, 1958). Thus, there is an asymmetry in terms of industry-specific knowledge between the top and divisional managers, requiring top managers to rely on divisional managers' judgments in the process of resource allocation despite the elusive and sometimes inconsistent information across proposals. On the other hand, assuming they prefer larger capital budgets, divisional managers have strong incentives to exaggerate the prospects of their divisions. Indeed "...any manager worth having can produce numbers that will make a project look good" (Bower, 1970, p. 15). The cost of such exaggerations to divisional managers is inconsequential to the extent that divisional performance outcomes can be attributed to various sources. Essentially, when diversity in industry-specific knowledge increases, a headquarters loses its ownership (control) advantage, i.e., the ability to access critical information and pick winners based on this information. Thus, in the face of equivocal and inconsistent information, top managers' resource allocation decisions are likely to reflect a tendency toward allocating resources evenly across divisions (i.e., over-investing in unprofitable divisions and under-investing in profitable divisions), assuming that resources are limited. Such an allocation policy is relatively inefficient because the efficiency of allocation decisions could be improved by increasing (decreasing) the allocation to more (less) profitable divisions. Thus, I propose the following hypothesis:

Hypothesis 1: There is a negative relationship between resource allocation efficiency and K-diversity.

Diversity in Industry Specific Investment Opportunities

Divisions in a typical multidivisional firm face various industry-specific investment opportunities, each exhibiting a different potential for value creation (hereafter, Q-diversity, à la Rajan et al., 2000). Assuming that (capital) resources are limited, the efficiency principle requires that top management behaves in a "winner-picking" (Stein, 1997, p. 3) fashion when allocating capital resources among divisions. Thus, when Q-diversity increases, the likelihood of resource transfer among divisions increases, assuming that top managers have incentives to allocate resources to value-creating projects. On the other hand, top managers' tendency to pick winners creates a dynamic of competition for 'winning' more resources among divisions because divisional managers derive private benefits from more resources.

Competition for resources is likely to be destructive as Q-diversity increases. Since transfers among divisions are likelier and larger when divisions face diverse potentials, higher Q-diversity creates stronger incentives to compete over resources. In this process, managers waste their time and energy seeking rent and protecting their quasi-rents within the organization rather than performing their intrapreneurial duties. This problem worsens particularly when divisional managers expect bleak prospects for their divisions (Meyer et al., 1992; Ozbas, 2005; Scharfstein & Stein, 2000). Thus, relatively poorer divisions exaggerate their

prospects to obtain more resources. Richer divisions also exaggerate to protect their resources from flowing to other divisions. Moreover, when managers spend excessive time on organizational rent-seeking, they are not only less likely to make useful decisions regarding their duties but also less likely to help top management correctly rank investment proposals. As a result, the top management's ranking of the investment proposals according to their potential value tends to be flawed, which, in turn, causes underinvestment in relatively more valuable investment projects and overinvestment in relatively inferior projects. This logic leads to the following hypothesis:

Hypothesis 2: There is a negative relationship between resource allocation efficiency and Q-diversity.

Diversity in Operations

Operating in multiple and diverse product markets (hereafter, O-diversity) increases the number and complexity of key managerial decisions. This, in turn, expands the volume and diversity of the information and knowledge requirements for effective coordination and decision making. On the other hand, the managerial skills and capabilities needed to effectively manage wide-ranging and larger operations grow at a rate slower than the rate of growth in product market scope. The discrepancy between the existing managerial capacity and the needed managerial services puts a strain on the top management's ability to effectively monitor and control increasingly disparate and less familiar businesses (Gerringer, Tallman, & Olsen, 2000). This attention-deficit creates governance inefficiencies (Feldman, 2016; Markides, 1992) and a lack of adaptability to environmental changes that might require, for instance, divestment from some industries and investment in emerging opportunities. Thus, a headquarters' advantage in resource allocation becomes limited and may even disappear when the diversity and amount of information needed for decision-making increase beyond what top management could handle efficiently (Natividad, 2013). This line of reasoning parallels Penrose's (1959) argument that successful expansion into new product markets necessitates versatile executive services. Thus, the managerial ability and technical services required for the planning, execution, and efficient operation of the enlarged firm scope establish a limit on profitable expansion. Similarly, both Barnard (1938) and Simon (1947) state that it is the coordination function of management (i.e., authoritative communication) that sets a limit on the profitable growth of a firm.

One could argue that there is a trivial need for coordination across divisions in highly diversified firms, as there are not many linkages among divisions. However, since capital resources are allocated on a competitive basis, there is competition for capital among divisions, which complicates and politicizes the resource allocation process. When O-diversity increases, the attention deficit described above creates a context where information could get

distorted easily, leading to allocation inefficiencies. This discussion suggests the following hypothesis.

Hypothesis 3: There is a negative relationship between resource allocation efficiency and O-diversity.

Interaction Effects

It is quite possible that K-diversity interacts with the other two forms of diversity in its influence on resource allocation efficiency. This is because the mechanism through which either Q-diversity or O-diversity influences resource allocation efficiency is related to the information a headquarters needs to make efficient resource allocation decisions. More precisely, in a world of perfect rationality, increases in either Q- or O-diversity would not lead to information asymmetry between divisional and top managers. Put differently, when the industry-specific knowledge at the headquarters' level is complete, divisional managers will find it harder to exploit Q- or O-diversity and misrepresent information in their quest for a larger investment budget. Thus, when K-diversity decreases, we should observe a weaker (and possibly insignificant) negative relationship between resource allocation efficiency and either Q-diversity or O-diversity. Conversely, when the level of K-diversity increases, we might expect a stronger negative relationship between resource allocation efficiency and either Q-diversity or O-diversity. This logic leads to the following two interaction hypotheses.

Hypothesis 4: As K-diversity decreases, the negative relationship between Q-diversity and resource allocation efficiency gets weaker.

Hypothesis 5: As K-diversity decreases, the negative relationship between O-diversity and resource allocation efficiency gets weaker.

Data and Method

Data Sources and Sampling

In this study, I operationalize the multidivisional firm as a firm that reports financial data for at least two divisions, each having a distinct industry class at the 4-digit NAICS level. Thus, the population of firms operating in and providing financial data for at least two industry classes constitutes an appropriate setting for testing the hypotheses of this paper. To measure resource allocation and several other variables, I exploit data on divisional (segment-level) capital expenditures in multidivisional firms. Capital expenditure is generally defined as addition to property, plant, and equipment, excluding amounts arising from acquisitions. I use Standard and Poor's COMPUSTAT segment and industry files of the years 2002 and 2003 to collect data on divisional capital expenditures and other divisional- and firm-level

financial variables.¹ This database contains data on 5963 publicly held and active firms. Of these firms, 1250 can be classified as multidivisional firms, after excluding those with at least one division in either the utilities or the financial industries. I also use the US Bureau of Labor Statistics' Occupational Employment Survey (OES) data to measure diversity in industry-specific knowledge. The OES database contains information on the distribution of occupational employment for 22 major occupations at the industry level. The occupational employment data are considered to be reliable indicators of the extent to which different types of knowledge, expertise, and know-how are required in an industry (Anand, 2004; Barbieri & Consoli, 2019; Coff, 2002; Farjoun, 1994; 1998). As I will explain below, the calculations of some of the measures used in this study require some industry-level benchmarks, which I estimate using data on stand-alone (single-business) firms.² Due to missing data on some firm-level variables and industry-level benchmarks, the measure of the dependent variable of this study is available only for 597 multidivisional firms. The numbers of observations on the remaining variables range from 597 to 1250.

The Dependent Variable

Analyzing the efficiency of resource allocation by a headquarters makes sense only when the headquarters somehow reallocates resources among divisions, i.e., transfers resources from one division to others. Thus, a measure of resource allocation efficiency must account for the transfers between divisions and whether the transfers are in the right direction. This paper uses Rajan et al.'s (2000) measure of "overall value added by allocation" as the measure of resource allocation efficiency. This measure exploits divisional capital expenditures data to measure resource allocation among divisions. Rajan et al. assume that the average of asset-weighted capital expenditures of single-business firms operating in the same industry as a division, i.e., the industry investment ratio, establishes a benchmark by which the division's assets-weighted capital expenditures, i.e., the divisional investment ratio, can be assessed to determine if a division's capital expenditures include resource transfers from (to) other divisions. Thus, the difference between the divisional investment ratio and the industry investment ratio would constitute a proxy for the level of transfer.³ Following Rajan et al., I proxy the amount of resource transfer to (or from) a division as follows:

$$T_{ij} = IR_{ij} - IR_{ind}$$

where ij indicates division j of multidivisional firm i , where a division is defined at the 4-digit NAICS level. IR_{ij} is the divisional investment ratio, calculated by dividing divisional

1 While the data used for analysis may be considered relatively old, the validity of the conceptual framework of this paper does not depend on the timeframe of the data. That being said, a dataset with a longer timeframe would probably be more useful for more detailed and rigorous analysis.

2 Stand-alone (single-business) firms are those that report data for only one industry segment at a 4-digit NAICS level.

3 This logic has been adopted widely in the empirical literature on resource allocation.

capital expenditures by the beginning of year divisional assets. IR_{ind} is the industry investment ratio, calculated by taking the average investment ratio of all single business firms operating in the same 4-digit NAICS industry class as division j . A positive difference indicates inward transfer into division j from other divisions, whereas a negative value indicates outward transfer from division j to other divisions. Thus, T is a proxy for the direction rather than the efficiency of the transfer. A transfer would be efficient to the extent it is in the direction of divisions with valuable investment opportunities. To measure divisional investment opportunities, the literature, in general, relies on Tobin's q of single-business firms in the same industry as a focal division (e.g., Almeida et al., 2015; Arrfelt et al., 2013; Bardolet et al., 2017; Bardolet, Lovallo, & Rumelt, 2010; Lamont & Polk, 2002; Rajan et al., 2000; Shin & Stulz, 1998). Following the literature, I use the average Tobin's q of single business firms operating in the same industry as a focal division as a measure of divisional investment opportunities. The Tobin's q for a single-business firm is calculated as follows:

$$Tobin's\ q = \left(\frac{(A + P \times S) - (E + DT)}{A} \right),$$

where A refers to the book value of total assets, P refers to the fiscal year-end stock price, S refers to the firm's number of outstanding shares, E refers to the book value of common equity, and DT refers to deferred taxes. Q_{ij} , my proxy for divisional investment opportunities, is then calculated by obtaining the asset-weighted average Tobin's q of all single-business firms operating in the same (4-digit NAICS) industry as a focal division. Assuming that an industry's average Tobin's q is a good proxy for divisional investment opportunities, and given the efficiency rule outlined above, the efficiency of resource allocation is measured as follows (Rajan et al., 2000):

$$Efficiency_i = \frac{\sum_{j=1}^n A_{ij} \times (Q_{ij} - \bar{Q}_{ij}) \times T_{ij}}{A_i},$$

where, i and j denote multidivisional firm and division, respectively. *Efficiency*, A , and Q , denote resource allocation efficiency, the book value of assets, and the value of investment opportunities, respectively. \bar{Q} denotes the firm-level average investment opportunities (imputed Tobin's q), calculated by taking the asset-weighted average of all Q_{ij} . According to this measure, when Q_{ij} is larger than \bar{Q}_{ij} , a positive transfer creates value, whereas a negative transfer destroys value. This measure expresses the magnitude of value creation or destruction as a percentage of assets.

Explanatory Variables

K-diversity. I use the OES data on industry-level occupational employment percentages to measure K-diversity. The occupational employment percentages have been considered as proxies for both the extent and the type of occupational knowledge requirements in a parti-

cular industry. As such, these data have been used to measure knowledge-based diversity in research on diversifying mergers and acquisitions (e.g., Anand, 2004; Barbieri & Consoli, 2019; Coff, 2002). Following this literature, I argue that, in a multidivisional firm, divisional executives hold diverse knowledge to the extent that the divisions of the firm are in industries that are dissimilar in terms of their distributions of occupational employment percentages. Thus, dissimilarity in terms of occupational employment percentages across industries indicates dissimilarity in industry-specific knowledge.

To measure K-diversity, I first identify the occupational employment percentages for each of the 4-digit NAICS industry classes in which a multidivisional firm operates. Next, for each firm-occupation combination, I calculate the firm-level average employment percentage weighted by divisional assets, and then, take the Euclidean distance between this average and the occupational employment percentage at the industry (division) level. This Euclidean distance quantifies, for a given occupation, the difference in industry-specific knowledge between a division and the firm average. The overall firm-level K-diversity is, thus, equal to the sum of Euclidian distances between the division and the firm’s occupational employment percentages, weighted by divisional assets weight and then summed over all divisions. Formally, the measure may be expressed as follows:

$$K-diversity_i = \sum_{j=1}^n w_{ij} \times \left[\sum_{k=1}^K \left| \left(\sum_{j=1}^n (w_{ij} \times ep_{ijk}) \right) - ep_{ijk} \right| \right],$$

where $i, j,$ and k indicate firm, division, and occupation, respectively. Also, $w, n, K,$ and ep refer, respectively, to divisional asset weight, total number of divisions, total number of occupations, and occupational employment percentage.

Q-diversity. This variable is defined as the disparity in the potential, or expected value, of investment opportunities across divisions. Following Rajan et al. (2000), I measure Q-diversity by calculating the coefficient of variation of the divisional Q s, as follows:

$$Q-diversity_i = \left[\frac{\sqrt{\frac{\sum_{j=1}^n (Q_{ij} - \bar{Q}_i)^2}{n - 1}}}{\frac{\sum_{j=1}^n Q_{ij}}{n}} \right],$$

where, $i, j,$ and n denote multidivisional firm, division, and the number of divisions respectively.

O-diversity. This variable is defined as the breadth of a multidivisional firm’s product-market activities. I measure O-diversity using the unrelated component of the entropy index (see Palepu, 1985; Miller, 2006) as follows:

$$O\text{-diversity}_i = \sum_{j=1}^n P_{ij} \times \ln \left(\frac{1}{P_{ij}} \right),$$

where, i, j , and n denote multidivisional firm, division, and the number of divisions, respectively. P refers to the proportion of sales from division j defined at 2-digit NAICS code.⁴

Controls

While the estimation technique used in this paper may account for some unobserved firm heterogeneity, in my analysis, I control for two key influences: *firm size* and *excess capital* resources. Efficiency may vary with size because the resource allocation problem may be more complex in larger firms. I use the total number of divisions reported by the firm as a measure of firm size. Alternatively, a firm's total sales or assets can be used to measure firm size. However, note that the allocation problems discussed in this paper may not arise as much from a large asset (or sales) base, *per se*, as from a large number of divisions. That is, the allocation is likely to be much more complicated in a firm with many divisions even when its sales are low. Thus, I use the number of divisions (*divisions*) as a measure of firm size and expect that resource allocation efficiency goes down as the number of divisions increases. I also control for excess capital resources because the availability of capital may affect firms' investment behavior (Bentley & Kehoe, 2020). The measure of excess capital resources is based on the adjustment factor that Rajan et al. (2000) calculate to account for the possibility of excess resources available to multidivisional firms. The adjustment factor is calculated by weighting divisional transfer, T , by the beginning-of-year divisional asset weight and then summing over all divisions. I use the mean value of the adjustment factor in the sample as an index indicator for a firm's excess capital resources. So, the measure of excess capital (*excess capital*) takes the value of 1 if the adjustment factor is above its mean value, and 0 otherwise.

The Empirical Model and Estimation

To test the hypotheses of this study, I specify the following linear regression equation:

$$\begin{aligned} Efficiency_{it} = & \alpha_0 + \beta_1 K\text{-diversity}_{i,t-1} + \beta_2 Q\text{-diversity}_{i,t-1} + \beta_3 O\text{-diversity}_{i,t-1} \\ & + \beta_4 (K\text{-diversity} \times Q\text{-diversity})_{i,t-1} + \beta_5 (K\text{-diversity} \times O\text{-diversity})_{i,t-1} \\ & + \beta_6 divisions_{i,t-1} + \beta_7 excess\ capital_{i,t-1} + e_{it} \end{aligned}$$

The dependent variable of this study is not observed for all multidivisional firms making up the sampling frame. As such, the firms that appear in my analysis sample may be syste-

4 To reduce the effect of outliers in the data and increase the linearity of the explanatory variables, both Q-diversity and O-diversity were transformed using the natural log transformation. K-diversity was transformed using the square root transformation. Also, whereas the dependent variable was measured using the end-of-fiscal year data, all independent variables were measured using the beginning-of-fiscal year data.

matically different from those not in the sample, which may lead to the so-called endogenous treatment of sampled firms. Thus, estimating the empirical model using the OLS estimator is likely to yield biased results (Greene, 2018). Thus, I utilize the Heckman selection model (Heckman, 1976; 1979) to estimate my regression equation. The Heckman selection model assumes that there is a regression relationship between a dependent variable and a set of independent variables; however, the dependent variable is not always observed. It is observed only when certain conditions are met. These conditions are specified using an auxiliary selection equation.

In this paper, I assume that the dependent variable is likely to be unobserved when a firm has a high number of divisions because as the number of divisions increases, the likelihood of obtaining benchmarks for all divisions goes down. Therefore, I include the number of divisions in the selection equation. Also, firms that operate in related industries may be more likely to be included in the sample. To account for this effect, I calculate the entropy measure of diversity in operations at the 5-digit NAICS and then, obtain the natural log of the related component of the total entropy index as a measure of relatedness to be included in the selection equation. I also include the natural log of the imputed average Tobin's q in the selection equation because the dependent variable is more likely to be observed when the imputed Tobin's q can be calculated. Finally, I include in the selection equation the natural logarithm of total sales because firms in the sample are significantly larger than censored firms. Thus, I specify a selection model, which suggests that the dependent variable is observed if:

$$\beta_0 + \beta_1 \text{divisions}_{i,t-1} + \beta_2 \ln \text{relatedness}_{i,t-1} + \beta_3 \ln \bar{Q}_{i,t-1} + \beta_4 \ln \text{sales}_{i,t-1} + u_{it} > 0$$

where u is normally distributed with mean 0 and a standard deviation 1. If there is a significant correlation between u and e , the errors in the main regression equation, then the OLS estimation of the main regression equation yields biased results. On the other hand, the Heckman selection model provides a procedure that produces consistent and asymptotically unbiased estimates even when the model omits some relevant variables (Greene, 2018).

Empirical Findings

Table 1 reports the descriptive statistics and correlations. The average level of allocation efficiency (hereafter, efficiency) appears to be approximately -0.009 , suggesting that the average multidivisional firm (i.e., a firm with total assets of \$10 billion) in my dataset has destroyed on average \$90 million through its resource allocation policies.⁵ However, the standard deviation of efficiency is more than ten times its mean level, suggesting that firms in my sample vary in terms of their efficiency. Also note that, in my sample, efficiency is not observed for more than half of the firms in the full sample. In my analysis below, I obtain and

5 The mean of total assets in the sample is approximately \$10 billion.

report the unconditional mean level of efficiency after accounting for the potential bias due to the sample selection.

Table 1
Descriptive Statistics

Variable	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Efficiency	-0.009	0.089								
(2) K-diversity (<i>square root</i>)	5.074	2.128	-0.11							
(3) Q-diversity (<i>ln</i>)	-0.586	1.090	-0.10	0.14						
(4) O-diversity (<i>ln</i>)	0.249	0.236	-0.04	0.38	0.17					
(5) Excess capital	0.270	0.444	-0.06	0.01	0.06	0.00				
(6) Divisions	4.067	1.498	-0.03	0.16	0.05	0.18	-0.08			
(7) Relatedness (<i>ln</i>)	0.202	0.242	-0.02	-0.07	-0.04	-0.49	0.01	0.29		
(8) Average q (<i>ln</i>)	0.200	0.871	-0.22	-0.06	-0.10	-0.03	0.04	0.02	0.07	
(9) Sales (<i>ln</i>)	6.033	2.619	0.05	0.00	-0.08	-0.01	0.12	0.40	0.27	0.00

Note: Correlations above 0.068 or below -0.068 are significant at $p < 0.05$.

Table 1 also reports the Pearson's pairwise correlation coefficients. This table indicates that efficiency is significantly and negatively correlated with both K-diversity and Q-diversity. However, although the correlation between efficiency and O-diversity is negative, it is insignificant. Also, relatively low correlations among the three types of diversity suggest that each measure of diversity corresponds to a different (diversity) construct. Overall, these correlations provide some reassuring evidence on the validity of the measures in this study.

Table 2 presents the regression estimates based on the Heckman selection model. Thus, each regression model in this table includes the estimates of coefficients of the main and the selection equations. Estimates of models 1–3 are based on the full information maximum likelihood procedure, whereas the estimate of Model 4 is based on the two-step estimation procedure. The standard errors of the estimates presented by Models 1–3 have been corrected for (and therefore are robust to) the presence of heteroskedasticity in the errors. The Wald χ^2 tests reported at the bottom of each column reject the null hypotheses that the coefficients in each model are jointly not different from zero. Table 3 also reports the estimates of ρ , the estimated correlations between the error terms of the main and the selection equations, and the significance levels of the Wald tests of $\rho = 0$. In all models, estimates of ρ are significantly different from 0, justifying the use of the Heckman selection model.

Model 1 of Table 3 presents the estimate of a model containing a constant only. The coefficient of the constant term in this model ($\beta = -0.014$) gives the unconditional mean of efficiency after accounting for the effect of sample selection. The estimated unconditional mean given by this model is much lower than the unconditional mean reported in Table 1. This difference is statistically significant at the 3.5% level.

Table 2
Heckman Selection Model Regression Estimates

	(1)	(2)	(3)	(4)	(5)
<i>Main Equation</i>					
K-diversity		-0.007** (0.002)	-0.014* (0.006)	-0.006* (0.003)	-0.013* (0.005)
Q-diversity		-0.012* (0.006)	0.017* (0.007)	-0.017** (0.006)	0.010 (0.014)
O-diversity		0.020 (0.017)	0.011 (0.038)	0.009 (0.026)	0.002 (0.070)
K-diversity × Q-diversity			-0.007* (0.003)		-0.006* (0.003)
K-diversity × O-diversity			0.002 (0.008)		0.002 (0.013)
Excess capital		-0.014 (0.013)	-0.013 (0.013)	-0.014 (0.010)	-0.013 (0.010)
Divisions		-0.006♣ (0.003)	-0.005♣ (0.003)	-0.012* (0.005)	-0.010* (0.005)
Constant	-0.014* (0.006)	0.019♣ (0.011)	0.046* (0.022)	0.011 (0.021)	0.037 (0.028)
<i>Selection Equation</i>					
Relatedness	0.679** (0.228)	1.266*** (0.256)	1.262*** (0.257)	1.284*** (0.255)	1.284*** (0.255)
Average q	0.829*** (0.062)	0.912*** (0.067)	0.911*** (0.067)	0.889*** (0.072)	0.889*** (0.072)
Divisions	-0.282*** (0.038)	-0.351*** (0.045)	-0.351*** (0.045)	-0.352*** (0.041)	-0.352*** (0.041)
Q-diversity	-0.637*** (0.055)	-0.658*** (0.058)	-0.659*** (0.058)	-0.658*** (0.050)	-0.658*** (0.050)
O-diversity	-0.003 (0.227)	0.429♣ (0.258)	0.424 (0.258)	0.440♣ (0.259)	0.440♣ (0.259)
Constant	0.317* (0.133)	0.073 (0.159)	0.073 (0.159)	0.082 (0.159)	0.082 (0.159)
N	1250	1061	1061	1061	1061
Uncensored N	597	408	408	408	408
ρ	0.115	0.216	0.214	0.546	0.539
Wald χ^2 test of $\rho = 0$	0.000	0.000	0.000		
Wald χ^2 test of all coefficients = 0		0.036	0.052	0.001	0.001

♣ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: Heteroskedasticity-robust standard errors are given in parentheses. Models 1–3 are based on the full information maximum likelihood estimator, whereas models 4 and 5 are based on the two-step estimator of the Heckman selection model. Due to missing data on some variables, N and Uncensored N may differ across models.

Model 2 of Table 3 reports the estimate of the regression equation when the coefficients on the interaction terms are constrained to be zero. While the sign and the significance of the coefficients on both K-diversity and Q-diversity in this model are consistent with hypotheses 1 and 2, it is not appropriate to attach any substantive meaning to these results since the conceptual framework includes interactions between K-diversity and both Q- and O-diversity.

Essentially, the estimate of Model 2 is most likely biased because it omits the interaction terms (see, Brambor, Clark, & Golder, 2006; Li, Sharp, Bergh, & Vandenberg, 2019). Hence, I evaluate my hypotheses using the estimate of the full specification, presented by Model 3.

Hypothesis 1 postulates a negative relationship between K-diversity and efficiency. Estimate of Model 3 provides support for this hypothesis ($\beta = -0.014, p < 0.02$). However, since K-diversity interacts with Q- and O-diversity, these estimates (i.e., both the coefficient and its significance) are correct only when both Q- and O-diversity are simultaneously set to zero. When these variables are held constant at their means, however, the estimated marginal effect of K-diversity on efficiency goes down to -0.007 while its precision increases ($p < 0.005$). This estimate indicates that, everything else equal, one standard deviation increase in K-diversity is associated with 0.012 percentage points decrease in the mean level of efficiency. This number is roughly equal to the unconditional mean reported by Model 1, suggesting that K-diversity also has an economically significant effect on efficiency. However, these effects are correct only for particular values of the explanatory variables. As such, the reported coefficients on the main variables are not much informative and thus, I evaluate my hypotheses by obtaining the marginal effects conditional on various values of the conditioning (moderating) variables.

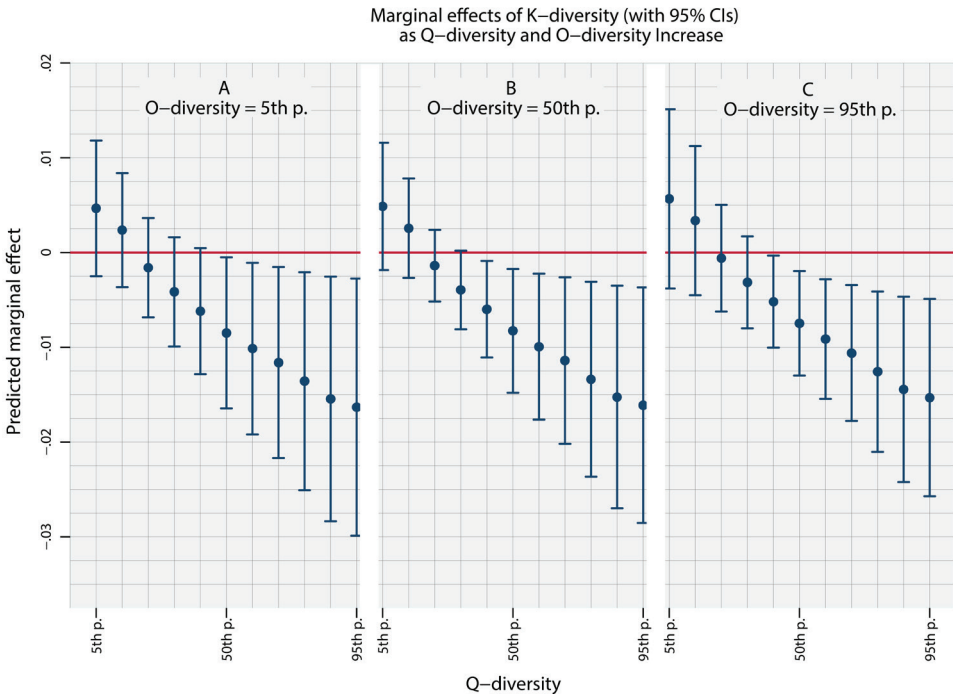


Figure 1. The Contingent Effect of K-diversity on Resource Allocation Efficiency

Figure 1 illustrates how the predicted marginal effect of K-diversity changes for different percentile values of both Q- and O-diversity. Panels A, B, and C of this figure show the predicted marginal effects of K-diversity while varying Q-diversity, but holding O-diversity constant at the 5th, 50th, and 95th percentile values, respectively. The figure indicates that for values of Q-diversity above its 20th percentile, the marginal effects of K-diversity are negative. However, these effects are significant—at the 5% level—only when Q-diversity takes values equal to or above its median. Moreover, as panels A, B, and C of Figure 1 indicate, the predicted marginal effects do not appear to vary significantly over the distribution of O-diversity.⁶ Thus, while results of Model 3 support Hypothesis 1, there is evidence indicating that some effect of K-diversity may be contingent on the level of Q-diversity.

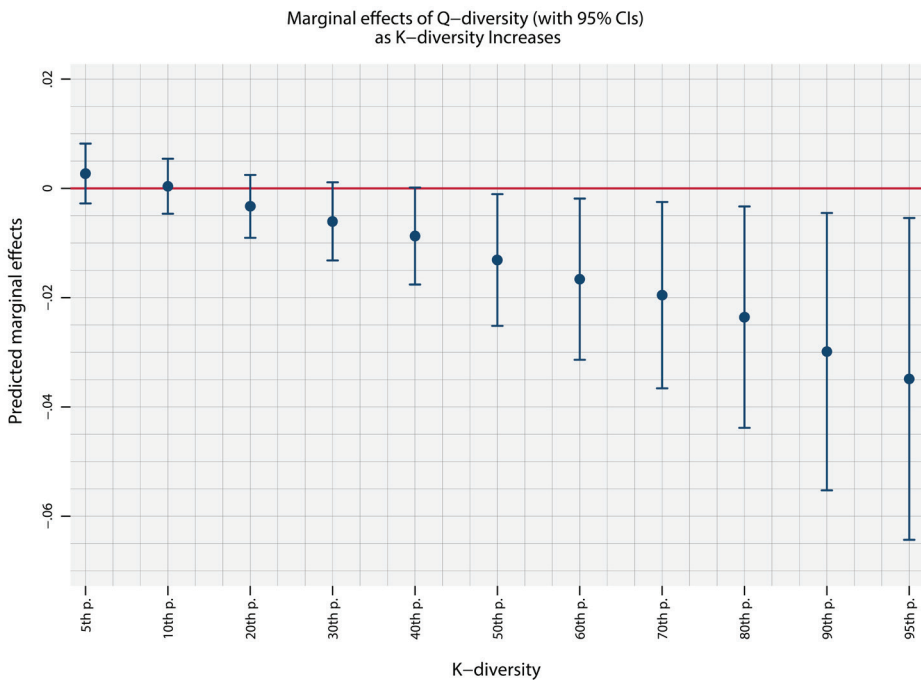


Figure 2. The Contingent Effect of Q-diversity on Resource Allocation Efficiency

Hypothesis 2 postulates a negative relationship between Q-diversity and efficiency. However, Hypothesis 4 argues that the negative relationship between Q-diversity and efficiency is contingent on the levels of K-diversity. Thus, using Model 3 results, I estimate the marginal effects of Q-diversity on efficiency over the distribution of K-diversity. Figure 2 presents the

6 While unreported further analysis indicates that the negative marginal effect of K-diversity becomes significant for values of Q-diversity above -1.7 (the 25th percentile) when O-diversity is held constant at its mean level, the overall results suggest that O-diversity does not have a significant effect on the nature of the interaction between K- and Q-diversity.

estimated marginal effects of Q-diversity with 95% confidence intervals. According to Figure 2, there is a negative relationship between Q-diversity and efficiency. Moreover, consistent with Hypothesis 4, it appears that the negative marginal effect of Q-diversity depends on the level of K-diversity. As K-diversity goes down, the marginal effect of Q-diversity becomes weaker. For sufficiently low levels of K-diversity, i.e., for values of K-diversity below its 40th percentile, the marginal effects of Q-diversity are indistinguishable from zero.⁷

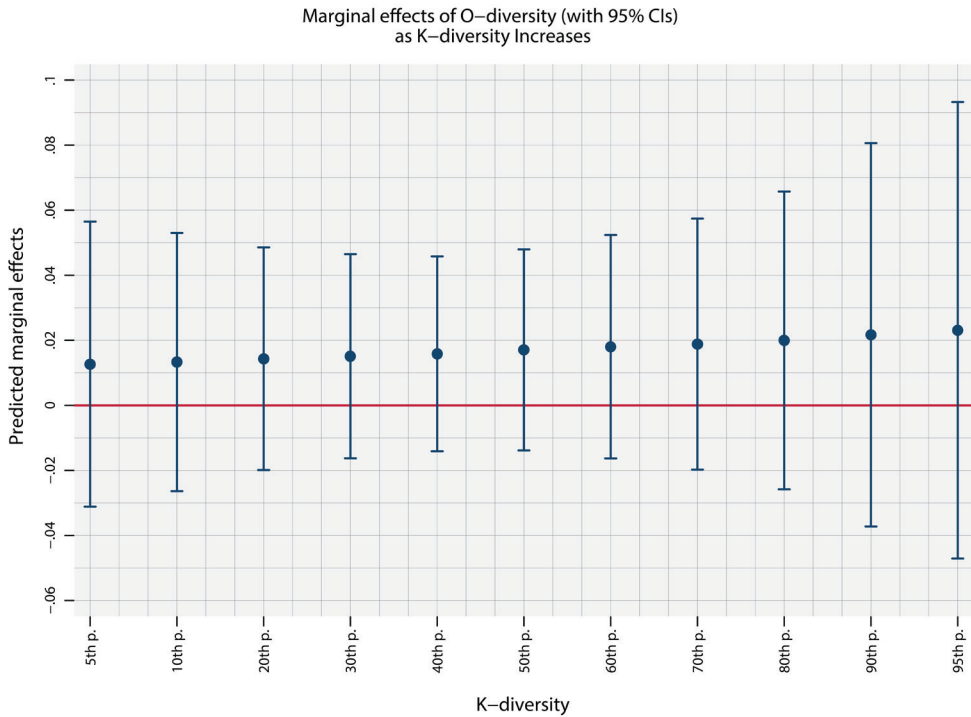


Figure 3. The Contingent Effect of O-diversity on Resource Allocation Efficiency

Hypothesis 3 posits a negative relationship between O-diversity and efficiency. However, Hypothesis 5 states that the negative relationship between O-diversity and efficiency becomes weaker as K-diversity goes down. The results of Model 3 are not consistent with these hypotheses. Figure 3 presents the estimated marginal effects of O-diversity based on Model 3 results. According to Figure 3, there is a positive, nonetheless insignificant, relationship between O-diversity and efficiency. Moreover, this relationship does not appear to vary over different values of K-diversity. Finally, I examine the robustness of Model 3 results

7 Model 3 results suggest that when the value of K-diversity is set to zero, the relationship between Q-diversity and efficiency becomes positive and significant at the 2.5% level. However, this conclusion is not realistic given that K-diversity is always positive and well above 1 for most of the multidivisional firms in my sample. When K-diversity is held constant at its lowest sample value, the marginal effect of Q-diversity on efficiency becomes indistinguishable from zero.

using Heckman's two-step estimation procedure. Model 4 of Table 3 presents this estimate. In terms of coefficient sign and significance, this estimate is quite similar to that of Model 3, providing further evidence that the findings presented so far do not depend on the estimator used to deal with the potential effect of sample selection.

Discussion and Conclusion

In an internal document leaked to the Wall Street Journal in 2006, Brad Garlinghouse, then a senior vice president at Yahoo!, compared their corporate strategy to "spreading peanut butter across the myriad opportunities that continue[d] to evolve in the online world. The result: a thin layer of investment spread across everything [they did] and thus [they] focus[d] on nothing in particular" ("Yahoo memo," 2006). Apparently, Yahoo! had a scheme of allocating its resources evenly across divisions, and perhaps, irrespective of the investment opportunities the divisions then faced. Whether such a resource allocation policy is a widespread phenomenon is a fundamental question for both researchers and practitioners because resource allocation is the most central managerial task with wide-ranging implications (Bower, 2017; Levinthal, 2017; Maritan & Lee, 2017).

According to the M-form hypothesis (Williamson, 1975; 1996), the headquarters in a multidivisional firm is well-positioned to allocate resources efficiently owing to its superior access to information regarding investment opportunities. Several researchers have criticized this hypothesis on the ground that a headquarters might not have either the proper incentives or the information needed to manage the resource allocation process efficiently (e.g., Arrfelt et al., 2013; Bower, 1970; Hill, 1994; Ozbas & Scharfstein, 2010; Rajan et al., 2000; Scharfstein & Stein, 2000). Moreover, descriptive studies of the resource allocation process have shown that the allocation of capital is a political process that entails crucial interactions, including the exchange of critical information among executives, who often hold diverse specializations and interests (Bower & Gilbert, 2005). Thus, the information used in decisions of resource allocation is generally distorted and incomplete. On this basis, this paper contributes to the literature by postulating that diversity in industry-specific knowledge, diversity in industry-specific investment opportunities, and diversity in operations lead to inefficient resource allocation. The empirical results corroborate the purported negative effects of diversities in both industry-specific knowledge and investment opportunities on allocation efficiency. Moreover, I find that the negative relationship between the diversity in industry-specific investment opportunities and allocation efficiency is less pronounced when the diversity in industry-specific knowledge is low. These results appear robust to the potential bias due to sample selection.

These results provide several contributions to the literature on resource allocation within multidivisional firms. It is generally held that in large multidivisional firms, divisional

managers develop industry-specific cognitive frames (i.e., industry-specific knowledge and specializations) that aid in identifying industry-specific profitable investment opportunities. Such benefits notwithstanding, one implication of the findings of this study is that diversity in industry-specific knowledge may create a limit on the headquarters' ownership advantage (i.e., the headquarters' easier access to information) in the resource allocation process. Accordingly, it appears that managerial specializations may be a double-edged sword. Which effect dominates may be contingent on the structural and strategic context of the resource allocation process (Bower, 2017; Gilbert & Christensen, 2005). The results of this paper suggest that diversity in cognitive frames may lead to inefficient resource allocation when the external strategic context exhibits diversity (i.e., when Q-diversity increases). Future research may explore how multidivisional firms design and manage their resource allocation processes (i.e., their structural context) to align the interest and actions of top management team members, and thereby bring their different specializations to bear on decision making in an efficient manner.

Previous studies have also suggested that resource allocation efficiency decreases when there is greater diversity in industry-specific investment opportunities across divisions (Lamont & Polk, 2002; Rajan et al., 2000; Scharfstein & Stein, 2000). The findings of this paper extend this proposition by providing a boundary condition on the impact of diversity in industry-specific investment opportunities. Note that a negative effect may appear counterintuitive because the potential for value creation through resource allocation is greater when there are differences in terms of investment opportunities across divisions. For example, in a two-segment firm, a transfer between divisions is not expected to create value if each of the divisions has the same potential for value creation. The finding of negative effect becomes plausible under a model of influence cost in the resource allocation process. As diversity in investment opportunities, and thus, the prospect of cross-subsidization across divisions increases, divisional managers' tendency to protect or enlarge their turfs becomes stronger, leading to inefficient allocation decisions. The significant interaction effect between diversities in both industry-specific knowledge and investment opportunities gives credence to the preceding interpretation. When the diversity in industry-specific knowledge is sufficiently low, the relationship between the diversity in industry-specific investment opportunities and resource allocation efficiency becomes positive (albeit insignificant), suggesting that when influence activity is not likely to pay off, the bright side of diversity in industry-specific investment opportunities may dominate. However, this effect is not strong, and thus requires further investigation.

Numerous studies have attributed the so-called diversification discount to the non-synergistic asset combinations in diversified firms (for instance, see Coff, 2002; Markides & Williamson, 1994; Miller, 2006; Palich, Cardinal, & Miller, 2000; Robins & Wiersema, 1995; Sakhartov & Folta, 2014; Seth, Song, & Pettit, 2002). While I cannot reject this con-

jecture, the results of this paper indicate that unrelated diversity in operations does not have an impact on resource allocation efficiency. One possible explanation for this result is that what causes resource allocation inefficiencies in multidivisional firms may not be operational diversity, *per se*. Rather, the diversities in industry-specific knowledge and investment opportunities may be among the primary causes of allocation inefficiencies. Note that while the overall conceptual framework of this paper hinges on the bounded rationality assumption, the first and second hypotheses depend crucially on the existence of a conflict of interest among divisional and top managers whereas the third hypothesis is based on potential inefficiencies resulting from operational complexity. In light of these assumptions, the findings imply that resource allocation inefficiency does not arise as much from operational complexity as from incentive incompatibilities and conflicts of interest among executives. However, this conjecture requires further investigations through different or more refined measures and methodologies.

There are a few limitations to this study. First, the conceptual framework ignores the direct and indirect impacts of firm-specific capabilities and organizational structures on allocation efficiency. A firm's governance structure, reward systems, and management capabilities affect resource deployment at both the business and functional level (for instance, see Arrfelt, Wiseman, McNamara, & Hult, 2015; Lovallo et al., 2020; Kor & Mahoney, 2005; Tağ, 2008; 2021). Moreover, firms may face different levels of environmental complexity which might affect their allocation strategies and the level of allocative efficiency they achieve. Thus, the results would be biased to the extent unobserved firm or industry-level heterogeneity is related to the included variables and my selection equation does not account for the influence of the omitted variables. Second, I conceptualize and measure investment opportunities at the industry level rather than at the division level. In practice, however, firms may be allocating their resources based on their evaluation of division-specific investment opportunities, which are functions of both firm-specific capabilities and industry-specific conditions. Thus, our understanding of the relationship between resource allocation efficiency and diversity in investment opportunities could be improved by developing improved measures of divisional investment opportunities. Finally, resource allocation by a headquarters is potentially more valuable when some divisions face constraints on capital while other divisions are capital rich. Therefore, it might be useful to control for this influence by examining resource allocation decisions at the divisional level.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The author has no conflict of interest to declare.

Grant Support: The author declared that this study has received no financial support.

Acknowledgement: The first version of this paper was presented at the 67th Annual Meeting of the Academy of Management, held in Philadelphia, USA. I am grateful for the insightful feedback from anonymous reviewers, conference participants, and the paper discussant Constantinos C. Markides. The current version of the paper develops and tests two additional hypotheses and utilizes a more refined dataset.

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Krinsky-McHale, S. J., Zigman, W. B., & Silverman, W. (2012, August). Are neuropsychiatric symptoms markers of prodromal Alzheimer's disease in adults with Down syndrome? In W. B. Zigman (Chair), *Predictors of mild cognitive impairment, dementia, and mortality in adults with Down syndrome*. Symposium conducted at the meeting of the American Psychological Association, Orlando, FL.

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