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Volume 24 • Number 1 • January 2024

Cilt 24 • Sayı 1 • Ocak 2024

Contents

EGE AKADEMİK BAKIŞ / *EGE ACADEMIC REVIEW*

Cilt 24 • Sayı 1 • Ocak 2024
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Self-Esteem as a Mediator in the Relationship Between Earnings and Job Insecurity

Sevda KÖSE[1], Beril BAYKAL[2]

ABSTRACT

When the researches on job insecurity, which is a considerable subject for both individuals and organizations, are examined, it appears that the researches examining the relationship between job insecurity, self-esteem and earnings are limited. This research aimed to analyze the mediator role of self-esteem in the relationship between earnings (wage & household income) and job insecurity. The research sample is 393 service sector employees in Kocaeli who participated willingly and opted through random sampling. Structural Equation Model was used in analysis of the data. For analyses IBM SPSS 21 and AMOS 21 were used. According to findings self-esteem mediates the relationship between earnings (wage & household income) and job insecurity, and the three variables were associated with each other. Earnings primarily affect the self-esteem of individuals, which, in turn, affect job insecurity. The increase in earnings also increase self-esteem, and this increase in self-esteem affects job insecurity perception in a negative way. Therefore job insecurity decreases. The findings are interpreted based on the relevant literature and previous studies.

Keywords: Job Insecurity, Self-Esteem, Earnings, Mediator Role, Structural Equation Model, Türkiye.

JEL Classification Codes: J00, J01

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INTRODUCTION

With the trends towards globalization and technological advancement, as well as the decreasing workforce and the weakening of the ties between employer and employee, job insecurity has become a problem that challenges the working life (Hoffman, Shoss ve Wegman, 2020). New information technologies, recession, industrial restructuring and increasing global competition have dramatically changed the working life by affecting the nature of work and organizations (Hellgren, Sverke & Isaksson, 1999). Flexible working arrangements, that begins to be implemented with these changes, together with the downsizing, restructuring, merging, privatization and subcontracting seen today, have made the problem of job insecurity deepened and one of the problems that need to be emphasized (Hellgren & Sverke, 2003).

Job insecurity, which harms the health of the individual and causes effects that reduce job satisfaction, causes employees to exhibit negative attitudes towards their organizations, reluctance to stay in the organization and decrease in performance. However, job insecurity has notable effects on workers' health, attitudes, behaviours rather than its effect on organizations (Klandermans & Vuuren, 1999). In terms of individual results, it was stated that job insecurity causes more psychological distress and somatic health complaints (Strazdins et al., 2004); and can be accepted as one of the factors that cause stress. Employees who experience uncertainty about the future experience anxiety about losing their job, their coping capacity decreases and they are prevented from taking action for better conditions (Strazdins et al., 2004). In addition, it is possible to come across studies showing that job insecurity causes health problems (Ashford, Lee & Bobko, 1989; Ferrie et al., 2001; Hellgren, Sverke &Isaksson, 1999; Strazdins et al., 2004). Some of the health problems that arise due to job insecurity are problems that harm the psychological well-being such as stress, anxiety, depression, fear, anger, guilt, dissatisfaction with self and environment. Some of them are somatic complaints and physical health problems that arise due to these problems (Sverke et al., 2004).

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In this context, the factors that exacerbate the perception of job insecurity gain importance. Factors affecting perceived job insecurity are sorted into three groups as environmental and organizational factors, individual characteristics, and personality traits (De Witte, 2005; Greenhalgh &Rosenblatt, 1984; Kinnunen et al., 1999).Rather than stating that any one factor is more important, it would be more appropriate to investigate different effects of these factors on job insecurity and the relationships between them (Klandermans & Van Vuuren, 1999: 148).However more studies have analysed premises and consequences of job insecurity (Ashford, Lee &Bobko, 1989; Chirumbolo &Hellgren, 2003; Ferrie et. al., 2001; Hellgren, Sverke & Isaksson, 1999; Klandermans & Vuuren, 1999; Naswall & De Witte, 2003;Strazdins et al., 2004;Sverke &Hellgren, 2002; Sverke et. al., 2004), there are few studies about the different effects of these factors and their relationships. So, this research's aim is to analyze the effects of earnings (wage & income) which is an element of organizational and individual characteristics, and self-esteem which is a personality trait, on job insecurity. Despite the prominence of the subject, the number of researches investigating the correlation between earnings, job insecurity and self-esteem is limited. In this regard, first, conceptual framework of job insecurity and self-esteem are discussed and theoretical background regarding the relationship between these concepts is presented. Finally, method will be explained and results will be discussed.

CONCEPTUAL FRAMEWORK

Job insecurity

Greenhalgh and Rosenblatt (1984) define job insecurity as the inability to maintain desired continuity when the job is under threat. For De Witte (2005) job insecurity is the perceived threat of losing job and concerns about this threat. Sverke, Hellgren, and Näswall (2002) define it as the subjectively experienced expectation of a basic and unvoluntary event related to job loss. Accordingly, it involves experiencing uncertainty about absenteeism or job loss (Wilson et al., 2020).

There are different approaches in defining job insecurity. These approaches can be categorized as subjective-objective, qualitative-quantitative, affective-cognitive. Subjective job insecurity is psychological that it expresses anxiety for the future of the job (Van Vuuren, 1990). According to Van Vuuren (1990), subjective job insecurity reflects three aspects. First, it is subjective and need not be associated with specific employment groups. Second, it is about future; that is, employees are not sure about future of their jobs. Third, it is about job continuity, not continuity of job content. Objective job insecurity is about external factors such as crisis and globalization (Çakır, 2007).Hellgren, Sverke, and Isaksson (1999) define job insecurity as qualitative and quantitative. Accordingly, while quantitative job insecurity is concern for losing job; qualitative job insecurity is concern for losing significant characteristics of the job. Perceived threats to quality of employment relations like ingravescent work conditions, absence of career opportunities, and not making wage improvements are about qualitativejob insecurity. Borg and Elizur (1992) define job insecurity as cognitive and affective. Accordingly cognitive job insecurity is expressed as stres type caused by individuals' possible job changes. Cognitive job insecurity, which is thought to be possibility of losing job, is related to environmental threats that cause stress in individuals. Fear of job loss is affective job insecurity(Huang, Lee & Asford, 2012).

Greenhalgh & Rosenblatt (1984) postulate two main dimensions of job insecurity: the severity of perceived threat and the perceived powerlessness to resist threats (Table 1). The severity of threat to job continuity depends on extent and significance of the potential loss. The severity of threat includes characteristics of job under threat, the value of each feature to the individual, the subjective possibility of losing each characteristic, the number of threat sources. The feeling of powerlessness is also a considerable element of job insecurity as it increases threat experienced. Powerlessness includes areas where insecure individuals experience power deficits.

Factors affecting perceived job insecurity are sorted into three groups as environmental and organizational factors (organizational change, communication, etc.), individual characteristics (age, education, gender, income, etc.) and personality traits (locus of control, personality, self-esteem, etc.)(De Witte, 2005; Greenhalgh & Rosenblatt, 1984; Kinnunen et al., 1999).Job insecurity experiences, regardless whether they are quantitative or qualitative/ cognitive or affective, result from the interaction between the situational characteristics and the individual's characteristics that affectindividual's interpretation of environmental factors(Blackmore, 2011).

In this research, first of all, the relationship between earnings (one of the organizational and individual characteristics) and job insecurity will be examined. According to Greenhalgh &Rosenblatt (1984) perception and effect of job insecurity are associated to employee's commitment to current job. If this commitment, which includes economic insecurity expresses that an individual cannot afford living costs without income earned from his job, is excessive, the individual may feel the threat of job

Table 1. Job Insecurity Dimensions

Severity of threat	Uncertain job loss Temporary job loss Downgrading of job within organization Career development Income flow Status/self-esteem Self-determination Sources Society Decline/ reducing age Reorganization Technological change Physical danger
Powerlessness	Lack of protection Unclear expectations Authoritarian environment Dismissal

Greenhalgh and Rosenblatt (1984: 442) Dimensions of Job Insecurity

insecurity deeply. Frese (1985) and Kinnunen et al. (1999) stated that individuals with lower income are often more dependent on their income and are defenceless to the threat of losing job. So, the first hypothesis is as follows:

H1: Earnings are related to job insecurity.

Self-esteem.

Self-esteem (SE), a socio-psychological phenomenon,expresses the individual's perceptions and attitudes regarding their worth. Rosenberg (1965) defines self-esteem as the general self-evaluation of the individual. Therefore, "*self-esteem is an evaluation of one's quality as an object, how good orbad, valuable or worthless, positive or negative, or superior or inferior one is"* (Thoits, 1999). SE is a state of appraisal arising from the acceptance of the self-concept that the individual reaches as a result of self-evaluation, and it defines the state of self-satisfaction, appreciation, value to be loved, and trust in one's essence without considering himself/herself inferior or superior (Özcan, Subaşı, Budak, Çelik, Gürel & Yıldız, 2013). Accordingly, self-esteem is an individual's feelings about their personal worth, competence, and suitability (Liu, Yang & Zou, 2021).

Individuals with high SE appreciate themselves, believe they are inherently valuable. Therefore they have a positive retention of their characteristics; so they are aware of their own competencies and abilities and have beliefs that they can do what their will. These individuals display a positive attitude when comparing themselves to others. Low SE refers the opposite of the positive qualities and results in negative situations as self-harm, helplessness, powerlessness, weakness and depression (Kağıtçıbaşı & Cemalcılar, 2016; Smelser, 1989).

SE of the individual starts to form from childhood and takes shape in line with the reactions given to life experiences. Praised and supported children through these experiences, will develop positive SE when evaluated as successful environment. Criticized, mocked and punished

children can have an unhealthy SE and begin to question their competence and worth. The quality of relationship with parents is important in this period. During adolescence the adolescent's attachment to parents decreases and interaction begins with friendships and socialization between gender. In this period, social groups and age-mate approval are effective in shaping SE (Richman, Hope & Mihalas, 2010).With the adulthood period, SE develops primarily within the scope of social relations and occupational issues. In this period, features of the job (such as wages), socio-economic status (education, income etc) are the factors that affect SE (Cited in Tufan, 1990).

In this research, secondly, relationship between SE and earnings will be examined. Individuals with higher incomes have high SE levels than do individuals with low incomes (Ross & Mirowsky,1996).Rosenberg &Pearlin (1978) stated that high levels of economic success willbring high SE. Accordingly, the second hypothesis is as follows:

H2: Earnings are related to self-esteem.

The mediator role of SE

Every employee has different personality traits, influenced by the personality of each element contained within the individual, and one of them is self-esteem (Soelton et al., 2020). Among personality traits, role of SE, in the relationship between job insecurity and earnings has not been clearly studied yet. In particular, SE may influence perceptions by buffering effects of stressors like low income and wages. In this context, an individual with high SE may evaluate a stressful or negative job situation as challenging rather than threatening (Callea, Presti, Mauno & Urbini, 2019).

Lazarus & Folkman (1984) identified SE as an emotional-based coping strategy. Accordingly, individuals who have higher SE can deal with any stress-related situation more actively than their precedents who have low SE and prefer to avoid challenge (cited in Adekiya, 2018).

*"Behavioral plasticity theory"*developed by Brockner(1988) indicates that external factors effect individual. According to the theory, individuals differ in the extent to which they stand by& respond to external cues. The factor that determines the extent of an individual's response to external cues is SE. Individuals who have low SE are more reactive (plastic) than those who have higher SE. While individuals who have high SE are expected to react less to these cues and to exhibit less related consequences; individuals who have low SE are expected to show more sensitivity and reaction to this negative situation (Cited in Pierce & Gardner, 2004). Low SE individuals are more sensible to environmental events than high SE individuals. High SE individuals are expected to be more elastic to external conditions and stress factors, and According to Lasdat (2010), the perception of job insecurity differs between individuals due to personal characteristics. SE can affect the perception of job situations, the choice of dealing strategies, the intension of an individual's actions (De-Keyser, Vlerick ve D'hoore, 2011). Therefore an increase/decrease in SE is related to a decrease/increase in perceived job insecurity (cited in Adekiya, 2018). Accordingly, third hypothesis is as follows:

H3: Self-esteem is related to job insecurity.

In the perspective of above explanations, it can be said that low earnings may lead to low SE and high level of perceived job insecurity and negative consequences. So we can say that higher earnings may increase SE and therefore decrease the perception of job insecurity and negative results of environmental factors. So the last hypothesis is as follows;

H4: Self-esteem mediates (affects) the relationship between earnings and job insecurity.

Accordingly, research model was designed as depicted in Figure 1.

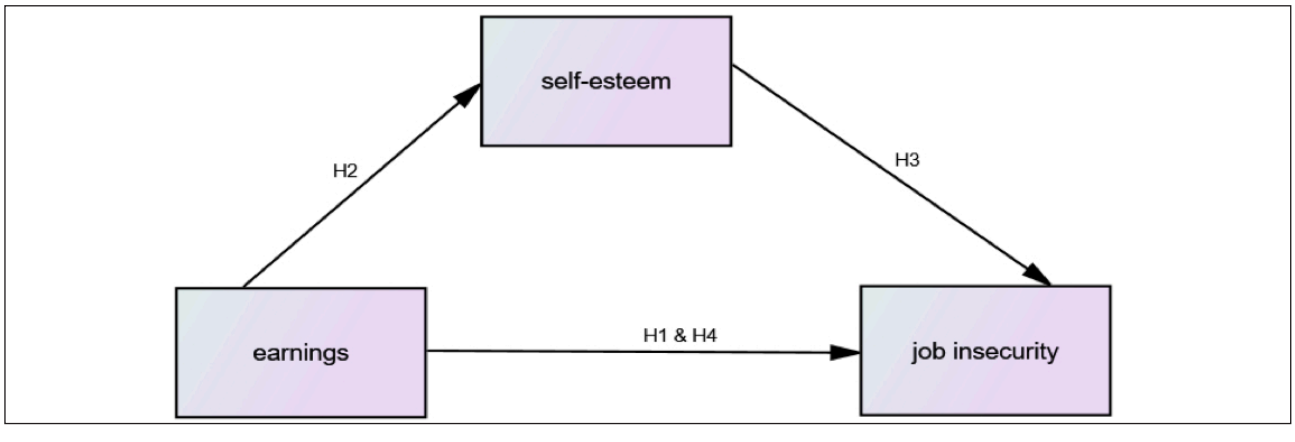

Figure 1.The Conceptual Model: Job Insecurity, Self-Esteem, Earnings and Hypotheses

METHOD

The Aim Of the Study

The aim of the research was to analyze mediator role of self-esteem in the relationship between earnings (wage & income) and job insecurity.

Population and Sample

The population of research is service sector employees in Kocaeli. The research sample is 500 service sector employees in Kocaeli, selected through random sampling. From this 500 participants, 393 interview was reliable for this research. For interviews, an application was made to the Kocaeli University Committee of Social and Human Sciences Ethics, and Ethics Committee Approval was obtained at the Committee's meeting, numbered 2021/12 and dated 30/09/2021.

The sample's socio-demographic characteristics were represented in Table 2.

Data Collection Tools

The following scales were carried out by face-to-face interview method with participants who agreed to participate in order to collect data:

Job Insecurity Scale. This 7- item and 5- point Likert scale, which has two dimensions as qualitative and quantitative

Table 2. Socio-Demographic Characteristics of the Sample

	N	%
Sex		
Female	196	49.9
Male	197	50.1
Age		
Under 25	101	25.7
25 – 34	197	50.1
35 – 44	55	14.0
45 +	40	10.2
Marital Status		
Single	247	62.8
Married	146	37.2
Education		
<High School	18	4.6
High School	89	22.6
Undergraduate	267	67.9
Postgraduate	19	4.8
Total	**393**	**100**

	N	**%**
Position		
Managerial	89	22.6
Non-Managerial	304	77.4
Occupation		
Managers	41	10.4
Professionals	154	39.2
Assistant professionals	41	10.4
Customer service and office	79	20.1
Sales and service	65	16.5
Unqualified	13	3.3
Years Worked		
Less than 1	71	18.1
1-5	181	46.1
6-10	83	21.1
10 +	58	14.8
Wage		
Minimum Wage	189	48.1
5500-10000 TL	141	35.9
Over 10.000 TL	63	16
	393	**100**

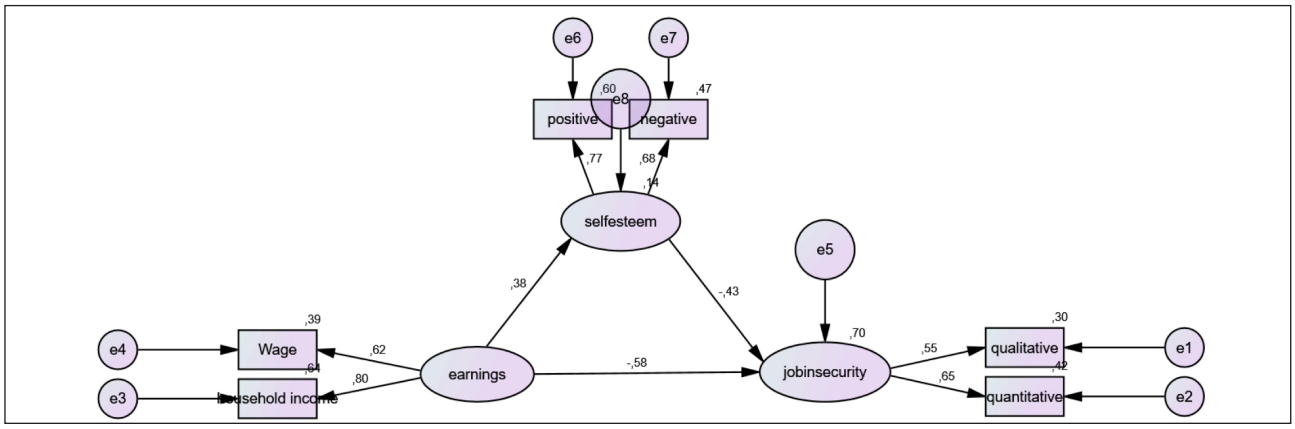

Figure 2. Structural Equation Model

job insecurity, was developed by Hellgren, Sverke, and Isaksson (1999). There are four items to test qualitative job insecurity and three items to test quantitative job insecurity. Scale's score ranges between '1' (strongly disagree) and '5' (strongly agree).The scale, which was translated into Turkish, was tested for reliability and the reliability level was high (Cronbach's Alpha: 0.732).

Self-Esteem Scale. This 10-item and 4- point Likert type scale was developed by Rosenberg (1965) and has 10 items. Scale's score ranges between '1' (strongly disagree) and '4' (strongly agree).There are five items to test low SE and five items to test high SE. The scale, which was translated into Turkish, was tested for reliability and the reliability level was high (Cronbach's Alpha: 0.800).

Demographic Questions. There are some demographic questions about the participants' gender, age, education, seniority and position, professions, wages and household income.

Process and Analysis

IBM SPSS 21 and AMOS 21 were used to analyze the data. For analyzing the factor structure of variables confirmatory factor analysis was used. Model fit was measured through the values of the comparative fit index (CFI), the chi-square goodness of fit statistic (χ2, χ2/df), the standardized root mean square residuals (SRMR) and the root mean square error of approximation (RMSEA). Measures of goodness of fit of model are χ2: 271,281; χ2/df: 2,422; CFI: 0,914; RMSEA: 0,06 and SRMR: 0,05. The CFA results showed that the measurement model had an acceptable fit.

Structural Equation Model was conducted for testing hypotheses and whether self-esteem mediates the effect of earnings on job insecurity.

FINDINGS

SEM findings were shown in Figure 2. First, SEM findings showed that earnings [β= -,740, p<,01] affect job insecurity significantly and negatively. Job insecurity decreases as earnings increase. Hence, H1 was supported. Second, SEM findings revealed that earnings [β=,380, p < ,01] affect SE significantly and positively. Hence, H2 was supported. In short, as earnings increases the individual's SE increases. Third, SEM findings showed that SE affect job insecurity in an negative way significantly [β= -,430, p < ,01]. Thus, H3 was accepted.

Lastly, with the bootstrapping method the mediator role of SE in the relationship between earnings and job insecurity isexamined. Total effect value of earnings on job insecurity is significant (β= -,307, p <01). Standardized direct effect value of earnings on job insecurity is β= -,580, p<01 and standardized indirect effect value of earnings on job insecurity through SE is β=-, 160, p<01.Whether standardized indirect effect value is significant or not is checked with bootstrap 95% confidence interval. The fact that this range does not contain value zero (β=-,160, 95% CI[-.246,-.084] indicates that standardized indirect effect value is significant. Findings show that SE mediates the relationship between earnings and job insecurity. Hence H4was supported.

The model shows satisfactory fit for most of the goodness of fit measures (χ2: 7,054; χ2/df: 1,176; CFI: 0,99; RMSEA: 0,021 and SRMR: 0,019).

DISCUSSION AND CONCLUSION

Flexible working arrangements, downsizing, restructuring, merging, privatization and subcontracting seen today with globalization, have made the problem of job insecurity more crucial because of affecting individuals well-being, physical and mental health, job

attitudes negatively. Environmental&organizational factors, individual characteristics, personality traits are factors that affect job insecurity. In perception of job insecurity, earnings (wage and household income) are related to organizational and individual factors, while SE (overall evaluation of self) is related to personality traits. This research focuses on the effect of these two factors on job insecurity based on the plasticity theory.

This research aimed to analyze the mediator role of SE in the relationship between earnings and job insecurity. Findings confirmed that SE mediates this relationship, variables correlate with each other. The first noteworthy finding revealed that the relationship between earnings and job insecurity is negative and significant; that is, as earnings increases, job insecurity decreases. Brockner et al. (1992), Kinnunen et al. (1999), Kristensen, Borg And Hannerz (2002), Bustillo and Pedraza (2010) and Scicchitano, Biagetti And Chirumbolo (2020) also found that individuals with low income were more influenced by job insecurity.

The second considerable showed that the relationship between earnings & SE is significant and positive. This positive relationship between earnings and SE has also been shown in previous researches (Rosenberg & Pearlin,1978; McMullin & Cairney, 2004; Kammeyer-Mueller, Judge & Piccolo, 2008).That is, as earnings increases, SE level increases.

The research's findings also revealed a significant and negative relationship between job insecurity and SE. Orpen (1994), Kinnunen et al. (1999), Kinnunen et al. (2003) and Callea (2019) obtained similar results in their work. So, high level of SE decreases perception of job insecurity. Taking into account that this research was conducted with individuals employed in the service sector, highly competitive, demanding & stressful, job insecurity is an important problem for these individuals. It can be said that high self-esteem can help these individuals to deal with highly competitive and stressful environmental factors such as low wages and can affect the perception of job situations and the choice of dealing strategies.

As a result, it can be said that earnings primarily affect SE of individuals and SE affects perception of job insecurity. An increase or decrease in earnings causes a parallel change in SE, which adversely affects the perception of job insecurity. The higher the earnings, the higher the individual's SE and the lower job insecurity. In contrast, the lower earnings will negatively affect SE and individual's ability to deal with stress and difficulties, leading to higher job insecurity. As assumed in plasticity theory low SE individuals are more sensible to environmental events. Therefore perception of job insecurity will be higher for them. High SE individuals are more adaptable to external circumstances and stressors, therefore perception of job insecurity will be lower for these individuals. This situation will also affect the individual's well-being, mental and physical health and work attitudes.Therefore, it can be said that having earning sources that positively affect SE is important for the perception of job insecurity.

LIMITATIONS

This research had some limitations. First, because of cost and time constraints, research was carried out in Kocaeli with the service sector. Therefore, generalization cannot be made to all employees. Second, using of quantitative method in the research limits an in-depth analysis. Despite these limitations, this research contributes to further research by ensuring a reliable and generalizable perspective about the mediator role of self-esteem. For more comprehensive findings, future research can be done using mixed research methods, different sectors and a large population.

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Testing the Rodrik Hypothesis in Türkiye

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ABSTRACT

In this study, the effect of globalization on government size is investigated for the period 1970-2019 in Turkiye. In the study, four different globalization indexes, namely general, social, political and economic, are used to represent the globalization variable. Four different models are created for each globalization index and Fractional Frequency Fourier ADF Test, RALS-ADL and RALS-EG2 cointegration tests are used as analysis methods. Model estimations are made with FOLS and DOLS methods. As a result of the analysis, the effect of economic globalization on government size is positive in all models. In other words, it is concluded that the compensation hypothesis is valid for Turkiye.

Keywords: Globalization, Government Size, Compensation Hypothesis, Efficiency Hypothesis, Turkiye.

JEL Classification Codes: C32, F62, H50

Referencing Style: APA 7

INTRODUCTION

The phenomenon of globalization not only provides trade, labor and capital mobility, but also contributes to the dissemination of information. However, globalization also facilitates funding diversification, technology transfer and product diversification, which leads to the creation of benefits such as greater efficiency and greater export markets access for domestic producers. However, in addition to these advantages, it also makes economies susceptible to supply shortages, currency fluctuations and income volatility that can result in difficult financial and economic crises (Katumba, 2013:1).

Increasing international trade and investment flows, financial liberalization and global interdependence have become the basic realities of countries at this point. In economic terms, globalization represents greater production factor mobility, greater integration with the world through foreign direct investment and increased trade (Adams & Sakyi, 2012). In order to examine the effects of globalization more comprehensively, the globalization measure is needed. At this point, Dreher's (2006) globalization index offers a significant advantage by bringing together various social, political and economic variables.

The phenomenon emphasized in the efficiency hypothesis is that governments have difficulties in collecting tax revenues and cannot easily manage budget deficits (Liberati, 2007). According to the hypothesis, the mobility on tax competition puts downward pressure on tax revenues, which may lead to a decrease in public expenditures.

Compensation and efficiency hypotheses are among the topics with important research areas in the literature. In particular, the relationship between globalization and public size, as of the period of intensification of openness, has been discussed in empirical studies for different countries, mostly with panel data analysis. However, the number of studies on Turkiye on this subject is few. This is one of the differences between the study and other studies in the literature. Another difference is in the analysis method applied. In this study, the subject is examined with current econometric analysis methods that were not used in previous studies.

In the econometric model, the ratio of public expenditures to GDP is considered an indicator of government size. To represent the globalization variable, four different globalization indexes, namely general, social, political and economic, are examined.

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Four different models are created to represent each globalization index. In the study, Fractional Frequency Fourier ADF Test, ADF and PP unit root tests are performed in unit root analysis. RALS-ADL and RALS-EG2 cointegration tests are conducted to analyze whether the variables are cointegrated in the long run.

The plan of the study is formed as follows. First, the conceptual framework related to globalization and public size is created and the development of the aforementioned sizes in Turkiye is revealed. In this context, compensation and efficiency hypotheses are also comparatively explained in detail. After the model and data sets are introduced in the empirical analysis, the results were evaluated statistically. Finally, the results are interpreted.

GLOBALIZATION-PUBLIC SIZE RELATIONSHIP AND TURKİYE

Globalization is one of the important concepts that determine the future of countries. Increasing financial liberalization, investment flows and increases in international trade have turned the world into a global village. Accordingly, it has become an undeniable fact that no nation can exist alone. Under the pressure of international norms and profit-making interests, it is accepted that the responsibility of guaranteeing trade and compensating the citizens for any loss or negative impact that this trade may cause belongs to the governments (Olorunfemi & Alimi, 2020:2). At this point, the effect of globalization on government size differs. In other words, due to the intensification of competition day by day, discontent is increasing between and within countries. Because of these, people demand greater public interventions. On the other hand, globalization requires more deregulation and liberalization compared to global efficiency. This situation brings with it a smaller government size (Choi, 2010:1447).

There are three basic theories that explain the relationship between public expenditure and globalization. According to the first theory (Compensation Approach), globalization leads to a decrease in public expenditures. According to the latter (Efficiency Approach), globalization causes an increase in government spending. The third theory argues that although globalization may have minor effects on public spending, local factors are one of the more important determinants of public spending (Heimberger, 2021:352).

The globalization process affects the ability of the governments to maintain their social protection as in previous years (Sanz & Velázquez, 2003:2). On the other hand, the fact that the economies of the countries are more open to the outside brings external risks for those living in the host country. By reducing external risks, countries can increase their demands for social security and welfare expenditures (Rodrik, 1998). Hence, we may expect a positive correlation between trade openness and the size of the government. Because in economies exposed to external risk, government expenditures play a risk-reducing role (Sanz & Velázquez, 2003:2).

Rodrik (1998), drew attention to the positive relationship between globalization and public spending. Because economies that are more exposed to external shocks demand social security and welfare expenditures to reduce the exposure of residents to external risk. In other words, the fact that residents are more exposed to external risks leads to an expansion of the government's role.

In the compensation hypothesis, it is assumed that public expenditures increase in order to reduce the risks brought by international trade; in the efficiency hypothesis, it is assumed that capital mobility increases caused by globalization will reduce public expenditures. At this point, the basic principle of the efficiency hypothesis is that governments have difficulties in collecting tax revenues and can hardly manage budget deficits in response to the increasing capital gap (Liberati, 2007). In the expanded version of the efficiency hypothesis, it is difficult to make precise predictions about the sorts of government expenditure that globalization will have a negative influence on. Globalization puts downward pressure on public expenditures. The most important reason for this situation is that the welfare state redistributive fiscal policies are almost attacked (Alesina & Perotti 1997).

Globalization generally has three dimensions: Economic, social and political. The fact that globalization has different dimensions has led to the emergence of different indices over the years. The KOF index is accepted as the best index since it includes the political and social dimensions of globalization (Topuz, 2016: 787). Researchers have tried to gather all dimensions of globalization in a single index. For this purpose, indices based on various criteria have been developed. In Table 1, the mentioned indices and the indicators discussed are presented collectively.

The KOF globalization index developed by Dreher (2006) provides more comprehensive information by combining various variables from economic, political and

Table 1. Globalization Indexes and Criteria

Index	Criteria												
	Years	Countries	Indicators	Economic Globalization				Social Globalization		Political Dimension	Negligible Weight	Geolocation	Environment
				Flow		Real Trade Flow	Restriction of trade and capital	Culture	Information and Communication				
				Foreign capital	DYY								
KFP	1971-2005	62	12	X	✓	✓	X	X	✓	✓	✓	X	X
KOF	1970-2008	158	25	✓	✓	✓	✓	✓	✓	✓	X	X	X
CSGR	1982-2004	62	16	✓	✓	✓	X	X	✓	✓	✓	✓	X
MGI	2000-2008	117	11	✓	✓	✓	X	X	✓	X	Same Weight	✓	✓
NGI	1995-2005	70	22	✓	✓	✓	X	✓	✓	X	X	✓	X
G-Index	2001	185	6	✓	✓	✓	X	X	✓	X	X	X	X

Source: Samimi at all, 2011, p.210

social fields. The KOF Globalization Index is calculated annually from 1970 to 2019. However, missing values are calculated using the linear interpolation method, since all data by countries and years are not available (KOF, 2022). Figure 1 shows the ratio of public expenditures to GDP for the period 1970-2019 in Turkiye. Accordingly, the year with the highest rate in question is 2009. The lowest year is 1985. Although there has been an increase and decrease in the size of the public over the years, the period between 1988 and 1991 can be characterized as the period in which the highest increase is recorded.

Figure 2 shows general globalization index according to different income groups. Accordingly, the general globalization index in the high-income group is well above the world average. It is seen that the level of globalization in countries has increased rapidly since 1990.

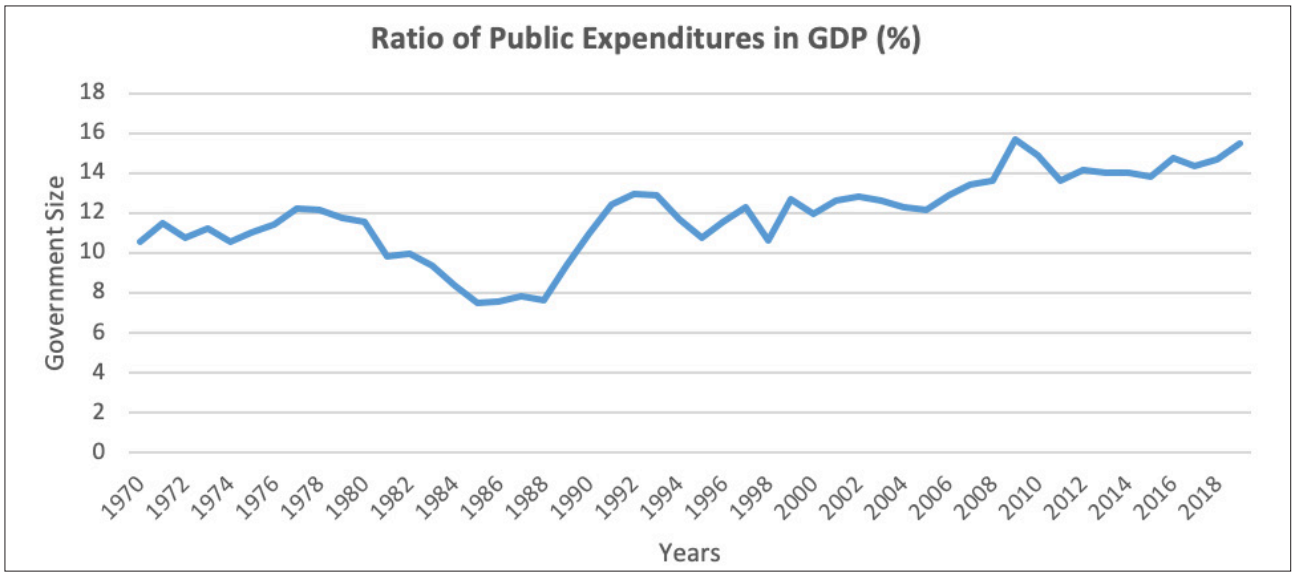

Figure 1. Ratio of Public Expenditures in GDP for the period 1970-2019 in Turkiye (%)

Source: Worldbank (2022).

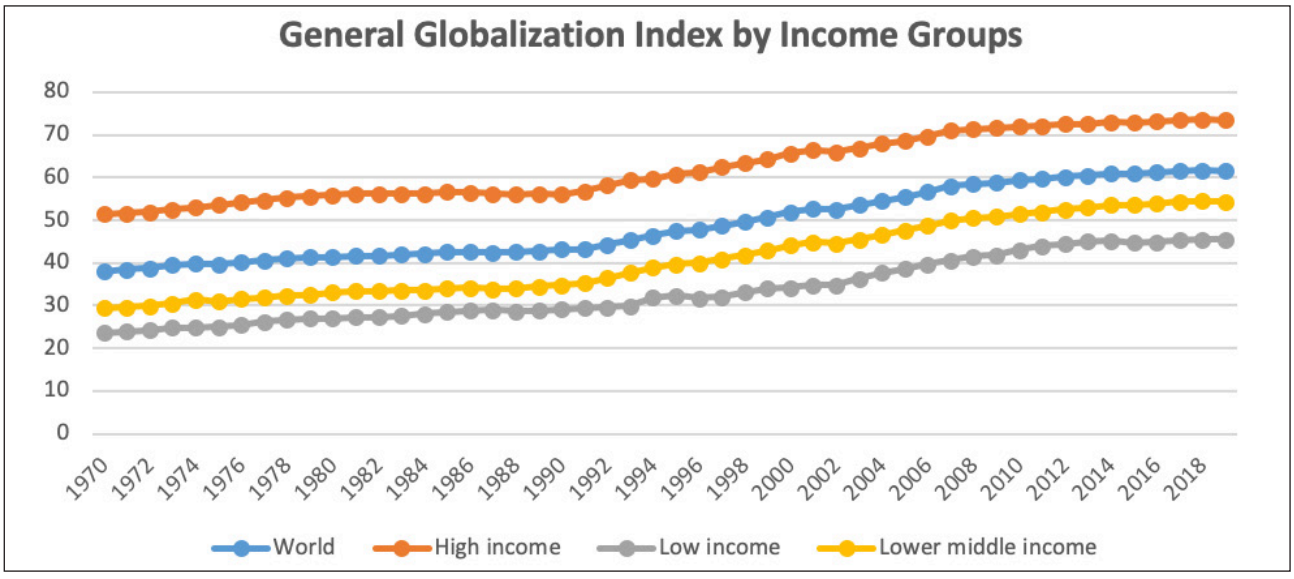

Figure 2. General Globalization Index by Income Groups (1970-2019)

Source: KOF is created by the authors using data from http://globalization.kof.ethz.ch.

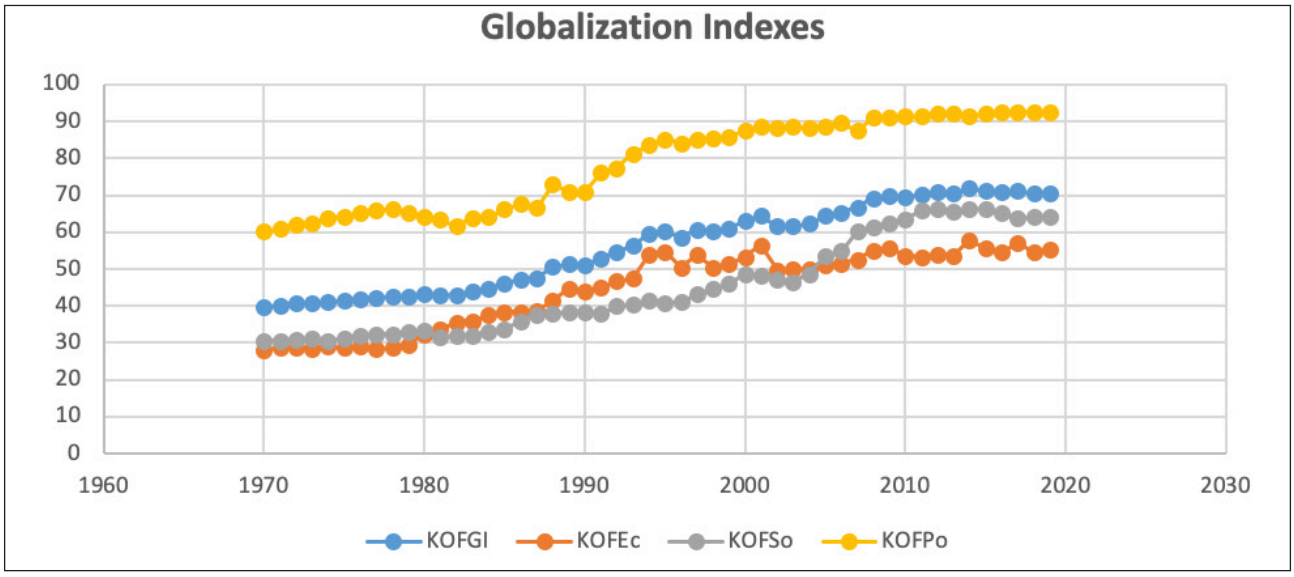

Figure 3. General, Economic, Social and Political Globalization Indexes for the period 1970-2019 in Turkiye

Source: KOF is created by the authors using data from http://globalization.kof.ethz.ch.

Figure 3 shows the general, economic, social and political globalization indexes for the period 1970-2019 in Turkiye. Accordingly, it is observed that the political globalization index has hovered above over the years. In addition, in general, all globalization index values have increased over the years.

EMPIRICAL ANALYSIS

Under the title of empirical analysis, first of all, detailed information about the model and data will be given. Then, cointegration analyzes will be included after descriptive statistics and stationarity analyses. Finally, the model will be estimated and the results will be evaluated statistically and theoretically.

Data Set

Table 2 presents the explanations of the variables.

Four different models are created in the study. The models in question are shown in the Table 3.

Statistics and Stationarity Analysis

Before making a cointegration analysis and model estimation, descriptive statistics and unit root analyzes of the variables are performed. Fractional Frequency Fourier ADF, ADF and PP tests are carried out to determine whether the series have unit roots. In Table 4, probability, Jarque-Bera, kurtosis, skewness, standard error, minimum, maximum, median and mean values of the series are reported.

Table 2. Explanation of Variables

Abbreviation of Variables	Names of Variables	Source of Variables	Period
gov	Public Expenditures Ratio in GDP	World Bank	1970-2019
kof	Globalization Index (GI)	KOF Swiss Economic Institute	1970-2019
kofsoc	Social (GI)		1970-2019
kofpol	Political (GI)		1970-2019
kofec	Economic (GI)		1970-2019

Table 3. Models Used in the Study

Model 1	$lng_t = \delta_0 + \delta_1 lnkof_t + e_t$
Model 2	$lng_t = \alpha_0 + \alpha_1 lnkofsoc_t + e_t$
Model 3	$lng_t = \beta_0 + \beta_1 lnkofpol_t + e_t$
Model 4	$lng_t = \gamma_0 + \gamma_1 lnkofec_t + e_t$

Table 4. Descriptive Statistics

	lng	lnkofec	lnkof	lnkofpol	lnkofsoc
Average	1.068	1.637	1.739	1.889	1.637
Median	1.084	1.696	1.771	1.923	1.611
Maximum	1.194	1.761	1.856	1.966	1.821
Minimum	0.875	1.447	1.597	1.779	1.482
Standard Error	0.080	0.110	0.091	0.068	0.121
Distortion	-0.833	-0.637	-0.208	-0.279	0.297
Kurtosis	3.246	1.822	1.479	1.352	1.616
Jarque-Bera	5.917	6.277	5.180	6.302	4.722
Possibility	0.051	0.043	0.075	0.042	0.094

Table 5. Fourier ADF Test Results of Variables (Fractional Frequency)

Variables	Frequency	Min.SSR	F test Statistic	Appropriate Delay	FADF Test Statistic	%1	%5	%10
lng	3.4	0.046	3.053	0	-1.165	-3.696	-3.020	-2.677
lnkofec	0.2	0.013	5.057	1	-3.057	-4.513	-3.895	-3.594
lnkof	0.5	0.002	6.012	1	-2.674	-4.528	-3.932	-3.636
lnkofpol	0.7	0.003	5.343	3	-3.114	-4.538	-3.942	-3.634
lnkofsoc	0.6	0.005	6.193	1	-2.980	-4.551	-3.942	-3.639

Note: ***,**,* denote 1%, 5% and 10% significance levels.

Traditionally used unit root tests fail to detect structural breaks. At this point, Fourier function unit root analysis provides the opportunity to analyze structural breaks (İltaş & Demirgüneş, 2020:979). Enders & Lee (2012) used the Fourier transform to allow smooth transitions in their work.

In the study of Omay (2015), the frequency value is between 0 and 2, while in the studies of Bozoklu, et al. (2020), this value ranges from 0 to 5. At this point, the critical values changing in the range of [0.1, 0.2,…, 5] have been tabulated in the work of Bozoklu, et al. (2020). Here, the frequency value takes fractional values, not integers. For this reason, the test is called "fractional frequency".

Table 6. Unit Root Analysis Results of Variables

Variables	ADF	PP
lng	-1.133 (0.695)	-1.424 (0.562)
Δlng	-6.489 (0.000)***	-6.551 (0.000) ***
lnkofec	-1.491 (0.529)	-1.519 (0.515)
Δlnkofec	-7.774 (0.000) ***	-7.777 (0.000) ***
lnkof	-1.120 (0.700)	-1.096 (0.710)
Δlnkof	-6.339 (0.000) ***	-6.348 (0.000) ***
lnkofpol	-1.180 (0.675)	-1.169 (0.680)
Δlnkofpol	-7.897 (0.000) ***	-7.833 (0.000) ***
lnkofsoc	-0.038 (0.950)	-0.164 (0.935)
Δlnkofsoc	-5.135 (0.000) ***	-5.135 (0.000) ***

Note: *** denotes significance at the 1% level.

For the significance of trigonometric terms, the study of Enders & Lee (2012) is used, for table values, the studies of Bozoklu, Yılancı & Fikir (2020) are used.

Table 5 shows the Fractional Frequency Fourier ADF test results. Accordingly, the significance of trigonometric terms are tested first. Here, it has been determined that the F-statistics values do not exceed the table critical values. At this point, based on the assumption that the series are linear, the ADF test is applied to the series. In order to present the results comparatively, the ADF test results are given together with the PP test results.

Table 6 shows the unit root test analysis results of the variables. According to the results, the variables become stationary after the first difference. At this point, it has been determined that the prerequisite of cointegration analysis is met.

Cointegration Analysis

After demonstrating that the variables are stationary by difference, the existence of a cointegration relationship was tested with residuals augmented least squares (RALS) cointegration tests. The preference of these tests is based on three important reasons (Oh et al., 2019): First, in the RALS cointegration test, information on errors that do not show normal distribution, which is not considered in the literature, is used. Second, RALS cointegration tests avoid power losses due to predetermined misidentification of a particular functional form. The third reason is that the use of RALS-based tests increases the explanatory power of the test due to non-normal distribution characteristics when non-normal distribution features are detected in the estimation process. Accordingly, the results of RALS-ADL and RALS-EG2 tests are reported together to present the results comparatively.

Lee et al. (2015) recommended the RALS-EG2 test, which is more powerful than the standard strong EG (Engle-Granger) test. For this, they proposed adding RALS terms to the model in the second stage. The terms to be added are as follows:

$$\widehat{w}_t = [\![\hat{e}_t^2 - m_2, \hat{e}_t^3 - m_3 - 3m_2\hat{e}_t]\!]' \quad (1)$$

In the RALS-EG2 test, the notation to which the terms are added is as follows:

$$\Delta u_t = \gamma_1 + \gamma_2 u_{t-1} + \Delta x_t + \widehat{w}_t + e_t \quad (2)$$

Table 7. RALS-EG2 Cointegration Test Results

Models	EG2 Test Results	RALS-EG2 Test Results	rho	1%	5%	10%
Model 1	-2.369	-2.855	0.966	-3.982	-3.386	-3.082
Model 2	-2.440	-3.287*	0.922	-3.892	-3.306	-2.986
Model 3	-2.125	-2.341	0.984	-3.982	-3.386	-3.082
Model 4	-1.875	-2.253	0.978	-3.982	-3.386	-3.082

Note: The studies of Lee et al., (2015) are used for critical values. ***, **, * indicate significance according to 1%, 5% and 10% of the table values, respectively.

Table 7 shows the RALS-EG2 cointegration test results. Accordingly, a cointegration relationship has been identified between social globalization and government size. However, no cointegration relationship is detected in model 1, model 3 and model 4.

The ADL cointegration test, which is introduced to the literature by Banerjee et al. (1998), is a one-step test, but considers the following model:

$$\Delta y_t = \alpha_1 + \alpha_2 y_{t-1} + \alpha_3 x_{t-1} + \alpha_4 \Delta x_t + u_t \quad (3)$$

In the equation above, there is the first difference of the dependent variable on the left side of the equation, and there is lagged value of the dependent and independent variables and the first difference of the independent variable on the right side of the equation. By adding RALS terms to the model in question, it is possible to make it more powerful.

The RALS terms to be added to the model are as follows (Lee et al, 2015:401):

$$\hat{w}_t = [\![\hat{e}_t^2 - m_2, \hat{e}_t^3 - m_3 - 3m_2\hat{e}_t]\!]' \quad (4)$$

The model for the RALS-ADL test becomes the following:

$$\Delta y_t = \alpha_1 + \alpha_2 y_{t-1} + \alpha_3 x_{t-1} + \alpha_4 \Delta x_t + \hat{w}_t + u_t \quad (5)$$

Table 8 shows the RALS-ADL cointegration test results. The cointegration relationship is detected in model 1, model 2 and model 4.

If the RALS-ADL and RALS-EG2 results are different, the RALS-ADL test is considered a more powerful test (Salihoğlu & Hepsağ, 2021:52). Therefore, RALS-ADL test results are taken into account in terms of cointegration analysis results.

Model Estimation

After determining the existence of the cointegration relationship, model estimation is started. The estimation results in question are shown in three separate tables.

The estimation results for model 1 are given in Table 9. Theoretically, the effect of general globalization on government size is positive.

The estimation results for model 2 are given in Table 10. Theoretically, the effect of social globalization on government size is positive.

Finally, Table 11 shows that the effect of economic globalization on state size is positive.

Table 8. RALS-ADL Cointegration Test Results

Models	ADL Test Results	Min AIC	RALS-ADL Test Results	rho	1%	5%	10%
Model 1	-2.950	-3.952	-2.950*	0.946	-3.793	-3.171	-2.846
Model 2	-3.643	-3.952	-3.852***	0.874	-3.793	-3.171	-2.846
Model 3	-2.445	-3.930	-2.861	0.963	-3.864	-3.252	-2.923
Model 4	-2.951	-3.963	-3.187**	0.946	-3.793	-3.171	-2.846

Note: The studies of Lee et al., (2015) are used for critical values. Table values show significance according to 1%, 5% and 10%. ***, **, * indicate significance according to 1%, 5% and 10% of the table values, respectively.

Table 9. Model 1 Estimation Results

FOLS Estimation Results				
FOLS Estimation Results	Variable	Standard Error	T-Statistics	Probability Value
lnkof	0.578***	0.160	3.601	0.000
C	0.074	0.280	0.265	0.791
DOLS Estimation Results				
DOLS Estimation Results	Variable	Standard Error	T-Statistics	Probability Value
lnkof	0.577***	0.161	3.573	0.000
C	0.087	0.284	0.308	0.758

Note: The symbols ***, **, * indicate significance according to 1%, 5% and 10%.

Table 10. Model 2 Estimation Results

FOLS Estimation Results				
FOLS Estimation Results	Variable	Standard Error	T-Statistics	Probability Value
lnkofsoc	0.489***	0.113	4.319	0.000
C	0.276	0.186	1.483	0.144
DOLS Estimation Results				
DOLS Estimation Results	Variable	Standard Error	T-Statistics	Probability Value
lnkofsoc	0.505***	0.121	4.177	0.000
C	0.253	0.198	1.281	0.207

Note: The symbols ***, **, * indicate significance according to 1%, 5% and 10%.

Table 11. Model 4 Estimation Results

FOLS Estimation Results				
FOLS Estimation Results	Variable	Standard Error	T-Statistics	Probability Value
lnkofec	0.357**	0.160	2.229	0.030
C	0.494	0.263	1.878	0.066
DOLS Estimation Results				
DOLS Estimation Results	Variable	Standard Error	T-Statistics	Probability Value
lnkofec	0.356**	0.171	2.078	0.043
C	0.496	0.284	1.742	0.088

Note: The symbols ***, **, * indicate significance according to 1%, 5% and 10%.

CONCLUSION

Rodrik (1998) reveals that countries with more openness have larger governments. Because the citizens of the country demand a higher portion of government expenditures to reduce external risks. This study, as Rodrik has stated, has tried to empirically answer to empirically answer the question of whether globalization increases public expenditures in Turkiye or vice versa. Empirical analysis is carried out using four different models for the period 1970-2019. The reason for using four different models in the study is to clearly demonstrate the existence of the relationship between different globalization indices and government size. At this point, the effect of globalization on government size is examined in this study. In the first model, the general globalization index, in the second model, the social globalization index, in the third model, the political globalization index and in the last model, the effect of the economic globalization index on the government size are examined.

Fractional Frequency Fourier ADF Test, RALS-ADL and RALS-EG2 cointegration tests are used. Model estimations are made with FOLS and DOLS methods. According to the empirical analysis results of the study, firstly, it is determined that the series are stationary at the first difference in unit root examinations made with appropriate tests. Then according to the RALS-ADL cointegration test results, a cointegration relationship is determined in model 1, model 2 and model 4. According to the results of the RALS-EG2 cointegration test, which is carried out to reveal the results comparatively, a cointegration relationship is detected only in model 2. At this point, since the RALS-ADL test is considered a more powerful test (Salihoğlu & Hepsağ, 2021:52), the results of the RALS-ADL test are taken into account in terms of cointegration analysis results.

In model predictions, as in cointegration analysis, FOLS and DOLS estimation results are reported together to present the results comparatively. Accordingly, the effect of economic globalization on public size in model 1, model 2 and model 4 is found to be statistically significant according to both FOLS and DOLS estimation results. In addition, in all models, the effect of economic

globalization on public size is positive. In other words, the validity of the compensatory hypothesis in Turkiye is confirmed as a result of the study. This result can be interpreted as an increase in public expenditures in order to reduce the risks brought by international trade in Turkiye. In this context, considering the conclusion that economic globalization has increased public expenditures in Turkiye, necessary policies should be implemented to ensure that these expenditures are financed with solid resources.

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Prepayment and Default Risks of Mortgage-Backed Security Collateral Pools

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ABSTRACT

Mortgage-backed securities (MBS) are structured financial products that are produced via securitization of mortgage loans. Due to the nature of securitization, all risks of mortgage loans are transferred from originators to MBS investors. Prepayment and default risks of mortgages lead to uncertainty in MBS cash flows and create a complex problem for valuation of these instruments. Therefore, estimating these mortgage termination risks has become the focus of valuation of MBS collateral pools. This study explores two questions by using a publicly open dataset provided by Fannie Mae. First, two machine learning algorithms (Random Forest and Multinomial Logit Regression) are used for classification to predict whether a mortgage loan is likely to be prepaid, defaulted or current. Afterwards, Competing Risks Cox Regression Analysis is performed to see determinants of when mortgage termination risks are likely to happen. It is found that not all mortgage borrowers behave optimally in their prepayment and default decisions. Therefore, in addition to refinancing incentive and negative equity which depend on variations in prevailing mortgage interest rates and housing prices, heterogeneity in mortgage borrowers' behaviors and loan characteristics, and also local economic factors are significantly important in estimating mortgage termination risks. It is worth noting that prominence role of mortgage payment delinquencies in particularly predicting defaults emphasizes the essential need of monitoring payments by servicers to keep safety of MBS investors and financial markets.

Keywords: Mortgage Risks, Mortgage-Backed Securities, Valuation Of Mbs Collateral Pools, Real Estate Finance, Machine Learning.

JEL Classification Codes: C14, C53, G17, G21, R30

Referencing Style: APA 7

INTRODUCTION

Value and yield of a financial instrument are the key factors considered for investment decisions in the fixed income securities market. Value of a fixed income security technically equals to present value of its expected cash flows. However, in the case of mortgage-backed securities (MBS), financial analysts and investors encounter with one of the most complex instruments in financial markets due to notorious risks in their collateral pool of loans: prepayment and default risks; i.e. mortgage termination risks (Hayre & Young, 2004).

MBS are structured financial products that are produced via securitization of mortgage loans. Mortgage loans are sold to special purpose vehicles under the true sale doctrine of securitization, which means that all risks of mortgage loans are transferred from originators (housing finance institutions, banks) to MBS investors. Mortgage borrowers are expected to make their payments in line with their loans' amortization schedule periodically, and investors can estimate value of the MBS they hold or plan to make investment by calculating present value of expected cash flows. Yet borrowers' payment behavior may vary significantly. Unscheduled early payments and/or mortgage default decisions result in uncertainty in cash flows of MBS pools and create a complex problem for valuation of these instruments.

Variations in housing prices and mortgage interest rates are the two major systematic factors influencing mortgage termination risks. Depressing housing values triggers mortgage defaults because continuation of repayments will be nonsense if negative equity occurs meaning that the value of house falls below the outstanding balance on the mortgage used for purchasing that property. In other words, despite their ability to make mortgage payments they strategically

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choose to default when they face with negative equity (Foote & Willen, 2018). Within a similar point of view, falling mortgage rates create an incentive for borrowers to prepay their loans by replacing current loan with a new one with lower interest rates (refinancing) (Lowell & Corsi, 2006; Spahr & Sunderman, 1992). Early studies in the literature focus on these two indicators, negative equity and refinancing incentive. They suggest that borrowers behave optimally based on these two indicators and decide whether to prepay or to go default or to continue repaying their loans in scheduled terms (Downing, Stanton, & Wallace, 2005; Dunn & McConnell, 1981). Roughly speaking, that borrowers take the most strategic decision providing the best economic advantageous lays behind the optimal behavior theory, and MBS are referred as financial instruments with embedded options that allow for prepayment and default. These studies adopt option-based theory developed by Black and Scholes (1973) and improved by Merton (1974) to estimate value of an MBS pool.

On the other hand, it is observed that many borrowers take suboptimal decisions (Weiner, 2016). Furthermore, optimal decision differs for every mortgager and should be distinguished from rational decision because not every optimal decision equals to rational decision. For instance, household debt and expenditures, moving from current house due to various life events like marriages, divorces, health conditions, and job or school changes of children are different for all borrowers (Spahr & Sunderman, 1992). In addition to borrower characteristics, mortgage loan features should be counted among the drivers of mortgage repayment behaviors. For example, unpaid principal balance amount, existence of prepayment penalty, amortization type, fixed or adjusted mortgage rates, and legislative regulations undoubtedly influence prepayment and default decisions.

Mortgage terminations are accompanied by transaction costs depending on borrower and loan features. In the case of prepayment via refinancing, borrowers need to consider prepayment penalties and new loan expenses. Having to move from home, finding a new mortgage loan or a rental house, adversely affected credit scores and therefore encountering of higher interest rates and/or not being given a new loan are among the adverse effects of default decisions (Foote & Willen, 2018). In short, any decision is accompanied with transaction costs which differ for mortgage loans with different features but these costs are not limited to economic burden. Psycho-social consequences of mortgage defaults are hardly ignorable because leaving home and being a person who is incapable of paying loan regardless of whether it is a strategic decision will hurt social status and/or mental health of borrowers (Agarwal, Ambrose, & Yildirim, 2015).

Timing is another important criterion to reach the optimal decision. Choosing the most optimal time either to prepay or to go default is crucial for obtaining the most optimal economic advantageous (Kalotay, Yang, & Fabozzi, 2004). Following variations in mortgage rates and housing prices, being aware of trends in financial markets, and understanding sophisticated financial engineering models and tools or getting consultancy from professionals may help borrowers.This reemphasizes the importance of borrower characteristics in terms of their financial decision skills, education and intelligence (Keys, Pope, & Pope, 2016).

Option-theoretical models cannot provide satisfactorily accurate predictions despite attempts of financial institutions by transferring professors studying in this specific field from universities and trying to develop a closed-form formula to determine the value of MBS pools. On the other hand, econometric models that are able to pay attention to borrower and loan characteristics, and local economic indicators are suggested in the literature (Sirignano, Sadhwani, & Giesecke, 2016). Econometric approach tries to model drivers of mortgage risks rather than directly targeting valuation of MBS pools because understanding the mortgage termination risks and their drivers are the core components of valuing MBS. Furthermore, modelling prepayment and default risks are key determinants from approval of loan applications and securitization to creating and rating MBS pools (McConnell & Buser, 2011).

Econometric models are criticized for their data-driven nature, requiring for dealing with huge datasets, and necessity of frequent updates (Weiner, 2016). Technological advances enable working with big data. Improved data accessibility and availability has allowed using machine learning algorithms in financial market analysis-including real estate and mortgage markets, and has been mitigating many drawbacks of the econometric models (Sirignano et al., 2016).

This study employs econometric modelling approach, and explores two questions by using a publicly open dataset provided by Fannie Mae, one of the two leading government sponsored entities in the United States. First, two machine learning algorithms (Random Forest and Multinomial Logit Regression) are used for classification to predict whether a mortgage loan is

likely to be prepaid, defaulted or current. Afterwards, Competing Risks Cox Regression Analysis is performed to see determinants of when mortgage termination risks are likely to happen. It is found that refinancing incentive and negative equity are the two of major determinants of prepayment and default risks respectively. However not all borrowers always take optimal decisions that provides economic advantages. Therefore, these two variables are not able to explain mortgage termination risks sufficiently without considering heterogeneities in borrowers' behaviors. Loan-to-value ratio, debt-to-income ratio, creditworthiness of borrowers, loan age and amount, variations in economic conditions and local default and prepayment rates are found among the major determinants of mortgage risks. It is worth mentioning that mortgage payment delinquencies are significantly important indicators particularly in predicting mortgage defaults. This obviously emphasizes the crucial importance of monitoring payments by servicers to keep safety of MBS investors and financial markets.

This paper is organized as follows. Section 2 provides a summary of existing literature. Section 3 explains mortgage termination risks, and Section 4 provides the details of methodology employed in this study. The data and empirical works are presented in Section 5, and finally Section 6 concludes this paper.

LITERATURE REVIEW

A closed-form formula determining value of complex MBS carrying prepayment and mortgage risks in their collateral pools has not yet constructed despite many attempts of both academicians and sector professionals (Rajashri, Davis, & McCoy, 2016). Majority of the literature focuses on the United States (US) since the country has the largest secondary mortgage market in the world and many types of securitized products. Furthermore, a good part of the literature is only interested in Agency-MBS, which carry guarantees[1] to the investors against losses arising from default risk on the underlying mortgages. Initial studies were only interested in prepayment risk, as the first MBS issuances were made by these institutions and therefore the reflection of default decisions on MBS collateral pools were considered similar to prepayments. Default risk was either ignored or accepted as prepayment (Huh & Kim, 2019). However, default risk has also been started to be included into the analyses along with the increase in private label MBS issuances and awareness of the seriousness of the default risk consequences (McConnell & Buser, 2011).

Another interesting aspect of the literature is that many of initial studies employ option-theoretic models. They assume that refinancing incentive for a mortgage borrower when market interest rate falls below the contract rate triggers refinancing (prepayment) decision, and negative equity that occurs when the value of collateral real estate falls below the outstanding balance on the mortgage loan pushes the borrower to go default (Hayre & Young, 2004; Kau, Keenan, & Li, 2011). Dunn and McConnell (1981) is considered as the first study attempting to value MBS by using option-pricing model of Black and Scholes (1973) and (Merton, 1974). They focus only on prepayments as they study on MBS with Ginnie Mae guarantee, and assume that all borrowers simultaneously prepay their mortgagers at the first moment when refinancing incentive occurs. Following studies take the attention to transaction costs of mortgage risks (Timmis (1985) and Johnston and Van Drunen (1988)). Professionals as well as the academics contribute to the literature, among which Davidson, Herskovitz, and Van Drunen (1988)'s model built for Merrill Lynch is one of the most famous ones. They accept the existence of suboptimal refinances and suggest that variations in transaction costs of borrowers are the major reason of these suboptimal decisions.

Relatively recent studies take heterogeneity in borrowers into account in addition to prepayment transaction costs. Kalotay et al. (2004) categorized borrowers into different groups based on their certain characteristics by arguing that borrowers with similar characteristics have also similar prepayment behaviors. Deng, Pavlov, and Yang (2005) assume that borrowers with similarities in their prepayment and default decisions live in close neighborhoods.

Predictive power of option-based models lags behind econometric models because of nonrealistic assumption of complete optimal behavior. That in addition to variations in mortgage interest rates and housing prices, borrower and loan characteristics, housing market conditions and financial and economic environment have

[1] Ginnie Mae, Fannie Mae and Freddie Mac are named as Agencies in the USA (the latter two are also known as government sponsored enterprises - GSEs). Ginnie Mae is a governmental institution while GSEs could be referred as quasi-governmental institutions. They were established by the Federal Government to enhance the housing sector conditions and economy in the US. Ginnie Mae provides full faith and credit guarantee of the US government for the MBS backed by mortgage loans issued under government agency programs. GSEs provide similar guarantee against default risk for the MBS they issue but this guarantee is not from the government but from themselves. However, their guarantee is known as "implicit guarantee" of the government as they have always been provided various privileges, and supported by the federal government. This implicit guarantee is proven with the rescue of GSEs by placing them into conservatorship of the Federal Housing Finance Agency (FHFA) in 2008.

significant impacts on prepayment and default rates has led to use of econometric models (Kalotay et al., 2004; Weiner, 2016). Loan level data availability has catalyzed adopting econometric models for estimating mortgage termination risks. Despite various econometric modelling-based studies performed in the late 1980s, models developed by Schwartz and Torous (1989) and Richard and Roll (1989) are accepted as the reference studies of the related literature. Schwartz and Torous (1989) employ proportional hazards model to estimate parameters of variables influencing prepayments of mortgage loans in MBS pools. They include refinancing incentive, burnout level of pool and seasonality in their model. Richard and Roll (1989) estimate annual prepayment rates with a multiplicative model built with four variables- refinancing incentive, loan age, seasonality and burnout level of pool. In the following studies features of geographical regions and outstanding mortgage balance are included in the models (Lowell & Corsi, 2006).

Some studies are interested in only prepayments (e.g. Schwartz and Torous (1989)), others focus on only default decisions (e.g. Quigley and Van Order (1991)). However, studying mortgage risks separately is found an unsound approach because occurrence of one risk makes the other impossible. Therefore, it is suggested that prepayment and default risks are competing risks and both should be modelled simultaneously (Bennett, Peach, & Peristiani, 2001). Competing Risk Analysis becomes like a standard procedure in modelling mortgage termination risks (Kau, Keenan, and Smurov (2006), Pennington-Cross (2010)).

Technological improvements allow making advanced model building studies using machine learning algorithms and big data for financial market analyses (Sirignano et al., 2016). For example, Groot (2016) and Mamonov and Benbunan-Fich (2017) analyze mortgage termination risks by using various machine learning algorithms. Sirignano et al. (2016) employ deep learning for classification of mortgages based on their risk exposures. By employing various machine learning algorithms for classification, Cowden, Fabozzi, and Nazemi (2019) focus on default rates of commercial real estate loans. Barbaglia, Manzan, and Tosetti (2023) compare the prediction accuracy of several machine learning algorithms modelling mortgage defaults in European mortgage markets. Zhu, Chu, Song, Hu, and Peng (2023) apply explanatory machine learning models to predict mortgage defaults. Some studies investigate specific subjects related to mortgage risks. For instance, Cooper (2018) compares default rates of modified and non-modified mortgage loans while Fout, Li, Palim, and Pan (2020) perform a similar study to compare default risks of high- and lower or mid- income borrowers. An, Deng, and Gabriel (2021) explore the impact of negative equity on default rates during the 2007 financial crises. A recent study by Blumenstock, Lessmann, and Seow (2022) applies machine learning techniques for survival analyses to predict mortgage terminations.

MORTGAGE TERMINATION RISKS

Prepayment and default risks, i.e. mortgage termination risks or mortgage risks, are the core of valuation of MBS because they crate uncertainties in cash flows on MBS collateral pools (LaCour-Little, 2008). Therefore, estimation of mortgage risks has become the focal point of any studies on valuation of MBS collateral pools. Besides, these risks are core components of mortgage markets from evaluation of mortgage loan applications in primary mortgage market to selection of mortgages to be securitized, credit enhancement, and rating MBS in secondary mortgage market. MBS investors need to spend a good deal of their resources on evaluation and estimation of these risks (Berliner, Quinones, & Bhattacharya, 2016).

Prepayment Risk

Prepayment risk is the probability of a mortgage loan will be fully paid off before its due date. Mortgage borrowers are given the chance of paying off their mortgage debt any time in return for bearing transaction costs although it depends to the legal regulations of the countries (Fabozzi, Bhattacharya, & Berliner, 2007; Rajashri et al., 2016). There are various systematic and idiosyncratic drivers behind prepayment behavior of mortgagors.

Prepayments occur in two ways: (1) refinancing, and (2) housing turnover. Additionally, there are also "payoffs" which means that mortgagors may pay off the mortgage loan debt with their own savings or non-credit resources before the due date. "Curtailments" or "partial prepayments" may occur when borrowers make extra payments in order to shorten the maturity period or reduce the outstanding balance. These two types of prepayments rarely happen and their share is quite minor compared to refinances and housing turnovers.

Refinancing is the replacement of an existing mortgage loan with a new loan without any change in the conditions of the collateral property. There are various types of refinances. One of the most common and well-known types is 'cash-in refinancing' which is preferred by a borrower when current mortgage rates substantially fall below the existing mortgage contract rate. In other words,

refinancing incentive arising from the declines in mortgage rates is the main motivation of cash-in refinances. Amount of the new loan equals to sum of current outstanding balance of the previous mortgage and transaction costs of prepayment. Cash-in refinancing provides mortgage rate and/or term advantageous for borrowers, however, creates a serious risk for MBS investors because principal payments are made unexpectedly early. Investors cannot gain return as much as they expected and also can reinvest at substantially lower prevailing interest rates (reinvestment risk) (Fabozzi et al., 2007).

of the existing loan and use remaining money for their other needs after paying off the current mortgage. A 'cash-out refinance' loan lets a borrower convert home equity into cash. Cash-out refinances tend to get higher when housing prices rises (Rajashri et al., 2016).

Figure 1 and Figure 2 illustrates share of cash-in refinances with mortgage interest rates, and share of cash-out refinances with housing price index, respectively (Data are provided from Freddie Mac (2020), FHFA (2021), and Freddie Mac (2021)). Figure 1 obviously shows the

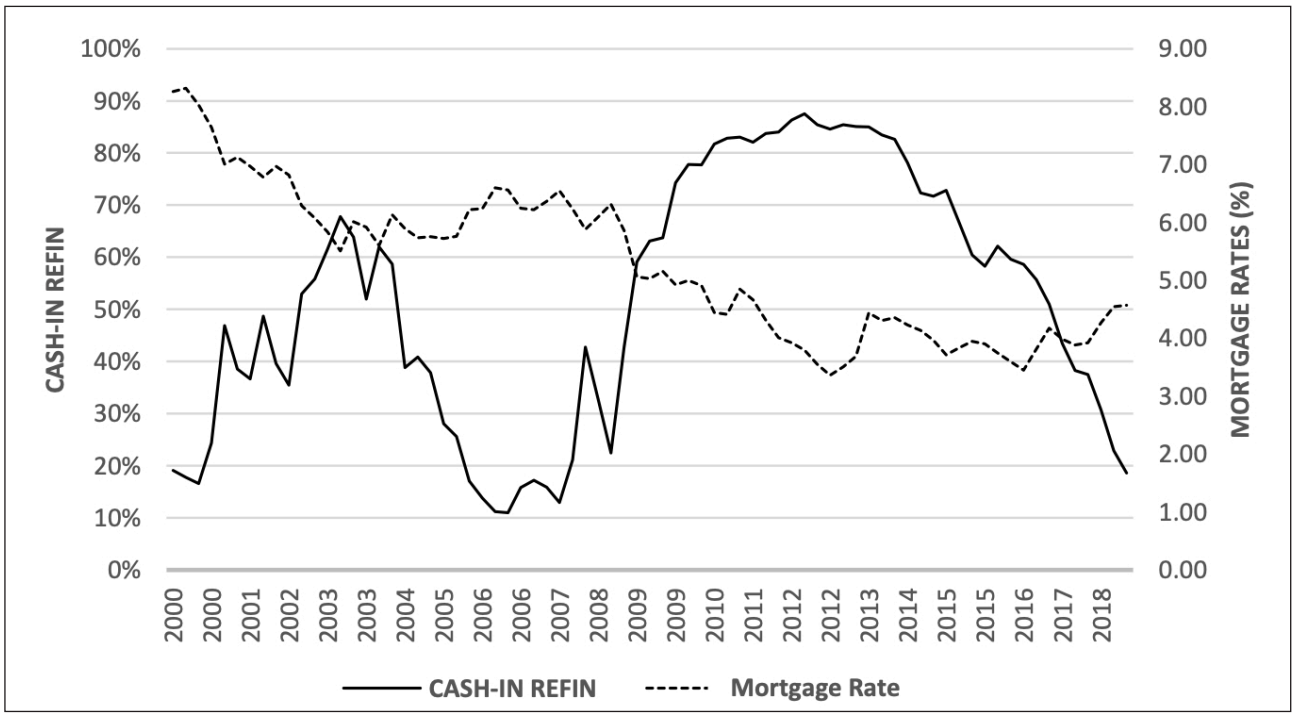

Figure 1. Mortgage Rates and Cash-in Refinancing Loans

Data Source: Freddie Mac (2020) and Freddie Mac (2021))

Refinancing incentive takes place at the center of option-based approach in MBS valuations. This theory assumes that borrowers refinance their current mortgages at the most optimal time when mortgage rates decline sufficiently. However, not all mortgagors can take rational decisions. Optimal decision requires borrowers to be fully informed and educated to follow and understand trends in financial markets. Also, they must guess the most optimal time for themselves because being late/early to refinance may result in suboptimal decisions (Kalotay et al., 2004; Keys et al., 2016).

It is observed in the markets that refinancing incentive is not the only driver of refinances. Borrowers apply for refinancing loans to meet their cash needs as well. Instead of a second-lien mortgage, they apply for a refinancing loan with a higher amount of than outstanding balance

negative correlation between mortgage interest rates and cash-in refinances while Figure 2 indicates the positive correlation between cash-out refinances and house prices.

Another type of prepayment occurs when home owners move from their residents. Housing turnover rate, second home sales as a percentage of total housing stock, provides a measure for this prepayment type in a country or a region (Rajashri et al., 2016). Seasonality influences prepayment speeds because in summers moving to another house becomes more available for people in terms of weather conditions and school term.

Default Risk

Default risk is the probability that mortgage borrowers will not make their payments on their loans

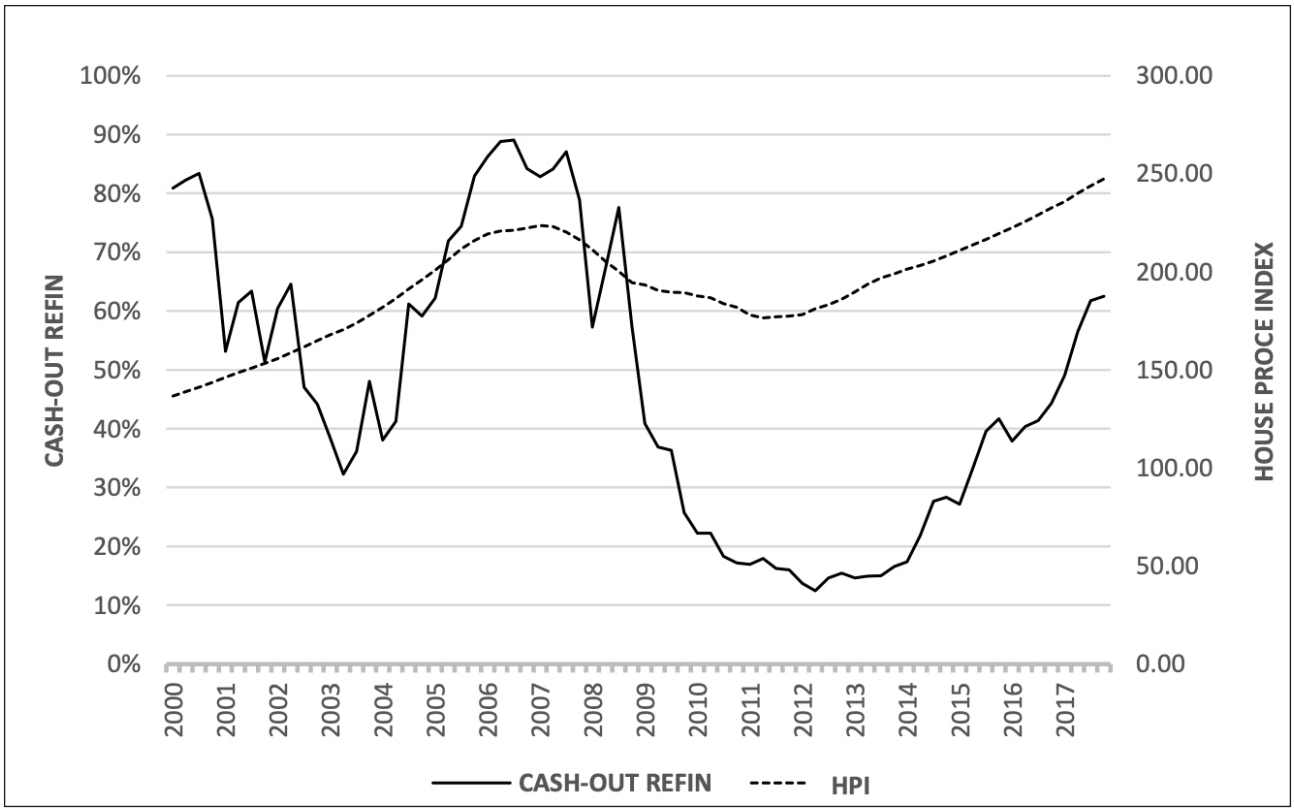

Figure 2. Housing Price Index and Cash-out Refinancing Loans

Data Source: FHFA (2021) and Freddie Mac (2021)

in exchange for giving the collateral property to the financial institution (Berliner et al., 2016). First studies explain mortgage defaults within the context of Black and Scholes (1973) and Merton (1974)'s option pricing theory, and assume that negative equity is the reason of any defaults. Borrowers strategically go to default when negative equity occurs when housing prices fall in the market. Another assumption of this frictionless/ ruthless option model is that there is no any cost or loss for borrowers other than losing their house, and they are able to obtain a new loan as much as they need with prevailing interest rates any time (Foote & Willen, 2018).

However, these assumptions are never always true. Negative equity alone cannot trigger default unless it deepens significantly (e.g., according to Foote and Willen (2018) mortgagors do not prefer unless negative equity reach to at least 35% or 40%) because people are unwilling to lose their home easily. Many studies show that defaults happen when an adverse life event accompanies with negative equity. This is called Double Trigger Model, which suggests that defaults and delinquencies occur if and only if negative equity and also an idiosyncratic shock adversely affecting households' capability of making payments happen together in the same household (Foote & Willen, 2018). Unemployment, income cuts, excessive financial stress, and also a serious disease or a death of a family member and divorces are the major shocks leading to delinquencies and defaults (Schelkle, 2018).

Furthermore, defaults are recorded in the financial history of borrowers for years and seriously harm their credibility. Credit institutions hesitate to lend a new loan such borrowers, or even if these borrowers are granted with a new loan, most probably the amount of the loan will be lower than they need and with higher interest rates (Demyanyk, 2017). Psycho-social consequences are worth to remember as well (Agarwal et al., 2015). So, consequences of default decisions are not limited to only losing homes. On the other hand, strategic defaults occur at a level of that to be underestimated (Gerardi, Herkenhoff, Ohanian, & Willen, 2018).

METHODOLOGY

Machine learning algorithms are quite popular in finance literature recent years (Sirignano et al., 2016). This study employs two supervised machine learning algorithms, Random Forest (RF) and Multinomial Logistic Regression (MNL), for classification of mortgages based on their repayment statuses. Random Forest is an ensemble machine learning algorithm using bagging

technique. There are many other ensemble machine learning algorithms with their own advantages and disadvantages. One fundamental advantage of the Random Forest over some of the other advanced learning models is that Random Forest is more interpretable and has better transparency (Tchuente & Nyawa, 2021). Multinomial Logistic Regression is commonly used in particularly predicting mortgage defaults in the literature (e.g. Mamonov and Benbunan-Fich (2017), Chen, Xiang, and Yang (2018), Barbaglia et al. (2023)), which allows comparing the results of this study with those of previous works. Afterwards, Competing Risks Cox Regression is performed to estimate marginal probability of prepayment and default risks of mortgage loans.

Classification with Machine Learning Algorithms

Logistic Regression is used to predict a categorical variable with two categories (binary variable). It estimates the probability of an event occurrence based on given a set of independent variables, and assumes a linear relationship between the binary dependent variable and the covariates which may include continuous variables. A transformation from probability to log-odds is applied to satisfy the linearity assumption, and model becomes as follows:

$$logit(\pi_i) = \log\left(\frac{\pi_i}{1-\pi_i}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k \quad (1)$$

When the dependent variable has more than two categories, it is called Multinomial Logistic Regression and used frequently for classification problems in the literature.

Random Forest (Breiman, 2001) is a tree-based ensemble machine learning algorithm that is used for solving classification and regression problems. Decision trees are the basis of any tree-based models. A decision tree is composed of leaves and nodes. Each independent variable is represented with the nodes. Independent variables are sorted based on their importance, and the most important one becomes the first node of the decision tree, and split the given dataset into subgroups. Covariates are reordered and second level nodes continue partitioning the dataset. This recursively splitting process based on certain criteria until the optimal classification is reached. Decision trees are able to be implemented and interpreted easily but prone to overfitting. Ensemble modelling methods are proposed to mitigate the overfitting problem. Random Forest, one of most powerful ensemble algorithms, averages predictions of many individual trees built on bootstrap samples. It is an extension of bagging (bootstrap aggregating) that fits many models on different subsets of a dataset by using randomly selected variables in each subsample. Random Forest is able to reduce overfitting problem of decision trees and handle nonlinearity and feature interactions (Kok, Koponen, & Martínez-Barbosa, 2017).

Classification works are started with splitting the dataset into two subsamples, 70% of the dataset (training data) is used to train the machine learning models, and prediction performances of the models are tested on the rest (30%) (testing data) (Hertzmann & Fleet, 2012). k-fold cross validation is a technique that is proposed in order to avoid overfitting risk. This technique splits the data into k sub-groups, and trains the model by using k-1 groups of data. The trained model is tested on the other sub-group (validation data), and this procedure is repeated k times (Berrar, 2018).

The training process of a model involves choosing the optimal hyperparameters. These hyperparameters are essential components of the training to improve the learning capability of the model. For instance, finding out the optimal number of trees to be included in a Random Forest is required for the training. Hyperparameters can be set heuristically or tuned via various techniques proposed in the literature. This study employs Random Search technique offered by Bergstra and Bengio (2012). The main idea behind this technique briefly is that after setting up a grid of hyperparameter values, model training is performed on randomly selected combinations of those values.

Confusion matrix, showing the predicted and actual classifications, helps in evaluating classification performances of machine learning models. For a binary classification, there are two classes as 'positive' and 'negative'. Confusion matrix can be written as follows:

$$Confusion\ Matrix: \begin{bmatrix} \varphi_{PP} & \varphi_{PN} \\ \varphi_{NP} & \varphi_{NN} \end{bmatrix} \quad (2)$$

where φ_{PP} is True Positive (TP: number of elements belonging to the class Positive and are classified in class Positive), φ_{NP} is False Positive (FP: number of elements are wrongly classified in class Positive), φ_{PN} is False Negative (FN: number of elements are wrongly classified in class Negative), and φ_{NN} is True Negative (TN: number of elements belonging to the class Negative and are classified in class Negative). Classification performance of a model is evaluated with various metrics. This study uses accuracy, sensitivity and specificity that are defined as follows (Alpaydin, 2020):

$$Accuracy = \frac{TP + TN}{TP + FN + TN + FP} \quad (3)$$

$$Sensitivity = \frac{TP}{TP + FN} \quad (4)$$

$$Specificity = \frac{TN}{TN + FP} \quad (5)$$

Competing Risks Cox Regression

Survival Analysis is used to analyze the expected duration of time until a certain event (e.g. time from surgery to death) occurs. In this study, that incidence is mortgage termination before the scheduled maturity date due to exposure of either prepayment or default risks. Suppose is a non-negative variable representing the duration time until the termination of a mortgage (survival time of a mortgage). Probability that a mortgage will continue to be paid after time , i.e. survival probability (also known as survival function) is as follows:

$$S(t) = P(T > t) = \int_t^{\infty} f(x)dx = 1 - F(t) \quad (6)$$

and, survival probability of a mortgage loan is 1 at t_0 ($\lim_{t\to 0} S(t) = 1$), and 0 (zero) as time approaches to infinity ($\lim_{t\to\infty} S(t) = 0$).

Hazard function is the probability of termination of a mortgage at time t, when this mortgage has not experienced the event (termination) until time t is as follows:

$$h(t) = \lim_{\Delta t\to 0} \frac{P(t \le T < t < \Delta t \backslash T \ge t}{\Delta t} = \frac{f(t)}{S(t)} \quad (7)$$

and Cumulative Hazard Function is defined as:

$$F(t) = P(T \le t) = \int_0^t f(x)dx = 1 - S(t), \qquad t > 0 \quad (8)$$

When the event of interest (exposing to mortgage termination risks) is not observed for some individuals (mortgage loans) before the study is terminated, survival times would be remain unknown for a subset of mortgages. This is called censoring, and if there had been no censored observations, time to event analysis would have been estimated by using regression analysis. As survival times of censored observations (mortgage loans) are exactly unknown, they should be taken into account while estimating survival function (Kaplan & Meier, 1958; Link, 1989). Both prepayments and defaults cause right censoring in the data. Some mortgages continue to be paid in the dataset, therefore they have not experienced prepayment or default yet. Also, if a mortgage is prepaid, then it cannot be defaulted vice versa. Therefore, defaulted (/prepaid) mortgages are accepted as censored for prepayment (/default) function.

The most common non-parametric method used to estimate the survival function is the Kaplan-Meier estimator but it is unable to consider the variables influencing the survival time. A flexible and semi-parametric method called Cox Regression is proposed to incorporate the covariates into the analyses (Cox, 1972). However, traditional survival analysis might be misleading if occurrence of a certain event depends on more than one reason. Competing Risks Cox Regression is proposed in such cases, and rather than using Kaplan-Meier estimator, Cumulative Incidence Function is proposed in estimating the marginal probability of the specific event of interest (Kalbfleisch & Prentice, 2011).

An event may occur due to one of reasons in competing risks analyses, and the time elapsed is observed only until the first (earliest) of these reasons occurs. Therefore, let denotes survival time ad is the reason of an event occurrence (for instance, mortgage termination is an event while the reasons are prepayment or default). Cumulative incidence function for the reason is as follows:

$$CIF_k(t) = P(T \le t, \delta = k) \quad (9)$$

Two methods are proposed for competing risks analyses in the literature, Cause Specific Hazard Function by Prentice et al. (1978) and Sub-distribution Hazard Function by Fine and Gray (1999). This study employs the Cause Specific Hazard Function that is defined as follows:

$$\lambda_k(t) = \lim_{\Delta t\to 0} \frac{P(t \le T < t + \Delta t,\ \ \delta = k \ \backslash \ T \ge t)}{\Delta t} \quad (10)$$

because Fine and Gray (1999) is interested in the occurrence of an event due to reason for the observations who have not experienced the reason while Prentice et al. (1978) provides the occurrence rate of an event due to reason for the observations that have not experienced any of the reasons.

DATA AND EMPIRICAL WORKS

The primary data for this study are provided by Fannie Mae for the period between 2000 and 2019 (Fannie Mae, 2019)[2]. Dataset consists of loans with fully amortizing,

[2] Data for the following years are seriously affected by the Covid19 because various changes and support schemes were launched to support borrowers during the pandemic, which are not fully reflected in the data.

single-family, 30-year, fixed rate mortgages. Data provide mortgage and borrower characteristics at the time of loan origination, and monthly payment performances of each loan. Mortgages that were modified or refinanced under certain programs are excluded from the dataset. Mortgage loans are defined as prepaid or defaulted according to Fannie Mae's instructions in the glossary file enclosed with the data. A loan is defined as prepaid if it is indicated as prepaid, repurchased or re-performing loan sale; and is defined as defaulted if it is indicated as third party sale, short sale, deed-in-lieu, note sale, or delinquent for 120 days or more. A stratified random sample of data based on loan origination month is used in the study. Under sampling method is employed to ensure a balance among mortgage payment status groups (prepaid, defaulted, and current) because number of defaulted loans is substantially smaller than prepaid and current loans (Drummond & Holte, 2003). The final dataset includes more than 455,000 loans, and Table 1 provides the number of observations for dependent variable per category of mortgage states.

Table 1. Mortgage States in the Dataset

Mortgage States	Sample
Current	152.766
Prepaid	163.315
Default	139.192
Total	**455.273**

Variables that are available for mortgage loan attributes at the time of origination, performance metrics for borrowers' payment behavior, and key economic indicators are listed in Table 2. Mortgage loans in the United States are originated through three channels. In other words, mortgage applications are made via either directly banks, or correspondents, or brokers. These loans can be used for purchasing a house or refinancing the current mortgages. Fannie Mae dataset provides the information on whether the collateral property is a second home or an investment for the borrower. Majority of the residential properties are single family homes in the USA. Since the number of other property types (condominiums, cooperative shares, planned urban developments and manufactured homes) are quite low in the dataset, they are collected under one category, "others". First time home-buyer flag represents whether it is the very first mortgage loan of the borrower. LTV and DTI represent the ratio of loan amount to collateral value, and the ratio of mortgage debt to borrower's income, respectively. Credit score is also known as FICO score that is a measure representing the credibility of the borrowers based on their financial behavior history. Loan age is the number of months since the mortgage origination date. Monthly refinancing incentive for each loan is calculated by distracting prevailing average mortgage interest rate from the contract rate. By following Demiroglu, Dudley, and James (2014), monthly negative equity for each mortgage is estimated as follows:

$$Negative\ Equity_{it} = EP_i - EP_i * HPA_t \quad (11)$$

where EP_i is estimated price of collateral property of loan i, which is calculated by dividing loan amount to loan-to-value ratio of loan i, and HPA_{it} is the house price appreciation rate for month t, calculated with house price index. Analyses are performed based on BEA Regions[3] because there are limited observations for several federal states in the dataset. Historical delinquency status of each loan is used in empirical analyses to represent borrowers' payment behaviors. Calculated prepayment and default rates at zip code level by using the original dataset (23.3 million mortgage loans) are used as the estimators of these two covariates. The dataset has both numerical and categorical variables. Continuous variables are used in their normalized versions. One-code encoding is used to transform categorical variables into numerical values

Results: Classification Analyses

Mortgage loans are classified based on their repayment status: prepaid, defaulted, and current. These three-state classification studies are performed with two machine learning algorithms, Random Forest (RF) method and Multinomial Logistic Regression (MNL). Random Search technique (Bergstra & Bengio, 2012) is employed to optimize the hyperparameters. The optimal hyperparameters for number of variables (mtry) and number of tress (ntree) for the final model turn out to be 24 and 400, respectively. Models are trained using the randomly selected 70% of the dataset (training data), and then tested on the rest of the data (testing data). By following the literature (López, López, and Ponce (2022) and Davis et al. (2022)), 5-fold cross validation is used for the evaluation of algorithm performances. The caret package of the R software is used to build the models. All mortgage loans are followed until either they exposed to a mortgage termination risk or the latest available month in the dataset.

[3] BEA regions are created by the US Bureau of Economic Analysis of the US Department of Commerce.

Table 2. Independent Variables

Variable	Short description
Loan origination channel	banks; correspondents; brokers
Loan purpose	purchase; cash-in refin; no cash-in refin
Occupancy status	owner occupied; second home or investment
Property type	single family homes; others
First time home-buyer	yes; no
Number of borrowers	one borrower; more than one borrower
Loan amount (USD)	US Dollar
Loan-to-Value ratio (LTV)	ratio of mortgage loan amount to property value
Debt-to-Income ratio (DTI)	ratio of mortgage debt to borrower income
Credit score of borrower	borrower's credibility measure
Mortgage interest rate	mortgage interest rate on the loan contract
Loan Age	number of months since origination date
Refinancing incentive	refinancing incentive monthly basis
Negative equity	negative equity monthly basis
Number of delinquencies	mortgage payment delinquencies
Unemployment rate	monthly unemployment rate at state level
House price index	monthly house price index at state level
Prepayment rate at zip code level	local prepayment rate
Default rate at zip code level	local default rate
Seasonality	winter, summer, spring, fall
BEA Region	8 regions based on state-level economic activity
Loan origination year	loan origination year

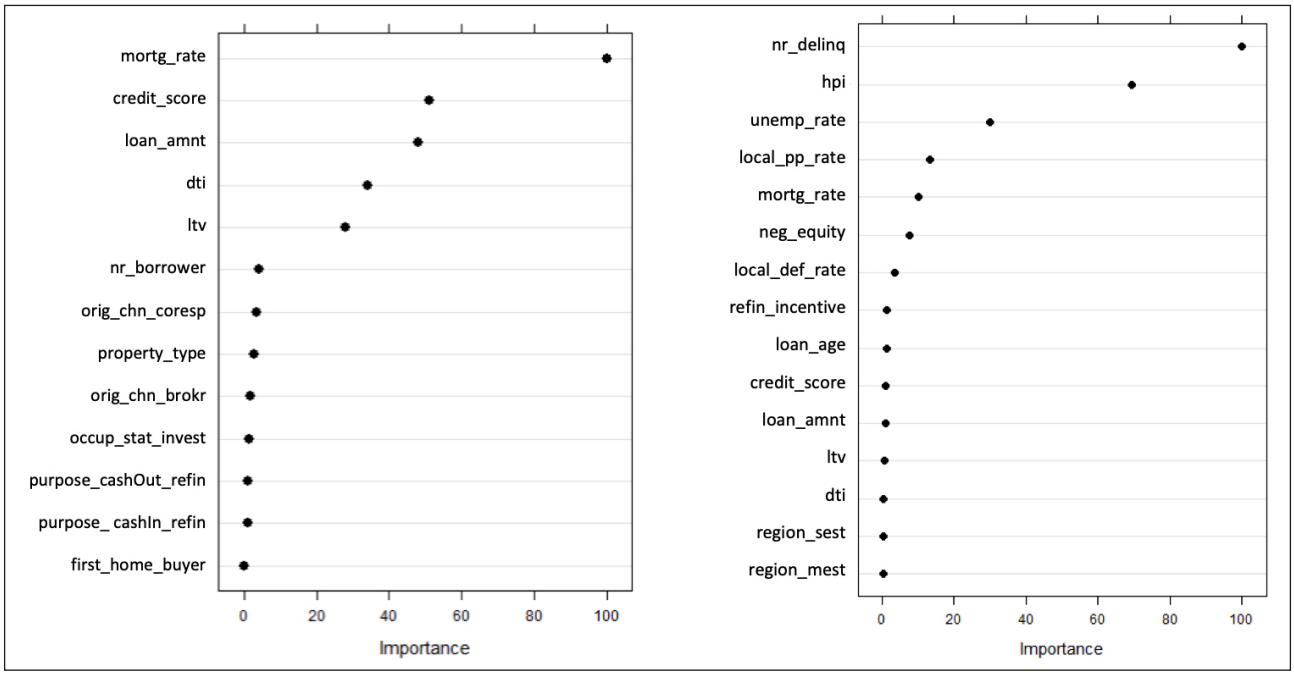

Figure 3. Variance Importance Plots for the Random Forest Model 1 (left) and Model 4 (right)

Table 3. Classification Results with Machine Learning Algorithms

		Random Forest			Multinomial Logit		
MODEL 1	Accuracy		0.699			0.688	
	p-value		p<0.001			p<0.001	
	Kappa		0.548			0.531	
	F1 score		0.799			0.803	
	Reference:	Current	Prepaid	Default	Current	Prepaid	Default
	Current	0.282	0.069	0.017	0.287	0.074	0.017
	Prepaid	0.035	0.198	0.069	0.031	0.200	0.086
	Default	0.019	0.092	0.219	0.018	0.085	0.201
	Sensitivity	0.839	0.551	0.718	0.854	0.556	0.660
	Specificity	0.869	0.838	0.841	0.862	0.817	0.852
MODEL 2	Accuracy		0.860			0.842	
	p-value		p<0.001			p<0.001	
	Kappa		0.790			0.762	
	F1 score		0.958			0.943	
	Reference:	Current	Prepaid	Default	Current	Prepaid	Default
	Current	0.332	0.008	0.017	0.330	0.018	0.017
	Prepaid	0.001	0.285	0.045	0.000	0.280	0.057
	Default	0.003	0.066	0.243	0.005	0.061	0.231
	Sensitivity	0.990	0.794	0.795	0.984	0.781	0.757
	Specificity	0.961	0.928	0.902	0.947	0.911	0.905
MODEL 3	Accuracy		0.871			0.851	
	p-value		p<0.001			p<0.001	
	Kappa		0.807			0.776	
	F1 score		0.969			0.949	
	Reference:	Current	Prepaid	Default	Current	Prepaid	Default
	Current	0.333	0.003	0.016	0.330	0.013	0.016
	Prepaid	0.000	0.293	0.045	0.000	0.284	0.053
	Default	0.002	0.063	0.245	0.005	0.061	0.236
	Sensitivity	0.993	0.817	0.802	0.987	0.939	0.937
	Specificity	0.971	0.930	0.907	0.959	0.990	0.982
MODEL 4	Accuracy		0.987			0.962	
	p-value		p<0.001			p<0.001	
	Kappa		0.981			0.943	
	F1 score		0.993			0.969	
	Reference:	Current	Prepaid	Default	Current	Prepaid	Default
	Current	0.332	0.001	0.000	0.333	0.005	0.014
	Prepaid	0.000	0.353	0.003	0.000	0.344	0.007
	Default	0.003	0.005	0.302	0.002	0.010	0.285
	Sensitivity	0.990	0.983	0.989	0.992	0.958	0.933
	Specificity	0.998	0.995	0.988	0.972	0.989	0.982

Model 1 is constructed using only mortgage attributes at the time of origination to anticipate what extent default and prepayments can be estimated during evaluation of mortgage applications, and Model 2 is performed by adding BEA regions and loan ages in the analyses. Model 3 is built by adding negative equity and refinancing incentive variables. Finally, local economic indicators and delinquency behaviors of borrowers are included in Model 4. Table 3 provides performance metrics of all these models including the confusion matrixes.

Accuracy scores of the Model 1 using the characteristics of mortgages and loans are found at around 69% for both RF and MNL algorithms. However, confusion matrixes reveal that classification performances are quite low. The Model 2 built with additional variables including the BEA regions where collateral property of mortgages located, mortgage origination years (vintages) and loan ages has a significantly higher accuracy score, 86% for the RF and 84% for MNL model; and provides better classification performances as well. Particularly the loan age variable[4] has a significant impact on predicting prepayment rates as the sensitivity score rises to almost 80% for 'prepaid' class in each machine learning algorithm, which supports that loan age is a major driver of mortgage prepayments.

Model 3 is constructed by adding negative equity and refinancing incentive. There is only a slight increase in the overall accuracy scores but the major increase occurs in sensitivity scores. Obviously, these two are significantly important variables to predict prepayments as prepayments, and defaults as defaults accurately. Delinquency experiences of the mortgages and economic factors are included in the final model. Both scores for overall accuracy and sensitivity are found quite high in the Model 4.

Normalized variable importance for the first and last Random Forest models are plotted with the caret library (Figure 3). Among the features of mortgages at the time of origination, mortgage interest rate is the variable that has the greatest effect on the mortgage termination risks in Random Forest Model 1. Borrower credibility, loan amount, and DTI and LTV scores are the other variables having the most importance in the model after the mortgage interest rate. When it comes to the latest model, delinquency behavior, local economic factors, refinancing incentive and negative equity are found among the most important variables in the Model 4. Mortgage interest rate, loan amount, credit score of borrowers, and LTV and DTI scores are still among the top 15 important variables. Loan age is definitely an important feature in the Model as it is a significant determinant of mortgage defaults and prepayments. That the seasoning is accompanied with delinquency behavior, refinancing opportunities and negative equity also implies the interaction among the variables. Therefore, mortgage features at the time of origination as well as the mortgage payment behavior and changing circumstances by time should be evaluated carefully to mitigate the impacts of mortgage risks exposures.

[4] Another model without the Loan Age variable is built during the empirical works, and sensitivity levels are found lower than 65% for both machine learning algorithms. These results may be obtained from the authors upon request.

Results: Competing Risks Cox Regression Analyses

Econometric models are required to be updated on a frequent basis because loan and borrower attributes, and economic conditions vary in time. For instance, the Basel Accords suggest twelve months for credit risk analyses. For prepayment and default modelling, first 12 or 24 months of observation period are recommended in the related literature (Fout et al., 2020) because prepayment and default rates show an increasing trend in the first years of the mortgage loans, and continue at a relatively constant level in the following years (Hayre & Young, 2004). As seen Figure 4, prepayment and default rates in the Fannie Mae dataset show a rising trend in the first years of mortgage loans. Therefore, Competing Cox Regression Analyses are performed for two years (24 months) of observation period (i.e. first two years of loans since their origination date) of the mortgage loans in the dataset by employing the Cause Specific Hazard Function offered by Prentice et al. (1978).

Model 1 is constructed with the variables of refinancing incentive and negative equity. Both are time varying covariates. In the Model 2, borrower and loan features at the time of origination (time invariant) are incorporated in the analyses. Model 3 is built with additional two variables, BEA regions and mortgage origination years (vintage). Finally, a set of time varying variables representing delinquency behaviors and one-month lagged regional economic indicators, are also taken into account in Model 4. All models are shown in Table 4. A variable with a positive/negative sign indicates that occurrence of risk (prepayment or default) will happen sooner/later; i.e. this variable has an effect of prolonging/shortening the survival time of a mortgage.

In line with theoretical expectations, both refinancing incentive and negative equity have positive a relationship with the occurrence of prepayment and default risks respectively, and parameters are found significantly important. The higher the refinancing incentive, the higher the risk of prepayment; and similarly the higher the negative equity, the higher the risk of default, as are stated in the literature (e.g. Sirignano et al. (2016) and Gerardi et al. (2018)).

Mortgage borrowers can apply for mortgages through the channel of banks or correspondents or mortgage brokers. Default rates are higher among the mortgages that are granted via the latter two channels in Table 4 because brokers have no responsibility about

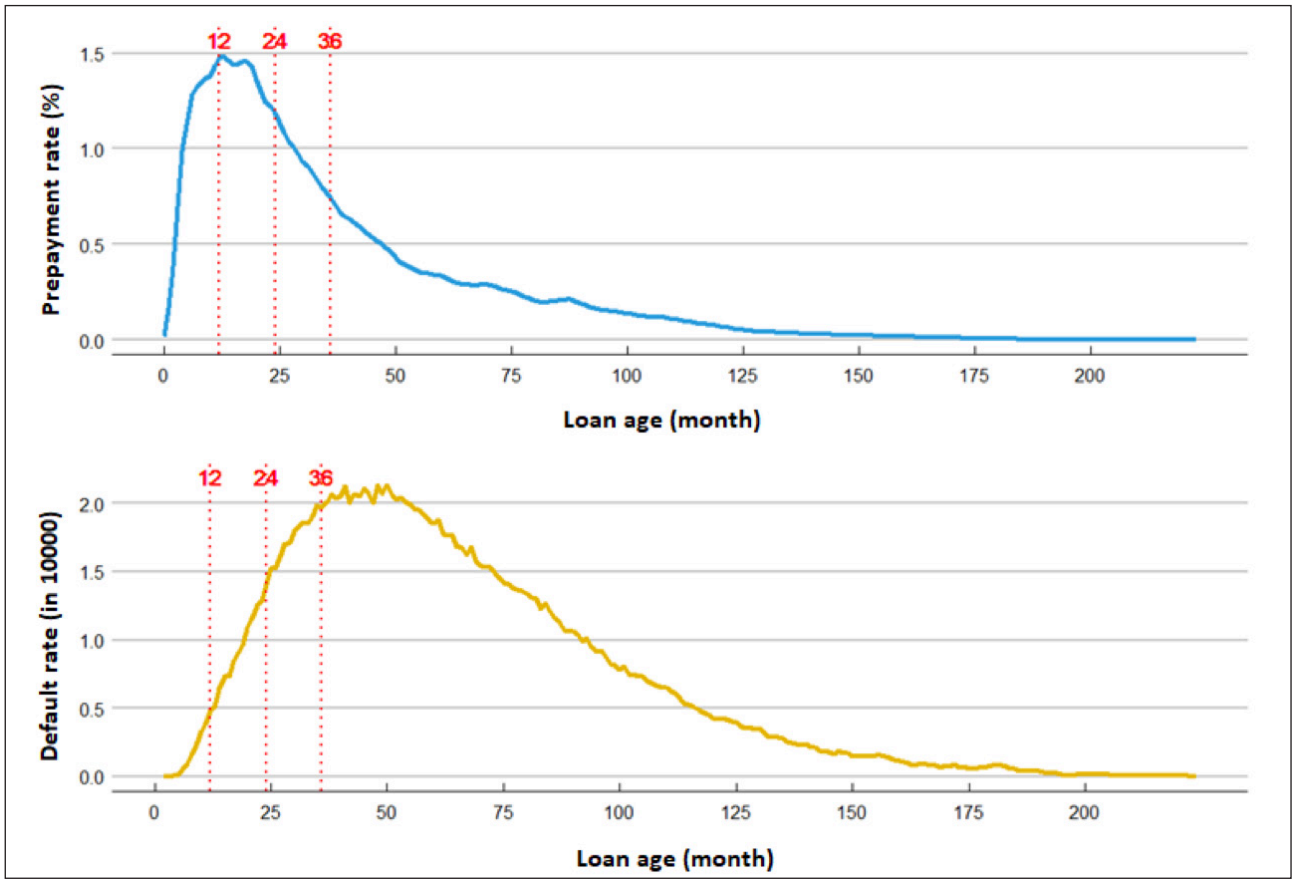

Figure 4. Prepayment and default rates based on Loan Age

loan repayments. The primary purpose of brokers is to generate high commission income by providing as much credit as possible, and they might take the advantage of information they have more about financial institutions and brokers for their own benefit. On the other hand, the results are found against the theoretical expectations for prepayment risk; exposure to prepayment risk is higher for mortgages originated via third party channels than banks. Cash-out refinancing loans might be lying behind this result.

In order to reduce their debt, mortgagors tend to add their current savings while making cash-in refinancing. Cash-out refinancing loans naturally increase borrowers' indebtedness which prevents making savings and therefore prepayments. Refinancing loans in prime mortgage market have higher default risk, which is supported in Table 4. Compared to mortgage loans granted for housing purchases, refinancing loans have lower prepayment and higher default risks.

Results for the occupancy status are consistent with theory. Mortgage loans used for purchasing home for investment purpose have higher default rates, and lower prepayment speeds. As the number of borrowers liable to pay the loan increases, prepayment risk increases and default risk decreases.

Similar to Patrabansh (2015)'s findings, probability of exposure to prepayment risk is found lower among the first-time home buyers, which might be arising from that first-time home buyers may be too young to have sufficient savings and income. On the other hand, there is no significant relationship found between first-time home buyers and default risk. Socio-economic and demographic factors undoubtedly influence housing acquisitions. Relationship between borrower attributes and mortgage payment behaviors could not be measured due to unavailability of data on these factors in the Fannie Mae dataset.

There is a positive correlation between loan amount and mortgage termination risks. Refinancing incentive occurs if the loan amount is large enough to cover refinancing costs. Besides, Sirignano et al. (2016) states that borrowers with high creditworthiness are able to obtain higher amount of loans, which implies getting refinancing loans might be easier for such borrowers. Also, when housing prices show a declining trend, negative equity occurs more rapidly for the loans with high volume. Therefore, findings about the relationship of loan amount with mortgage termination risks in Table 4 are consistent with theoretical expectations.

Credit scores of borrowers, and LTV and DTI ratios of the loans are counted as the leading determinants of mortgage

Table 4. Competing Risks Cox Regression Analyses Results (1/3)

	Model 1		Model 2		Model 3		Model 4	
	Prepay	**Default**	**Prepay**	**Default**	**Prepay**	**Default**	**Prepay**	**Default**
Refinancing incentive	0.557***	0.680***	0.460***	0.377***	0.690***	0.116***	0.588***	0.236***
	(0.004)	(0.006)	(0.006)	(0.008)	(0.01)	(0.014)	(0.007)	(0.01)
Negative equity	-0.185***	0.199***	-0.130***	0.273***	-0.016***	0.230***	-0.004	0.228***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.005)	(0.005)	(0.008)
Channel: correspondent			0.037***	0.161***	0.073***	0.136***	0.062***	0.151***
			(0.011)	(0.017)	(0.011)	(0.017)	(0.011)	(0.018)
Channel: broker			0.005	0.336***	-0.009	0.310***	0.008	0.277***
			(0.013)	(0.019)	(0.013)	(0.019)	(0.013)	(0.019)
Purpose: no-cash-in			-0.304***	0.437***	-0.250***	0.330***	-0.253***	0.483***
			(0.013)	(0.021)	(0.014)	(0.022)	(0.014)	(0.022)
Purpose: cash-in			-0.041***	0.433***	-0.139***	0.365***	-0.140***	0.400***
			(0.013)	(0.021)	(0.013)	(0.021)	(0.013)	(0.021)
Occupancy status: investment			-0.877***	0.166***	-0.608***	0.066***	-0.585***	0.338***
			(0.017)	(0.021)	(0.017)	(0.022)	(0.017)	(0.022)
Property type: others			-0.027**	-0.066***	0.107***	-0.114***	0.067***	0.011
			(0.011)	(0.018)	(0.011)	(0.018)	(0.012)	(0.018)
First home-buyer: No			0.315***	0.002	0.252***	0.017	0.252***	0.005
			(0.017)	(0.026)	(0.017)	(0.026)	(0.017)	(0.026)
More than 1 borrower			0.382***	-0.715***	0.271***	-0.676***	0.242***	-0.422***
			(0.01)	(0.016)	(0.01)	(0.016)	(0.01)	(0.016)

Table 4. Competing Risks Cox Regression Analyses Results (2/3)

	Model 1		Model 2		Model 3		Model 4	
	Prepay	**Default**	**Prepay**	**Default**	**Prepay**	**Default**	**Prepay**	**Default**
Loan amount			0.306***	0.224***	0.418***	0.185***	0.389***	0.170***
			(0.005)	(0.008)	(0.005)	(0.009)	(0.005)	(0.01)
LTV			-0.181***	0.575***	-0.183***	0.524***	-0.172***	0.641***
			(0.005)	(0.012)	(0.005)	(0.012)	(0.005)	(0.012)
DTI			-0.093***	0.189***	-0.027***	0.141***	-0.022***	0.128***
			(0.005)	(0.007)	(0.005)	(0.007)	(0.005)	(0.008)
Credit score			0.279***	-0.493***	0.242***	-0.493***	0.205***	-0.201***
			(0.005)	(0.008)	(0.006)	(0.008)	(0.006)	(0.008)
Interest rate (contract)			0.583***	0.270***	-0.192***	0.722***		
			(0.006)	(0.012)	(0.022)	(0.032)		
30-59 days delinquency							-0.161***	0.184***
							(0.008)	(0.002)
60-89 days delinquency							-0.142***	0.087***
							(0.016)	(0.001)
90-119 days delinquency							-0.043***	0.161***
							(0.016)	(0.001)
Unemployment rate							-0.028***	-0.035***
							(0.01)	(0.013)
House price index							-0.026**	-0.025
							(0.012)	(0.017)

Table 4 – Competing Risks Cox Regression Analyses Results (3/3)

	Model 1		Model 2		Model 3		Model 4	
	Prepay	**Default**	**Prepay**	**Default**	**Prepay**	**Default**	**Prepay**	**Default**
Regional prepayment rate							0.177***	-0.071***
							(0.002)	(0.01)
Regional default rate							-0.217***	0.109***
							(0.01)	(0.006)
Season: Winter							-0.040***	0.228***
							(0.014)	(0.021)
Season: Fall							-0.008	0.218***
							(0.013)	(0.021)
Season: Summer							0.090***	0.175***
							(0.013)	(0.021)
BEA region	No	No	No	No	Yes	Yes	Yes	Yes
Vintage	No	No	No	No	Yes	Yes	Yes	Yes
Observations	6,786,767	6,786,767	6,786,767	6,786,767	6,786,767	6,786,767	6,786,767	6,786,767
Likelihood ratio test	17339	16432	37383	30891	50846	33407	57159	73723
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AIC	1,104,605	465,523	1,084,586	451,090	1,071,171	448,622	1,064,876	408,324
BIC	1,104,622	465,539	1,084,717	451,208	1,071,511	448,929	1,065,294	408,702

* p < 0.1 ; ** p < 0.05 ; *** p < 0.01

Table 5. Financial crisis and mortgage termination risks

	Model 1	
	Prepayment	**Default**
Refinancing incentive	0.510***	0.589***
	(0.004)	(0.006)
Negative equity	-0.190***	0.187***
	(0.002)	(0.002)
Dummy variable for after crisis	-0.547***	-1.114***
	(0.011)	(0.020)
Observations	6,786,767	6,786,767
Likelihood ratio test	20173	20108
p-value	0.000	0.000
AIC	1,101,773	461850
BIC	1,101,799	461873

termination risks and mortgage approval decisions. LTV and DTI have a positive correlation with default risk while they are negatively correlated with prepayment risk. On the other hand, the higher the credit score, a measure of financial creditworthiness and payment ability of borrowers, the higher the probability of making prepayments and the lower probability of default. These findings are consistent with the literature (Mamonov & Benbunan-Fich, 2017).

Mortgage prepayment habits of the borrowers provide valuable insight into probability of mortgage termination risks (Agarwal et al., 2015; Sirignano et al., 2016). Mortgage defaults are particularly concentrated among borrowers with mortgage delinquencies in their credit history (Ahlawat, 2019; Pennington-Cross, 2010). As the number of delinquencies increases, default risk is also getting higher while prepayment risk falls (Table 4). Crucial importance of monitoring mortgage payment behaviors to offer loss mitigation exercises aiming to prevent default risk as much as possible is once again proven with these results.

Negative correlation between house prices and mortgage risks are consistent with theoretical anticipations. Declines in house prices might increase negative equity and therefore mortgage defaults, and also trigger willingness to move more luxurious or larger houses which results in an increase in prepayment rates. However, unemployment rate is found negatively correlated with default risk, which is against the theory. Similar results are also found in the literature (e.g. Danis and Pennington-Cross (2008)). Unemployment rates at federal states level cannot provide an exact intersection between negative equity and unemployment in a household. Therefore, without current employment status of borrowers, analyses would be misleading about the relationship between payment capability and default risk.

ROC curves and AUC values for prepayment and default models applied on testing data are provided in Figure 5. AUC values for prepayments increase from 0.61 to 0.79, and defaults from 0.64 to 0.75. Refinancing incentive and negative equity variables alone are able to explain mortgage risks under the level of 65% (61% for prepayments and 64% for defaults). Adding loan and borrower characteristics into the modelling increased AUC values significantly, this implies the heterogeneity in borrower behaviors and importance of loan age in explaining mortgage termination risks. Mortgage delinquencies and economic factors are indeed among the determinants of prepayment and default decisions as is seen with rising AUC values.

Many new regulations and amendments in legislative framework on mortgage markets from mortgage underwriting standards to securitization works were made after the financial crisis started in 2007. Therefore, Competing Risks Cox Regression Analyses are performed by adding a dummy variable representing the period after the crisis, and Model 1 is shown in Table 5. Both prepayment and default rates are significantly getting lower compared to the previous years but this effect is more obvious for the default rates. These findings might be interpreted as the fact that adoption of more stringent standards in mortgage underwriting process for particularly GSE loans, and transition to a more stable period reduce the uncertainties in the mortgage markets which has led to lower mortgage risks.

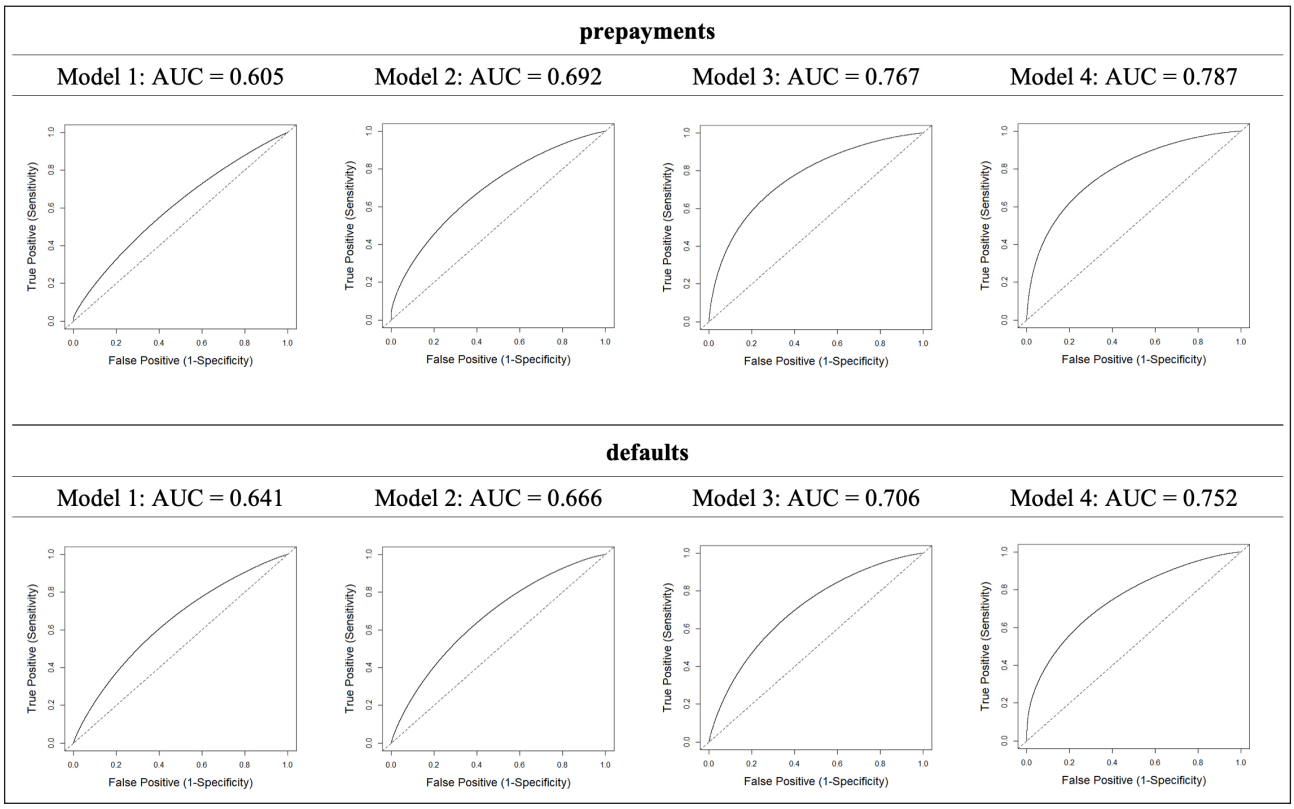

Figure 5. ROC curves and AUC values for prepayment and default models

CONCLUSION

Mortgage-backed securities (MBS) are produced through securitization, and mortgage termination risks are transferred from loan originators to MBS investors. Value of a fixed income security equals to the present value of its expected cash flows, however, valuation becomes a complex problem in the case of MBS due mortgage risks in their collateral pools because prepayment and default risks lead to uncertainty in the cash flows of MBS. Therefore, the mortgage risks become the core of valuation of MBS collateral pools.

There are both systematic and idiosyncratic factors behind the mortgage risks. Option-based models adopt the systematic risks view and focus on prevailing mortgage interest rates and housing prices. These models assume that borrowers behave in an optimal way while taking prepayment and default decisions, and try to explain prepayment speeds with refinancing incentive and default rates with negative equity. On the other hand, econometric models emphasize that not all borrowers take optimal decisions. In addition to refinancing incentive and negative equity, heterogeneity in borrower behaviors, loan attributes and local economic factors are suggested to be considered while predicting prepayment and default rates. This study employs econometric modelling view. After performing classification studies with machine learning algorithms (Random Forest and Multinomial Logistic Regression) and Competing Risks Cox Regression analyses to explain the prepayment and default rates, the study finds that refinancing incentive and negative equity variables alone are not sufficiently explain prepayment and default risks. Mortgage and borrower features (e.g. LTV and DTI ratios, loan amount, credit score of borrowers) and economic factors (e.g. house prices, unemployment rates, local prepayment and default rates) are significantly important indicators. Furthermore, borrowers' payment history of their current loans provides an import insight into whether they will make a default decision in the future because mortgage delinquencies are found important in predicting mortgage defaults. Therefore, role of servicers in monitoring payments closely to offer loss mitigation tools to potential defaulters is crucial to keep safety of both borrowers and financial markets.

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An Experimental Study to Determine Nutrition Profile Warning Message Effectiveness in Food Advertisements

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ABSTRACT

In our country, with the regulations implemented by the Ministry of Health, RTÜK and the Ministry of Commerce, bans on some food goods have been placed in television advertisements and the inclusion of flowband messages in food advertisements has become a legal requirement. The purpose of this research is to measure the effectiveness of flowband messages with nutritional profile content, which is mandatory in food advertisements. The main assumption of the research is that the effectiveness of the nutrient profile warning message, which is legally mandated and delivered through flowband messages, depends on the level of being seen and perceived by consumers. The effectiveness of flowband messages effectiveness was analyzed using eye tracking method, one of the neuroimaging techniques. As a result of the experimental study, it was determined that the level of focusing on the flowband message, which progresses for exactly 12 seconds in a 16-second commercial film, is 3.7 seconds. In general, it was determined that the flow band message was viewed by very few participants, and the viewers could not perceive the healthy nutrition message as catchy and accurate.

Keywords: Food Advertisements, Food Profile Model, Flow Band Messages, Eye Tracking Method, Neuroimaging, Subtitle Message.

JEL Classification Codes: M31, M37

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INTRODUCTION

The main purpose of advertisements is to inform current and potential customers about a good or service. Increasing the brand loyalty of the advertisements, strengthening the brand image, increasing the awareness of the product and brand, influencing the purchasing decisions of the consumers, and reminding the products can be listed among the important purposes of the advertisements (Dijksterhuis vd., 2005). Although advertisements have various purposes such as reminders and prompting to purchase, it is debated whether they have a direct effect on consumers' purchasing decisions. Abernethy, in her study conducted in 1991, states that watching product advertisements does not directly lead consumers to purchase behavior. Although it cannot be guaranteed that advertising messages will lead directly to purchasing behavior, there are studies showing that they direct consumers to a brand and product and increase consumption intention. It is thought that food advertisements increase the consumption level of individuals, especially children, and therefore, the audience should be directed to healthy foods with various regulations (Abernethy, 1991).

In our country, there are various practices to protect children and adults against food advertisements on television. In addition to the regulatory and supervisory institutions of the state, television advertisements are inspected by self-regulation, public inspection, and co-audit, and restrictions are imposed on these advertisements by various laws. However, despite these inspections, advertisements for unhealthy foods in some publications encourage the use of these products and make inspections difficult. The Ministry of Health, for the first time in 2018, determined the missing points in the regulations of the regulatory and supervisory institutions and prepared a list called "Nutrient Profile Model Usage Guide for Ads for Foods and Beverages for Children whose Over-Consumption is Not Recommended", which includes issues related to public health in commercial advertisements. In this list, foods consist of three categories as "Red, Orange, and Green Category". The types of food in these categories are clearly stated in the

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guide and various regulations are included for foods that are harmful to health. One of these regulations is that food advertisements in the red category cannot be made together with children's programs and it is necessary to include ticker tape warnings that encourage the consumer to eat regularly and healthily while broadcasting these food advertisements in other broadcast types (news, TV series, education, sports, etc.). ; Ministry of Health, 2022).

The aim of this study is to measure the effectiveness of flow band messages with nutritional profile content, which is mandatory in food advertisements. In the study, the effectiveness of mite bands in advertisements with nutritional profile content, which is mandatory in food advertisements, will be measured by the eye tracking method, one of the neuroimaging techniques. The study, it is also aimed to determine the effect level of the written warnings on the flow band encouraging healthy eating on the lifestyle of the consumers.

CONCEPTUAL FRAMEWORK

The effects of television advertisements on the consumer are a subject that is frequently discussed in the literature. It is possible to say that the effect of advertisements on consumer behavior has increased due to the widespread use of mass media and technological advances. Due to the increase in people's use of mass media, it became necessary to make regulations regarding advertisements and to transfer these regulations from government control to sectoral organizations. However, recently, the importance of healthy nutrition and the tendency to obesity in young individuals have brought government regulations on food advertisements to the agenda again. It is seen that these regulations are aimed at protecting the young generation all over the world but for different product groups from country to country. In this context, it can be said that advertisements for food, medicine, tobacco, and alcoholic beverage products, which are broadcast on television and target consumers under the age of 18, are limited in various ways in order to protect public health and consumers (Mahy, 2014a, p. 16). European Union regulations primarily target "unhealthy food" advertisements (Mahy, 2014b, p. 34).

In Turkey, the regulators on advertisements; are the Radio and Television Supreme Council, the Advertising Board of the Ministry of Commerce, the Advertising Self-Control Board, and the Ministry of Health. The duties and powers of these institutions are different. The most up-to-date and important of these is the "Inclusion of foods and beverages containing foods and substances that are not recommended for excessive consumption in general nutrition diets" in the seventh paragraph of article 9 titled "Commercial Communication in Broadcasting Services" of the Law No. 6112 on the Establishment and Broadcasting Services of Radio and Television. Commercial communication cannot be included with or in children's programs." It is the regulation dated 27.03.2018 that regulates how the provision will be applied. According to this regulation; In the determination of foods, the list prepared by the Ministry of Health was taken as a basis and this list was published on the RTÜK website.

In television advertisements, it has become obligatory to comply with the "Nutrition Profile Model Usage Guidelines for Advertisements Regarding Foods and Beverages for which Excessive Consumption is Not Recommended for Children" prepared by the Ministry of Health. Foods that are not allowed to be advertised (chocolate and candies, waffles, energy bars, sweet sauces and desserts, cakes, cake mix chips, crispy cookies, energy drinks, all non-alcoholic sugar or sweetener drinks, edible ice) In the "Red" category, compliance with the specified criteria Foods that will be allowed to be advertised (nuts, crackers, breakfast cereals, oil, etc.) Regulations and prohibitions apply to advertisements for food products in the "Red category". Advertisements of food products in the red category cannot be broadcast together with children's programs and on television channels aimed at children. Food advertisements in the red category are allowed to be given together with broadcasts other than children's programs, but there is a requirement that the written messages prepared by the Ministry of Health in these product advertisements should be in the form of a flow tape that can be easily read by the audience (RTÜK, 2022; Ministry of Health, 2022). As a result of these practices, it is seen that there is a significant decrease in the number of children's programs broadcast in Turkey, and there is no change in advertising preferences. Stream band messages prepared by the Ministry of Health and frequently used in food advertisements; Examples of expressions such as "Reduce excessive sugar, fat, and salt consumption for your health", "Consume 4-5 servings of vegetables and fruits a day for your health", "Consume milk and dairy products every day for your health" can be given as examples.

Literature Review on the Effectiveness of Nutrient Profile Warning Messages

There are very few studies in the literature in this field since the regulations on food products have been implemented in Turkey in recent years. According to the "Report on Monitoring Food Marketing to Children in Turkey" published by the World Health Organization

Regional Office for Europe in 2018, the most common product category in television advertisements in Turkey is food with 32.1%. The majority of television advertisements are for foods high in fat, salt and sugar. Of these advertisements on TV, 21.2% are healthy products according to the World Health Organization nutrition profile model. The majority of food advertisements aired on TV during the time periods when children watch, target children with high fat, salt and sugar content, and 78.8% of these advertised foods do not meet the criteria of the World Health Organization nutrition profile model (Bosi, Ergüder, Breda, & Jewel, 2018). This report is a descriptive study examining the suitability of TV commercials in Turkey according to the WHO nutrition profile model.

Şahin and Durlu-Özkaya (2018) examined the extent to which food safety is emphasized in food advertisements broadcast on television and found that safety emphasis ranked fourth. In their study, they stated that brand ranked first in advertisement emphasis and flavor, innovation, food safety, price/campaign and nutrients were emphasized respectively. This study is a qualitative study in which advertisements on seven TV channels were analyzed on a time-based basis (Şahin & Durlu-Özkaya, 2018).

In the study conducted by Yardım, Ilgaz, Aydın and Kaya in 2020, food and beverage advertisements for children in some international children's television channels broadcasting nationally were analyzed according to the Ministry of Health nutritional profile guide. In the study, the development of obesity in infants, children and adolescents all over the world and in our country was included and food advertisements on TV channels were evaluated. According to the study, both the frequency and duration of food and beverage advertisements containing high energy, sugar, salt and saturated fat, which are not suitable for excessive consumption by children, were found to be high. This study is a descriptive study investigating the suitability of TV commercials according to the Food Profile Guide prepared by the Ministry of Health in accordance with the RTUK regulation (Yardım etc, 2020).

In Yılmaz's (2020) study, he discusses the regulations of RTÜK, the Ministry of Health and the Ministry of Commerce in this field in our country by comparing them with the examples of the world, and states that the nutrient profile model is not effective in our country, it is not sufficiently understood by consumers and advertisers, and it has only been put into practice by making it mandatory to use flowing tape messages. Yılmaz's (2020) study is a study that examines the food profile model and its applications on TV with a descriptive approach (Yılmaz, 2020).

Çetinkaya and Hof (2021), in their study to determine the capacity of flow bands in food advertisements to influence consumers, concluded that flow bands were not noticed by consumers watching the advertisements and in this context, flow bands are not effective in terms of preventing obesity and encouraging healthy eating by not going beyond legal obligation. This study is a study in which the level of awareness of the warnings of the warning tapes is examined based on qualitative methods (Çetinkaya & Hof, 2021). This study also examined food profile studies conducted around the world on foods with high fat, salt and sugar content that are not recommended for excessive consumption.

In the study conducted by Jenkin, Wilson and Hermanson in 2008, in which the UK Nutrient Profile Model was evaluated in terms of unhealthy TV food advertisements, it was determined that 483 of the 1893 advertisements analyzed during 60 hours on weekday afternoons were for food products. According to the UK Food Profile, 66% of these advertised food products are high fat, salt and sugar products, while only 28% are not included in this group. A descriptive approach was used in this study (Jenkin, Wilson, & Hermanson, 2008), which provides recommendations for the reorganization of TV food advertisements with high fat, salt and sugar content in accordance with the nutrient profile for all consumer groups.

Scarborough et al. (2013) analyzed a representative data set of 336 different products and brands in 11,763 advertisements in 2008. The representative dataset consists of data from company websites, food packaging and food ingredient tables. The representative dataset was applied to eight nutrient profile models and it was found that the percentage of ads allowed by different nutrient profile models ranged from 2.1% to 52.6%. It was concluded that there was little agreement between the food profile models (Scarborough et al., 2013).

National and international studies on the compatibility of Nutrient Profile Models with TV advertisements have investigated food safety through qualitative and descriptive methods. This particular study aims to determine the extent to which the fluffy tape messages - which are mandatory in British food advertisements - impact consumers' lifestyles. Eye-tracking analysis, a form of neuroimaging technique, was employed in this study

to gauge the impact of viewing level of flow bands on the effectiveness of flow band warning messages. The objective of this study is to assess the effectiveness of advertising messages on promoting healthy nutrition through duct tape by utilizing an experimental approach. The study aims to provide recommendations to regulatory bodies, advertisers and policy makers based on the findings of the experiment. The research offers a distinct contribution to examining the compatibility between nutrient profile models and TV commercials, as well as the effectiveness of warning messages via experimental means.

METHODOLOGY

The nutrient profile model is a science that classifies and ranks foods according to their nutritional value to protect public health. This model helps to distinguish healthy foods from unhealthy foods. In our country, within the scope of the "Law No. 6112 on Radio and Television Establishment and Broadcasting Services", which entered into force after being published in the Official Gazette in February 2011, the broadcasting of foods that do not comply with the nutrient profile model in commercial communication tools has been restricted. The restriction includes the content of foods as well as the requirement to provide warning messages for the consumption of healthy products in visual communication tools. However, it is not known whether this new practice convinces consumers about healthy nutrition or whether consumers see healthy nutrition warning messages in visual communication tools within the scope of the nutrient profile model, and even if they do, the level of impact of the messages is unknown.

In this context, the aim of the study is to measure the effectiveness of the mandatory food advertisements that contain a nutrient profile. The basic assumption of the study is that the effectiveness of the legally mandated nutrient profile warning message presented through flowing tape messages depends on the level of being seen and perceived by consumers. The effectiveness of the flowband message was measured using eye tracking, one of the neuroimaging techniques that measures the eye movements of consumers. The eye tracking technique analyzes where a person looks in response to visual stimuli by tracking pupil movements. In a standard eye tracking study, data are obtained showing where, when (milliseconds) and for how long the participants look at each element of the visual stimulus (Özdoğan, 2008). Warning messages in visual communication media are analyzed on the basis of time-based visual and numerical data on viewing, average viewing, and focusing times related to the eye tracking technique. The main mass of the study consists of individuals over the age of 18. The eye tracking method is basically recording the light reflected from the cornea of the eye. In experimental studies such as the eye-tracking method, the reliability of the research is measured by the power analysis method. In order to have 90% power in static images in eye tracking analysis, it is necessary to reach at least 21 participants (Şenduran, 2019, p.6). In the usability tests conducted for the eye-tracking method, it is stated that 8 participants per participant group is sufficient (Goldberg & Wichansky, 2003, p.512). Therefore, the sample size of the study was determined as 40 participants. Twenty of the participants were female and 20 were male. The participants were chosen from the student body, academic, and administrative staff of the Faculty of Economics and Administrative Sciences at Hitit University. Prior to participation, all participants received information about the study without disclosing its content. During eye-tracking experiments, the quality of data can be affected by various factors such as dirty or damaged glasses, thick-framed glasses, advanced visual impairment, or dyslexia and other similar disorders, as well as heavy eyelashes or mascara (Sharafi et al., 2020). To ensure the validity of the experiment, these factors were considered before initiating it. Once the necessary criteria were met, the experiment commenced. At this point, the participants viewed the advertisement for "Knorr Ginger Turmeric Tomato Soup with Turmeric" on the Gazepoint Analysis screen while their eye movements were recorded.

The reason for the preference of instant soup advertisement in the study is that according to the food profile model, foods that are easily prepared for consumption are in the red category. Advertisements of food products in the red category cannot be broadcast together with children's programs and on television channels for children. They are allowed to be broadcast with broadcasts other than children's programs. However, these product advertisements must include written messages prepared by the Ministry of Health in the form of flowing tape that can be easily read by viewers. The running tape remains on the screen for 12 seconds in a 16-second commercial. The nutrient profilemessage on the conveyor belt is "For your health, consume at least 5 servings of vegetables and fruits a day (total 400 grams a day)". The participants were then asked to answer a questionnaire

form regarding the experiment. Approval for the experimental research was obtained from the "Hitit University Non-Interventional Research Ethics Committee" (decision no: 2022-183) on 02/08/2022.

The survey comprises three sections. The initial segment contains five multiple choice questions to determine participant gender, age, income, education, and occupation status. The second segment utilises the Attitude Scale Towards Healthy Eating (SBITIÖ), developed by Demir and Cicioğlu in 2019, to evaluate the eating habits of the participants The Attitude Scale Towards Healthy Eating (SBITIÖ), showed a high reliability, with a score of 0.90 for the Knowledge about Nutrition (KN) factor, 0.84 for the Feeling Towards Nutrition (FEN) factor, 0.75 for the Favourable Nutrition (FN) factor, and 0.83 for the Poor Nutrition (PN) factor (Demir & Cicioğlu, 2019). In the third section, there are multiple-choice questions about the level of exposure to the nutrient profile warning message of the consumers participating in the experiment. In the analysis of the survey questions, percentage and frequency techniques from descriptive statistical methods were used. The following section presents the findings and analysis of the study.

DATA ANALYSIS AND FINDINGS

Descriptive Statistics on Demographic Characteristics of Participants

The percentage and frequency distributions of descriptive statistics regarding the demographic characteristics of the 40 participants are presented in

When the data in Table 1 are examined, it can be said that 60% of the participants in the study are single, approximately 68% of them are in the age group of 25 years and above, and 90% of them have at least a bachelor's degree. In the following section, descriptive statistics data on the participants' lodging habits are presented.

Descriptive Statistics on Participants' Nutritional Habits

Table 2 shows the healthy nutrition and unhealthy nutrition habits of the participants according to their demographic characteristics. In addition to the demographic information of the participants, their attitudes towards healthy nutrition.

Table 1. Results on Demographic Characteristics of Participants

Demographic Variable		N	%
Gender	Female	20	50
	Man	20	50
	Total	**40**	**100.0**
Marital Status	Married	**16**	40,0
	Single	**24**	60,0
	Total	**40**	**100.0**
Age	18-24	15	37,5
	25-34	13	32,5
	35-44	10	25,0
	45-54	2	5,0
	Total	**40**	**100.0**
Education	High school	**4**	**10,0**
	Licence	**19**	**47,5**
	Graduate	**17**	**42,5**
	Total	**40**	**100.0**

Table 2. Nutritional Habits of Participants According to Demographic Characteristics

Demographic Variable		Healthy Nutrition	Unhealthy Nutrition
Gender	Female	16	4
	Man	17	3
	Total	**33**	**7**
Marital Status	Married	11	5
	Single	22	2
	Total	**33**	**7**
Age	18-24	13	2
	25-34	9	4
	35-44	9	1
	45-54	2	0
	Total	**33**	**7**
Education	High school	4	0
	Licence	15	4
	Graduate	14	3
	Total	**33**	**7**

Table 2 shows that 33 participants had healthy nutrition habits and 7 participants had unhealthy nutrition habits. According to gender, most of the participants with healthy nutrition habits were male participants, while according to age, most of the participants were between the ages of 18-24. Single participants have more Healthy nutrition habits than married participants. In addition, according to educational status, it is seen that participants with undergraduate education have more Healthy nutrition habits. The following section presents the results of the experimental study analysis.

Participants' Eye Tracking Results for the Flow Band Message

Results of Imaging the Flow Band Message According to Participants' Demographic Characteristics

Table 3 shows the number of times the participants viewed the streaming message according to the eye-tracking analysis. Table 3 also shows the participants' answers to the question "Have you seen the flow band message?" in the questionnaire. The eye-tracking and survey data regarding the participants' viewing of the streaming message were compared according to their demographic characteristics

When Table 3 is analyzed, eye tracking and survey results overlap according to the gender of the participants. It is seen that female participants view the flow band message more than male participants. According to the age groups, it is seen that the participants between the ages of 25-34 view the flow band message the most, while the group that does not view the flow band message is mostly the participants between the ages of 18-24. According to the education level, it is seen that the participants with undergraduate education level view the flow band message the most. Table 4 shows the average viewing and focusing times of the participants who viewed the flow band message.

When Table 4 is analyzed, it is seen that the average viewing time of male participants is higher than that of female participants, but female participants focus on the flow band message more. It is seen that the average viewing and focusing time of married participants is higher than single participants. According to age groups, the participants who viewed and focused on the flow band message for the longest time were in the 25-34 age range, while the participants who viewed it the least were in the 18-24 age range. According to the educational level, it can be said that the average viewing time of the participants with undergraduate education level is higher, while the participants with postgraduate education level focus more on the flow band message. Considering the average viewing times and average focusing times of the participants, it can be said that the participants viewed the flow band message, but not all participants who viewed it focused on the message.

Table 3. Results of Participants' Viewing the Flow Band Message According to Demographic Characteristics

		Viewing Flow Band Message (Eye-Tracking)		Viewing Flow Band Message (Survey)	
Demographic Variable		Viewer	Non-viewer	Viewer	Non-viewer
Gender	Female	9	11	9	11
	Man	11	9	10	10
	Total	**20**	**20**	**19**	**21**
Marital Status	Married	9	7	10	6
	Single	11	13	9	15
	Total	**20**	**20**	**19**	**21**
Age	18-24	5	10	5	10
	25-34	8	5	7	6
	35-44	6	4	5	5
	45-54	1	1	2	0
	Total	**20**	**20**	**19**	**21**
Education	High school	**2**	**2**	1	3
	Licence	**9**	**10**	9	10
	Graduate	**9**	**8**	9	8
	Total	**20**	**20**	**19**	**21**

Table 4. Average Viewing and Focusing Times of Participants Viewing the Flow Band

		Flow Band	
Demographic Variable		Average Viewing Time (sec)	Average Fixation Time (sec)
Gender	Female	0,76	4,5
	Man	0,83	3,8
Marital Status	**Total**	1,01	5,1
	Married	0,63	3,2
Age	Single	0,54	3
	Total	1,06	5,5
	18-24	0,72	3
	25-34	0,51	4,5
Education	35-44	0,71	2,49
	45-54	0,85	3,7
	Total	0,73	4,63

Table 5 shows the results of the participants' viewing of the flow band message according to their eating habits.

When Table 5 is analyzed, it is seen that 20 participants viewed the flow band message and 20 participants did not view it. When the survey data were analyzed, 19 participants stated that they viewed the flow band message, while 21 participants stated that they did not view the flow band message. According to the results of the eye-tracking analysis, 18 of the 33 participants with

Table 5. Imaging Results Related to Flow Band According to Participants' Nutritional Habits

	Viewing Flow Band Message (Eye-Tracking)		Viewing Flow Band Message (Survey)	
Nutritional Habits	Viewer	Non-viewer	Viewer	Non-viewer
Healthy nutrition	18	15	16	17
Unhealthy nutrition	2	5	3	4
Total	20	20	19	21

Table 6. Average viewing and focusing times of participants according to their dietary habits

	Flow Band	
Nutritional Habits	Average Viewing Time	Average Fixation Time
Healthy nutrition	0,63	3,70
Unhealthy nutrition	1,55	6,66

healthy nutrition habits viewed the tear tape message, while 15 participants did not. Among the 7 participants with unhealthy nutrition habits, only 2 of them viewed the flow band message, while 5 of them did not. According to the answers given by the participants to the survey question regarding the participants' viewing of the tear tape message; 16 of the participants with healthy nutrition habits and 3 of the participants with unhealthy nutrition habits stated that they viewed the tear tape message. When the eye-tracking results and survey data are compared, it is possible to say that some participants saw but did not notice the flow band message. Table 6 shows the average viewing and focusing time of the participants according to their nutritional habits.

When analysing Table 6, it can be seen that the average viewing time of the participants with healthy nutrition habits was 0.63 s, while the average viewing time of the participants with unhealthy nutrition habits was 1.55 s. When analysing the average focusing times, it can be seen that the participants with healthy nutrition habits focused on the Flow Band message for 3.70 s, while the participants with unhealthy nutrition habits focused on the Flow Band message for 6.66 s. 70 s, while the participants with unhealthy nutrition habits focused on the flow band message for 6.66 s. Considering the average looking time and the average focusing time, it can be said that the participants with unhealthy nutrition habits focused more on the flow band message.

Survey Results of the Participants Regarding the Flow Band Message

In addition to the eye-tracking method, the participants in the study were also measured using the questionnaire method. At the same time, a question about the message content was asked in order to better measure the attention paid to the underline message in the tape. Table 7 shows the participants' responses to the questionnaire regarding the underline message in the ad.

Table 7 shows the participants' responses to the questionnaire regarding the flow band message in the advertisement. While 19 of the 40 participants (47.5%) stated that they had seen the subtitle message, 21 participants (52.5%) stated that they had not seen the flow band message. It can be seen that only 11 of the participants (27.5%) stated that the content of the flow band message was about "daily fruit and vegetable consumption". Therefore, it can be said that 8 of the 19 participants who reported seeing the flow band message only saw the content of the message and did not perceive the message. An analysis of Table 7 shows that 10% of the participants were prompted to consume fruit and vegetables by the flow band message in the advertisement, while 90% were not influenced by it. Considering that the purpose of the flow band message is to guide and encourage consumers to eat healthy within the framework of the nutrient profile, it can be said that the flow band message was not noticed by the viewers and was not effective in influencing healthy eating behaviour.

Table 7. Survey Results of the Participants Regarding Flow Band

Demografik Değişken		N	%
Did you see the subtitle message?	Yes	19	47,5
	No	21	52,5
	Total	**40**	**100.0**
What is subtitle message content?	Daily fruit and vegetable consumption	11	27,5
	Daily salt consumption	3	7,5
	Reading packaged product labels	4	10
	I do not know the subtitle message content	22	55
	Total	**40**	**100**
Did the subtitle message encourage you to eat fruit and vegetables daily?	Yes	4	10
	No	36	90
	Total	**40**	**100.0**

CONCLUSIONS

The nutrient profile model, which is an important step in separating healthy foods from unhealthy foods, is the classification of foods according to their nutritional values in order to protect public health. Especially with the increase in obesity, restrictions have been imposed on the broadcasting of advertisements of foods with low nutritional value in communication tools. The restriction includes the content of foods as well as the obligation to give warning messages for healthy product consumption in visual communication tools. However, it is not known whether this very new practice convinces consumers about healthy nutrition or whether consumers see healthy nutrition warning messages in visual communication tools within the scope of the nutrient profile model, and even if they do, the level of impact of the messages is unknown. From this point of view, the aim of the study is to measure the advertising effectiveness of flowing band messages with nutrient profile content, which are compulsorily applied in food advertisements. The basic assumption of the study is that the effectiveness of the legally mandatory nutrient profile warning message presented through flow band messages depends on the level of being seen and perceived by consumers. According to the results of the study;

- Eye-tracking and survey results coincide according to the gender of the participants. It is seen that female participants view the flow band message more than male participants. According to the age groups of the participants, it can be said that the participants between the ages of 25-34 view the flow band message the most, while the group that does not view it is mostly the participants between the ages of 18-24. Easily prepared foods such as instant soup are more preferred by the young generation, especially by students. However, it has been observed that the flow band message does not attract the attention of the participants aged 18-24. Similar to this result, in a study conducted on the alpha generation with eye tracking method, it was concluded that the participants spent an average of 0.5 seconds (7% of the total viewing time) on written messages (Thomsen and Fulton, 2007).

- According to the results of the eye tracking analysis, 18 of the 33 participants with healthy eating habits viewed the running tape message, while 15 participants did not. Participants with healthy eating habits focused on this message, which emphasised daily fruit and vegetable consumption, for an average of 3.7 seconds. This message, which specifically emphasised healthy eating, was seen but not perceived.

- According to the survey results, 19 out of 40 participants (47.5%) stated that they saw the flowing tape message, while 21 participants (52.5%) stated that they did not see the flowing tape message. According to the eye-tracking results, 20 participants saw the flow band message, while 20 participants did not see it. In this respect, the survey results and eye-tracking results overlap. When the participants were asked about the content of the subtitle message, only 11 of them (27.5%) stated that the content of the flow band message was

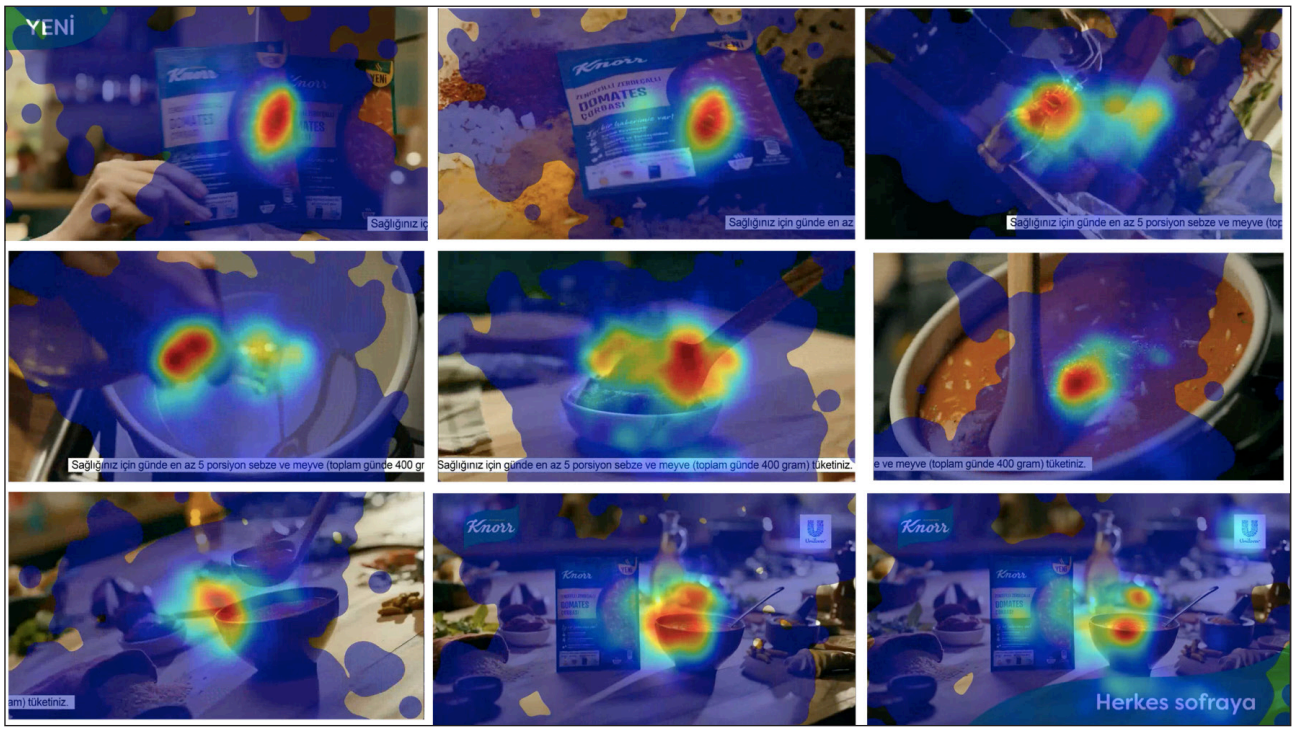

Figure 1. Heat Map of Knorr Advertisement

about "daily fruit and vegetable consumption". In this respect, the results of the research coincide with the study conducted by Çetinkaya and Hof (2021). The message is seen, but the message is not perceptible and memorable enough. Similar studies attribute the fact that the messages are not memorable to the subtitle speed. In the study conducted by Szarkowska and Moron (2018) with the eye-tracking method, it was observed that slow subtitles had more focus than fast subtitles. In addition, it was stated that the longer the subtitle duration, the higher the number of re-views to the subtitle area (Szarkowska and Moron, 2018).

In the experimental study conducted within the scope of the study, it would be more effective to evaluate the heat map related to eye-tracking analysis in order to see how much all participants focused on the advertisement message related to the flow band message and to determine which areas are the most effective in the advertisement. Accordingly, the heat maps related to the advertisement are shown in Figure 1.

When Figure 1 is examined, it is seen that the level of focus of the participants on the flow band message, which continues for 12 seconds in the 16-second commercial film, is very low. The middle point where the soup takes place throughout the advert is the most focused area. Especially the fact that the advert progresses as a story and the food attracts more attention than the brand shows that the flowing band messages will not achieve the desired result. Similar studies conducted with eye tracking technique show that the middle part attracts more attention in videos (Kim et al., 2019; Kim, 2022). In this respect, it is thought that it would be more effective to place the nutrient profile messages at the end of the advertisement and in the middle of the screen, as in public service announcements, instead of placing them at the bottom, which is the most inconspicuous part of the screen.

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When Remote Work is Inevitable: Experiences of Remote Workers During the Pandemic

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ABSTRACT

Remote working was obligatory rather than optional for many workers during Covid-19 pandemic. We interviewed 23 white-collar participants, who were forced to work from home in this period, using semi-structured questionnaires to determine their experiences in the remote working process and to identify the factors influencing the efficiency of remote working. We qualitatively evaluated the participants' responses and determined seven themes: location flexibility, time flexibility, belonging and status, communication, recordability/concrete evidence, anxiety of being invisible and being forgotten, and the view of other people on remote workers. The most important factor determining the participants' perception on these themes is the nature of the work. If the work requires constant and quick communication among different partners, remote working is not perceived to be as efficient as working in an office. Works involving tasks that can be performed individually and independently appear to generate more satisfaction in a remote working environment. Regardless of the nature of the work, personal development opportunities, such as trainings, seminars and workshops, provided by the employers to their remote working employees during the pandemic seem to alleviate negative consequences of remote working on the employees to some degree.

Keywords: Remote Work, Home Office, Covid-19 Pandemic.

JEL Classification Codes: M12, J81, J24

Referencing Style: APA 7

INTRODUCTION

Remote working is defined as "a flexible work arrangement whereby workers work in locations, remote from their central offices or production facilities, the worker has no personal contact with co-workers there, but is able to communicate with them using technology" (Di Martino & Wirth, 1990, p. 530). Advances in information technologies allowed companies to practice remote working since 1980's. With this working model, it has become possible to work remotely by using computers and as a result the necessity of doing the work in the office environment within certain times has been eliminated. Generally, this model has been preferred in companies dealing with design, software, translation, architecture, accounting and press release because of the suitability of jobs for remote working in such areas. Covid-19 pandemic, however, forced many other occupational groups to utilize remote working which they had never experienced before (Meşhur, 2007; Tozlu, 2011; Gallup, 2017).

The remote working model, which had already become widespread as a result of developments in digital technologies, became one of the most important agenda items of many businesses with the Covid-19 outbreak. There are indications that remote working will differ between countries and businesses and will become more widespread in different dimensions and forms. This increased flexibility in scheduling and executing tasks improves employees' perception of autonomy (TÜBA, 2020). Organizations around the world are trying to find new approaches to cope with such a dispersed workforce and to find solutions to new problems, but it is uncertain which of the created approaches will be more permanent (Optimist, 2020). From this point of view, the necessity of conducting a research with employees has emerged in order to determine the needs and experiences of the workforce in the remote working model and to establish corporate habits. The advantages and disadvantages of remote working have been identified in the existing remote working literature prior to the pandemic. This study was planned to identify new

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variables that affect the remote working model and previously unidentified advantages and disadvantages of remote working in the existing literature.

Remote working had become compulsory with the pandemic and forced many employees from different sectors to start working remotely. The way each employee experiences this process differs depending on their demographic characteristics and the structure of the job. This study focuses its perspective on the remote workers and their experiences.

LITERATURE REVIEW

While remote work was optional and preferred by some occupational groups before the Covid-19 crisis, the pandemic has made working remotely a necessity. Highly advanced information technology hardware, the output-oriented coordination and control systems, the experience in the use of flexible working hours, the size of the enterprise and the sector of activity play key roles in the adoption of remote work (Tokarchuk et al., 2021). In their research, Belzunegui-Eraso and Erro-Garces (2020) aimed to show how companies use remote work to ensure the safety of their employees and to ensure the continuity of economic activity in companies. With the development of digital technology, many businesses, regardless of size, have been using flexible working models from time to time for years. Researchers have studied the effect of remote working on employees, employers, organizations and society from various aspects (p.14).

Izthak (2002) listed the advantages and disadvantages of remote working using a methodological examination of the individual, organization and community components potentially affected by remote working. The advantages of remote working are 1) increased autonomy and flexibility for individuals, 2) capacity increase in human resources, 3) savings in direct expenses for organizations 4) ability to address the needs of people with special needs and 5) saving from infrastructure and energy. The disadvantages are potential expenses related to transitions to new work models and a possible sense of isolation for individuals which may lead to danger of creating detached individuals.

Tremblay and Thomsin (2012) focused on the advantages and disadvantages from perspective of remote workers. They identified reduced interference from colleagues, work schedule flexibility, opportunity for individual and occupational development and improvement, reduced time spent for commuting, better organization of working hours and better working opportunities, as well as the better work-life balance, management of family or personal responsibilities as dominant advantages of remote working. In contrast to the advantages, there are employees who think that working remotely from home has its own set of drawbacks. First, boundaries between private and work life progressively blurs when work is done remotely from home. Employees chose time and location of work to a large extent, this flexibility, however, results in an imbalance between personal and work life, blurring the boundaries roles (Naswall et al., 2008). In addition, since those who work from home do not go to work, they are also cut off from the opportunities offered by the business and social environment. This can leave home workers lonely and weaken their social skills.

Similar to occupational satisfaction (Smith et al., 2018), the advantages and disadvantages of remote working vary depending on individual differences. Raisiene et al. (2020) examined the relationships between participant age and work variables with participants who were forced to work remotely during the pandemic in Lithuania. The older participants tend to emphasize the disadvantages of telecommunication, whereas the youngers tend to possess more qualifications required for remote working such as good independent working, communication and time management skills.

A common issue with remote working is that remote workers can feel socially invisible (Harris, 2003). Remote work researchers have adopted many theoretical perspectives, such as social identity theory or social isolation theory, to show that remote work leads to negative social consequences Perry et al. (2018) emphasized that since remote workers are physically distant from the organizational environment, identity formation would be negatively affected; references for social support and identity formation would be lower, which would create weaker emotional bonds with the organization and their colleagues. They stated that this physical separation would reduce the opportunity to establish social connections, and as a result, remote workers would show lower satisfaction and performance. This situation can be more pronounced for high-intensity remote workers. Belle et al. (2015) examined the personal and professional satisfaction of such remote workers, the support and participation they receive from others, and the essence of their organizational belonging experiences. While the emotional language used by the participants in places where their experiences of not belonging were expressed includes expressions such

as 'to be sad, not cared for and alienated', the structural language includes implications such as "a ropeless kite", "being on an island alone".

Reduction in mentoring opportunities is a disadvantage of remote working for early career young employees. This can have prolonged adverse impacts on the professional development and career advancement of remote workers in terms of learning and networking opportunities (Gascoigne, 2021). Dambrin (2004) investigated the impact of remote working on the manager-employee relationships with remotely working sales people in four dimensions: coordination, division of labour, evaluation/control and compliance. He found that remote working facilitated communication between remote hierarchical levels by reducing formal communication between employees and direct managers, and reduced dependency autonomy of employees for their managers. The development of employees' perceptions of autonomy depends on flexibility in the planning and implementation of tasks. Working from home allows for controlling attire, ventilation, heating and lighting which may contribute to increased feeling of autonomy. In contrast to this autonomy, those who have remote work tasks online may also experience a reduced sense of freedom because electronic oversighting of work is fairly easy and, at the same time, confidential and continuous. While managers fear the loss of control over their subordinates, employees fear isolation and knowledge impoverishment. Employees who choose to work remotely can also see that their commitment are questioned by managers, and managers may have to change their strategies to monitor employees from behaviour-based supervision to output-based controls such as auditing by goals (Gajendran & Harrison, 2007).

Visibility is critical to performance appraisals, and such appraisals are crucial to career success. Therefore, it is natural for remote workers may experience such concerns. Remote working is often perceived as synonymous with time off and remote workers tend to feel the need to prove their virtual presence, increasingly resorting to actions such as sending messages to their managers and colleagues to indicate that they are reachable and to try to reduce feelings of isolation. Remote working is often perceived as synonymous with time off and remote workers tend to feel the need to prove their virtual presence, increasingly resorting to actions such as sending messages to their managers and colleagues to indicate that they are reachable and to try to reduce feelings of isolation. In this context, there is a real concern that out of sight is indeed out of mind. It has been observed that e-mails and telephones are used not only to exchange information, but also to inform employers that they are at work at home. Thus, it has been stated that a behavioural norm that increases technocratic administrative control by forming the basis of social control has emerged. This has led to an obvious paradoxical experience of social workplace, where remote workers now feel chained to their workstations at home (Sewell & Taskin, 2015). A common recommendation in the remote work literature is that the dwell on output controls will increase when employees work remotely. Sewell and Taskin (2015) stated that suitability for remote work can be determined in part by whether an employee's output can be measured or not. Felstead et al. (2003) indicated that a widely recommended approach to managing remote workers was to monitor outputs rather than inputs or behaviours. Similarly, Illegems and Verbeke (2004) argued that remote work would require setting clear performance goals and criteria. Richardson and McKenna (2014) found that remote workers felt more pressure to achieve performance goals than those who do not work remotely.

Tokarchuk et al. (2021) sought answers to questions such as remote working, which was adopted during the emergency period could be could be applied after the emergency ended and how it would contribute to the sustainability of cities. They emphasized that the adoption of remote working would require a shift in management style and should be replaced by direct supervision and coordination based on reciprocal trust. In this context, the organizational capability that businesses should have is ability to manage by objectives and performance.

In addition to all the above, the characteristics of the job and the nature of the tasks are also important variables that affect the remote work experience. These variables affect how remote workers structure their days. Jobs that require real-time communication require accessibility during working hours and push non-interactive tasks out of these times. Dimitrova (2003) examined remote workers with different job types to review the issue of control and autonomy in remote working. In the remote working process, it was concluded that the control mechanisms were better developed, and more comprehensive working rules were available in the activities with standard routine duties, while the remote workers with non-routine duties had fewer rules and could work independently of their supervisors.

In a study conducted by Başol and Çömlekçi (2021) with white-collar workers with remote working experience in different regions of Türkiye, it was observed that the level of positive attitudes towards remote working increased

when the organization of remote working was carried out in a planned and regular manner, the technical/ digital infrastructure was up to date and sufficient, the education levels were higher, the workload of the employee did not increase, and care was taken to spare time for family and private life. Hamouche (2021) states that all human resource functions and the general literature about HRM has been greatly impacted by Covid-19. The present literature on remote working does not offer a comprehensive evaluation of the mandatory remote working during Covid-19 pandemic (Waizenegger et al., 2020).

This study was conducted to determine which aspects of remote working are perceived as advantages or disadvantages by remote workers in the context of Covid-19 pandemic when almost all white collar workers were forced to work remotely. We put forward two main research questions in this descriptive study: 1) What do employees perceive as advantages and disadvantages of remote working when it is inevitable? and 2) In addition to the concepts about remote working already investigated in the literature, what new concepts can we identify about remote working?

MATERIALS AND METHODS

To reach the study goals we used the qualitative research approach. We developed a semi-structured interview form and to improve clarity of the interview questions we conducted pilot interviews with three white collar workers we personally knew who were working remotely. We obtained ethics approval, selected the participants and conducted the interviews. Data analysis was based on content and descriptive analyses. Details of these steps are explained below.

Interview form Development

We examined the literature on remote working and came up with a semi-structured interview form with 37 open ended questions. To ensure the clarity and validity of the questions we conducted pilot interviews with three white collar workers who we personally knew. Using the feedback from the pilot interviews we reduced the number of interview questions to 31. Eight of these questions were on demographic characteristics and 23 were open-ended questions related to remote working experiences of the participants. At this stage we obtained ethics committee approval to proceed with our study. The interview form is available from the authors upon request.

Participant Selection

Our target population was white collar remote workers who had no previous remote working experience but forced to work remotely due to Covid-19 pandemic. To reach to potential participants we disseminated the information about the study and our contact information in closed messaging groups. Once we selected our initial participants among the respondents conforming with the selection criteria, we used snowball sampling method to reach additional participants. This process resulted in 23 participants. We tried to ensemble a group of participants as diverse as possible in terms of sectors and positions.

Interviews

We collected data for this study by conducting a 30 to 45 minutes long on-line interview with each of the 23 participants using ZOOM video conferencing software (Zoom Video Communications, Inc.). The interviews took place in the time period when the participants were working remotely (between 06 March and 24 April 2021). The questions on the interview form were asked in the same order to each participant. We recorded the interviews with the consent of the participants and transcribed the contents into computer environment.

Data Evaluation and Theme Identification

In order to ensure validity and reliability in qualitative research, credibility, transferability, consistency and confirmability criteria must be met. For credibility, we recorded the interviews. For transferability, we detailed all stages of the research, reported the raw data with detailed descriptions and supported it with direct quotations. The transcripts of the interviews were subjected to content (Crabtree & Miller, 1999) and descriptive analyses (Miles & Huberman, 1994). In order to ensure the verifiability of the data, we (the authors) first analysed the datasets individually and independently, and then worked together to create the name of the code, themes and sub-themes (Creswell, 2002).

RESULTS

We interviewed six male and 17 female participants. Twelve participants were married and 11 participants were single. Nine participants had children. Ages of the participants ranged from 23 to 50 (mean = 36.3). Eighteen participants resided in Istanbul, three participants in Izmir and two participants in Ankara. Participants worked in companies operating in the IT, finance, service, health, electronic commerce and aviation sectors (Table 1).

Table 1. Demographic characteristics of the participants.

Participant	Gender	Age	Profession	Industry	Years of Seniority	Marital Status	Home City	Number of Children
P1	Male	32	Computer Engineer	Information Technologies	8	Single	Istanbul	None
P2	Male	50	Software Developer	Information Technologies	23	Married	Istanbul	2
P3	Female	27	Computer Engineer	Information Technologies	2	Single	Istanbul	None
P4	Female	41	Lawyer	Banking	16	Married	Istanbul	2
P5	Female	35	Bank Employee	Banking	7	Married	Izmir	1
P6	Female	42	Assistant	Banking	22	Married	Istanbul	1
P7	Female	38	Senior Payroll Specialist	Service Industry / Consultancy	16	Married	Istanbul	1
P8	Female	39	Bank Employee	Banking	18	Single	Istanbul	2
P9	Male	32	Foreign Trade	Health	1.5	Married	Istanbul	None
P10	Female	29	Chain Stores Sales Manager	Fast Moving Consumer Goods	6	Married	Istanbul	None
P11	Male	28	Information Systems Engineer	Information Technologies	5	Single	Istanbul	None
P12	Female	27	Human Resources Specialist	Electronic Commerce	4	Single	Istanbul	None
P13	Female	29	Medical Representative	Health	4	Married	Ankara	None
P14	Female	40	Lawyer	Banking	16	Single	Istanbul	None
P15	Female	30	Marketing Analyst	Information Technologies	6	Married	Izmir	None
P16	Male	32	Marketing Manager	Aviation Industry	7	Married	Istanbul	1

P17	Female	39	Marketing Employee	Banking	17	Single	Istanbul	None
P18	Female	48	Computer Engineer	Information Technologies	21	Married	Istanbul	2
P19	Female	49	Medical Representative	Health	5	Single	Ankara	None
P20	Male	45	Computer Engineer	Information Technologies	22	Married	Istanbul	2
P21	Female	23	Marketing Specialist	Electronic Commerce	1.5	Single	Istanbul	None
P22	Female	33	Bank Employee	Banking	8	Single	Izmir	None
P23	Female	47	Bank Employee	Banking	21	Single	Istanbul	None

The codes, categories and themes created by making content and descriptive analysis of the data obtained as a result of the study are shown in the Table 2. In the theme of "location flexibility", we took into account the desire of individuals to live in different cities from the institution for which they worked and their desire to pursue a career in institutions in different countries without leaving their own country. In addition, we evaluated the desire to be protected from the negative effects of factors such as uncontrollable noise, hygiene, heating and lighting in office environments within the scope of this theme. We determined the theme of "time flexibility" by taking into account the codes of not limiting daily work to working hours, being accessible at any time, blurring of the boundaries between private and business life. We created the theme of "belonging and status" based on the need for individuals to belong and be respected. We determined the "communication" theme with the written and verbal communication code that the employees establish with their colleagues and managers. We created the "recordability/concrete evidence" theme by using the codes of recording how a job is done using information technologies and using them when appropriate. We created the theme of "anxiety about being invisible and being forgotten" based on the code that employees are not present in the organizational environment, that they want to prove to their managers whether they are working or not, and that they need extra communication with the manager. The perspective of employees who do not have remote working experience also affects remote workers. For this purpose, we created the theme of "the view of other people on remote workers".

Location Flexibility

In the location-independent flexible working model, there is no obligation to be in a certain place or commute to a physical office. work can be done wherever there is a computer and internet. While in an office environment there can be problems with lighting, heating, ventilation, decoration, privacy of conversations, etc. These factors can be controlled by working from home. Our participants talked of this situation as follows:

- We work in an open office, you know. How can I say it? I am not a person who likes very hot, for example, I like colder environments. Here, when the air conditioners work a little, our other friends want to make the environment warmer by saying, "Oh, I'm so cold." (P23)
- There are no windows that can be opened in the plazas. I don't find the ventilation system healthy. There's only one toilet on the floors, and we're hundreds of people working. The kitchens where we buy tea and coffee are very small. Hygiene worries me as long as I'm in the office. (P14)

In addition, location flexibility allows them to find resources around the world independent of a physical location. They can also work for a certain time without leaving their own country. The experience of working

Table 2. Themes, categories and codes determined based on the interviews.

Themes	Categories	Codes
Location flexibility	- Career - City selection advantage - Work environment	- The working environment is not limited to a specific place - Desire to live in a different city - Desire to build a career in different countries and institutions - Control over the work environment
Time flexibility	- Time and cost savings - Uncertain working hours - Work-life balance - Control over the work	- Eliminating time and costs associated with commuting - Blurring the boundaries of work and private life - Have flexible working hours - Increased individual responsibility
Belonging and status	- Belonging - Status - Non-appointment meetings	- Managers' concerns about losing control and status - Improvement in working conditions - Decreased sense of belonging - Opportunities of going to work (meeting with friends without a pre-arrangement, shopping on the way home)
Communication	- Information sharing - Communication glitches/ misunderstandings - Virtual interviews - Inability to socialize - Written communication - Superior-subordinate relations - Relations with colleagues	- Inability to make short communication and small discussions in the office - More socialization in the workplace - Weakening of relations with decision makers/managers - Difficulty in self-expression
Recordability / Concrete evidence	- Gaining later access - Provide control	- Ability to access video and meeting recordings later on - Ability to control whether the work is done correctly and its quality - Access to the system at any time
Anxiety of being invisible and being forgotten	- Not being visible - Anxiety of being forgotten - Fear of missing out - Social isolation	- The need to prove to the manager that you're working and the need for extra communication - The need to remind yourself - Missing updates while away
The view of other people on remote workers	- Boundary violations - Perception of comfort - Perception of being on leave/on vacation	- Being perceived as not working at home - Being disturbed during working hours

remotely with the pandemic resulted in employees being more courageous in preferring international companies in terms of employment. One of our participants expressed this situation as follows:

- Because of the satisfaction I get from working remotely, I am more courageous at the point of starting a remote job in the international arena. In other words, at the point of my career development, I want to experience working remotely in a more competent position, in more multinational companies. (P11)

The participants, who did not want to attract the noise and traffic density of big cities and wanted to save time on the road, stated that they could continue their work in Istanbul by living in small cities or villages and working remotely.

- I can go and live in a quiet place in Antalya instead of in Istanbul. As long as I'm not disconnected from work, as long as there're no face-to-face meetings, that's fine. (P2)
- I would like to live with my family by the sea. It would be very nice to do the job I want and be with my family without experiencing the noise and traffic of Istanbul. (P3)

Time Flexibility

With the transition to remote working, one of the most important problems experienced by the participants was the stretching of the concept of working hours. While remote workers have more discretion in the timing of their work, the requirement to be available whenever needed has also removed their protection against long working hours. The participants conveyed the continuous connection situation that technology provides, or even imposes, as follows:

- On weekdays, we used to leave the computer there when we left the office unless there was a pre-planned job. There's no such thing right now. When a job comes, we have the computer anyway, we are at home and we have to do it directly. (P1)
- Always being at home, being accessible has resulted in around-the-clock demand from our customers and the teams we work with. (P11)
- I am spending all my waking hours dedicated to work. (P12)

Workers in these types of jobs said they were very unhappy working remotely and that the quality of their work declined, especially if the job required communicating with others.

- Especially on weekends, my colleagues with whom I have a close relationship, say, "Your system is open, can you send me this? and I can't say no. I'm sending it." (P5)
- Working from home, the concept of working hours is gone. I work every moment of the day. I don't know how to solve this situation. (P8)
- I can't turn off my computer at all while I am working at home. If someone from the system asks a question, I keep it open even when I'm sleeping so that I can answer it immediately. I wake up at night and check. (P10)

Those who work in project-based and result-oriented jobs stated that they were more productive because they could plan their own working hours.

- In my job, there are legal penalties if the job is not finished on time. So I adjust my working days and hours accordingly. (P7)
- As long as the job is completed on the specified date, there's no problem. I am very pleased. The number of meetings also decreased. I can plan my own time. (P11)
- The work I have to do is very clear. I know the deadline. It's been very good for me. I arrange my time at home the way I want. (P1)

Belonging and Status

Belonging to a group or a place and having a status are two of the prominent human needs. The feelings of remote employees regarding the sense of belonging due to their absence from the workplace are as follows:

- I can't see my friends very much outside work. We have to make appointments to see each other, and it is difficult to determine which day we all have together. It's already a natural process for us at work. Everyone agrees to that place at that time. Therefore, we meet in a natural way, without the need for any appointment, to spend time with those people. Belonging to somewhere makes our work easier. (P4)
- Every day at work, there are many faces whose names I have no idea. I don't have any conversation

with them, but I know them. We smile and say, "Good morning" when we get in the elevator. We see each other in the same environment at lunch. You feel like you belong somewhere, like you have another house. Now that sense of belonging is gone, suddenly, the only place you belong is home. You are like a stranger when you go there. For a year or two we haven't been there We have forgotten the face we saw in that elevator, and we'll feel like strangers when we go in again. (P8)

One participant, who was working as a manager, expressed how he felt in in the online meeting in terms of his status:

- There are very clear lines in the work. You have a separate room, so whatever we call the office room, you have something like that. There is a wall between you and the employees, but you are only one of the sixteen frames in the online meeting. (P16)

Communication

There is evidence that remote teams face significantly more communication difficulties than face-to-face teams (ILO, 2020, p.10). When communicating electronically, employees are likely to share less information with their colleagues and have difficulties in perceiving and interpreting the information they encounter. Participants also stated that they encountered communication problems during the remote working process, and that while they could get answers to their questions with short interviews or small business-related discussions in the office environment, this was not possible remotely.

- So no matter how hard we try, our facial expressions, our smiles don't really match up these online things or on the phone. There are so much misunderstandings. Already the face of the e-mail is very cold. (P10)
- Instead of sending an e-mail, those who worked side by side with their managers in the office would go to their desk and ask questions and return to work. In this process, they had trouble because they couldn't do it and couldn't call 30 times a day each time. (P14)
- For example, I write to the person I work with from the communication platform used by the workplace and ask if he is available, and he can't look at it at that moment. Maybe we can meet in three hours, but when I'm in the office, I can watch for his free moment and get my work done in fifteen minutes. (P9)

Many companies strive to provide informal online contact opportunities for employees to help employees to connect with their managers and co-workers. These are generally aimed at relieving employees from isolation or anxiety created by the current situation through social interactions. Our participants expressed this situation as follows:

- An online meeting environment has been created where everyone gathers for one hour a week. Sometimes writers and journalists are guests. Sometimes friends who have worked in our company before and started their own business come and talk about what has happened in their lives and how they have changed, and sometimes we chat in a free format. Thus, they have enabled us to socialize by re-establishing our bond with our friends. (P18)
- We were just talking business, and we realized that it wasn't good for us. We started to having online meetings where we could improve each other technically once a week. (P3)

The participants expressed the changes in their formal and informal relationships with their colleagues as follows:

- I lost a lot of social ties with the people I worked with. Working online and working from home has inevitably made everything a business goal. (P15)
- I don't ask, "How are you?" every day anymore because I get called all the time. Actually, you're just talking about business. I think there was more "effing around" going around at work. (P16)
- We used to talk about business while working at work, but apart from that, we used to chat with a lot of people while we finished our meals and had coffee at lunch break. Since we don't have such a chance now, I only call you if I have a job, otherwise I'm not calling you, I'm not saying let's have a chat. (P12)
- When I switched to my home office with the people with whom I had informal conversations in the office environment, we only started having formal conversations. In addition, I was able to establish informal relations with people with whom I had a formal relationship. I started getting to know different sides of people as well. (P8)

Recordability/Concrete Evidence

Going to the mentor every time to ask questions about the points that the learner forgets or gets stuck on in newly learned task will disrupt the flow of the work and prevent the mentor from planning her/his own time effectively. Recording the mentor's training process will enable the new learner to benefit from this recording when needed. The statements of the participants on this subject are as follows:

- When new recruits would ask me something, I would tell them, then they would forget and ask me again and again. Now he records what I tell them, they don't ask. They open the record and look at it. So it has been incredibly beneficial. (P3)
- When I was in the office, I would do my job, turn off the screen at the end of the shift and go home. When I had something on my mind, I would have to wait until the next day. Since I work from home, when I have a question, I can immediately open the screen and correct it. (P8)
- Having our office computers accessible at all times provided flexibility. We can save and make changes whenever we want. (P14)

Anxiety of Being Invisible and Being Forgotten

The shift to remote work while working in an office setting will likely to change the frequency, quality, and by definition, the form of one's interactions with other members of the organization. Therefore, remote work has the potential to reduce the quality of the subordinate-superior relationship (Gajendran & Harrison, 2007). It is seen that remote workers have been worried that they will not be able to benefit from promotions and other rewards because their daily face-to-face relations with their managers have decreased and that they may be adversely affected in terms of status loss and career development (Naktiyok & İşcan, 2003, p. 56). Employees who were away from their managers and colleagues during the remote working process had to make more efforts to remind themselves and prove that they were working.

The evaluations on this topic were expressed by the participants as follows;

- In terms of career, it's actually a bit of a negative situation. We're starting to lose relationships; relationships with the company are weakening. In other words, relationships with decision makers are weakening. (P18)
- Because we work remotely, it's possible that we've been forgotten. We need to remind ourselves more in this process. Look, we need to try to prove more that I am here. (P8)
- There is a desire to prove to one's manager that one is working. So I turn on my computer, but I may turn on my computer and go to bed, or I may be eating. I constantly need to contact my manager and explain in detail what I'm doing. (P12)

Besides the participants who stated that they used verbal communication more intensely due to the anxiety of being forgotten and not being visible, there were also participants who stated that written communication would provide an advantage. Written communication has advantages such as being concrete and permanent, being able to convey the message without the limitations of time and place limitations, being able to be reviewed and saved again upon request or in case of disagreement, and providing a document (Küçük, 2017). Some of the participants stated that written communication allowed for a more egalitarian and democratic approach to be visible with the following words:

- Working remotely has made written communication more important than verbal communication. While there are face-to-face conversations, communicating by writing and sharing a note provides something more democratic by being visible. The use of written communication is actually more egalitarian. (P15)
- When I was working in the office, I did not need to explain what I was doing because my manager would see what I was doing in the office. Since I work remotely, I take pictures of everything I do and post them. I report how I use my budget and send it. I use written communication instead of verbal communication. (P19)

When individuals work remotely, they are far from opportunities to develop interpersonal networks within the organization. Fear of missing opportunities, such as an informal interactive learning process, a team synergy and sharing ideas with other employees, is one of the concerns about working remotely. This supports the finding of Cooper and Kurland's (2002) finding that remote workers were more likely to perceive themselves professionally and socially isolated because, interpersonal networks in organization prevented them from building relationships and accessing information that could advance their professional careers.

- I think that working from home may not be very advantageous in a situation where some people return to the office. Not being able to go to lunch, drink tea and coffee and chat can be annoying. In the office environment, I would like to continue to communicating and learning with those around me. (P14)

The View of Other People on Remote Workers

The statements of the participants regarding the perception of remote workers by their family and friends as if they are not working are as follows:

- Even though we are online all the time, we always finishing work, when we talk to people outside, we received such reactions as "Oh are you at home, Oh how nice of course." The house is comfortable and so on. I have never once put my feet up on the couch and worked. (P5)
- There may be boundary violations. My relatives act as if I'm on a vacation. (P14)
- "Aren't you already at home?" This question really makes me sick to my stomach. "Yes, I am at home, but I am working." Even our managers say "why didn't you reply, you know it's during working hours" if they don't receive a response shortly after sending a message. I am a human being and I maybe fulfilling my human needs when they send that message. (P19)

Due to the negative perspective of the environment on remote working, it is seen that the participants are uncomfortable with this situation and reduce their interest in the concept of remote working.

DISCUSSION AND CONCLUSION

Due to the inevitability of remote working with the Covid-19 pandemic, many employees were force to work from home, creating a context where the applicability of existing knowledge on remote working is questioned. In this study, conducted with 23 participants, we aimed to determine the experiences of each participant in the remote working process. We sought answers to the questions about advantages and disadvantages of compulsory remote working to see whether it would be preferred and possible to realize a transition to such model. The advantages and disadvantages of remote working were evaluated separately for each theme. We found that the themes of location and time flexibility differ depending on demographics of participants. Employees who had children or had dependents at home were often interrupted during their work hours and needed to create additional time during the day to finish their work. Location flexibility reduced the negative effects of uncontrollable physical factors such as uncontrollable noise, hygiene, heating and lighting in open office environments. In addition, it allowed people, who did not want to experience the traffic, noise and cost of living problems brought about by big city life, to work in rural areas. It may increase the employability of people in different cities and countries. Information and communication technologies, which enabled the employee to perform the act of working wherever and whenever s/he wanted, also allowed the employer to constantly monitor and supervise the employee, and moreover, to be able to reach the employee continuously regardless of working hours and workplace. Technological devices that provided access to work-related issues at any time, wherever and whenever, could actually become a means of infiltration of work into the time that should be reserved for rest. This caused more blurring of the boundaries rather than providing time flexibility (Naswall et al., 2008, p. 5; Kıcır, 2019, p. 178), eliminating the flexibility of the individual to determine her/his own time and making more effort to fulfil the demands. Therefore, it was of great importance to determine which hours the employee was available (Dimitrova, 2003).

Toygur Eroğlu, et al. (2023) found that relationships are negatively affected when the time spent working remotely during the day exceeds six hours. In addition, the perception of financial contribution and development of skills are also negatively affected.

If the work is result-oriented and the remote worker finds this way of working efficient in terms of time and location flexibility, remote working seems to be effective. Therefore, it would be appropriate to use remote working when both the nature of the job, the employee's finding it productive, and the organization's capabilities support it. Among the participants of this study we found that especially those working in software and result-oriented jobs were satisfied with this working model. For tasks that require communication and coordination, employees have to spend more time on one-on-one meetings or team controls due to physical separation of teams (Reisenwitz, 2020). Remote workers had concerns about how their performance would be evaluated, how their promotion processes would be determined, and how the audit would be conducted due to lack of visibility. These concerns went as far as the fear of being fired. Many companies saw giving their employees the right to control their work as an important motivational tool to

keep them in the company. In studies dealing with the relationship between remote work and the employee's level of personal control over job (Lim & Teo, 2000; Handy & Mokhtarian, 1996), it was emphasized that remote working could increase control over one's job if the job was complex and required autonomy, remote working could increase one's control over one's work. There is suggestion that people who prefer controlling the pace of their work and avoid in person interactions would be successful remote workers Bailey and Kurland (2002). It was also supported in our work that business-oriented people who liked to work online with their own schedule may prefer to work remotely.

In the remote working model, employees can have more authority, the opportunity to evaluate and control their mistakes in their own work life. As a result of the ease of recording information with the developing information technologies, the fact that the subject can be recorded, especially at the learning stage of a work, allows the individual working remotely to access this information and records when he/she needs it. This is a great advantage for the manager in terms of avoiding time loss. However, such a situation also imposes more responsibility on the remote worker. The fact that the flexibility of time and space in remote working imposes more responsibilities on the remote worker has also been supported by many studies (Dambrin, 2004).

Şimşek Demirbağ and Demirbağ (2022) showed that the full-time remote working system increases the burden on pandemic employees due to the absence of crisis management strategies for this process. Therefore, it may be useful to create more systematic remote working arrangements.

İlhan (2021) states that new legal regulations to be developed on remote working can help establishing work-life balance. Being at work makes it possible not only to socialize, but also to meet with colleagues every day without having to make any special arrangements or effort to meet. Similarly, the ability to take advantage of the social opportunities (shopping malls, cafes and restaurants) offered by the workplace and the environment in which it is located is seen as an advantage of commuting to and from the workplace. Some participants stated that greetings in the service bus or at the workplace made them feel that they belonged to the workplace. One of our participants stated that from a manager's perspective, even having a private room at the workplace provides status in order to draw more clear boundaries. In the online meetings he held with his team during the remote working period, he perceives becoming one of the frames on the screen as a situation that leads to a loss of status.

Office-based workers in Türkiye and around the world need a great deal of technological, sociological and psychological support and training to adjust to the new remote working model. Understanding how these sudden changes are experienced is important for practitioners as they chart forward on what is needed to meet the needs of employees. Authoritarian managers face different difficulties in motivating their employees in virtual environments compared to more participative and empathetic team managers, and therefore have different training and development needs. For remote working to become a successful workplace alternative, managers need to learn how to be effective remote mentors. During this period, many companies organized various trainings sessions, seminars and workshops for their employees under the name of the club for the "personal development" of their employees, or purchased them as a service from companies operating in this field and offered them to their employees. These clubs can be in the form of obtaining information on a new topic, such as artificial intelligence club, mobile technology club, or they can be in the form of clubs for healthy living and interests. Our participants requested that the companies they work with effectively implement such activities effectively in case of a transition to the remote working model after the pandemic. At this point, it emerges that there is a need for platforms where managers and employees can interact informally and develop interpersonal relationships. This is because the common values specific to the company, which are formed by the people working together, disappear in the remote working process, and the weakening of these values, which can be expressed as the business culture, causes the alienation of the employees towards the company.

Providing flexible time, flexible space, technologically appropriate work arrangements, and family-friendly work arrangements at home will be effective in helping remote workers adapt to this new way of working (Shirmohammadi et al. 2022). Başol and Çömlekçi (2022) developed an instrument to measure attitudes and perceptions towards remote working. In their study using this tool, they concluded that technical and social support, the work environment of remote organizations, and skill development practices (training, increasing digital skills, etc.) positively affect employees' attitudes toward remote working (Başol & Çömlekçi, 2022). The implementation of remote working in companies will vary depending on the type of the work, the suitability of

the organization and the department where the work is done, and the needs and expectations of the employee. Transparency of working hours, job descriptions and the identity of contact persons will be preferred by employees as it reduces uncertainty in the remote working model.

This study is limited to employees working in large companies operating in Ankara, Istanbul and Izmir. In future studies to be conducted with remote workers living in different provinces, their remote working experiences can be compared with the remote working experiences of employees working in big cities. Employee's experiences will ensure the effectiveness of the policies that organizations will develop for remote working practices. In future studies, it is thought that conducting comparative international studies that analyse employees' remote working experiences through in-depth interviews will contribute to the remote working literature.

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Glass Ceiling Syndrome: A Perspective of Women Working In Health Institutions

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ABSTRACT

Background and Purpose: Although women constitute the majority of the workforce in the healthcare sector, the number of representations in management positions needs to be increased. This study aimed to determine female health workers' glass ceiling syndrome perception levels and examine socio-demographic variables' effect on this level.

Design/methodology/approach: The research sample consists of 708 female healthcare professionals who work in six public hospitals. Perceptions were measured using the 42-item Glass Ceiling Perception scale. Measurements were made on a 5-point Likert scale ranging from 0 to 4.

Findings: It was found that the glass ceiling syndrome perception levels of female healthcare professionals were neutral (1.94). It has been determined that female healthcare professionals with a high level of education, doctors and nurses, those between the ages of 26-35, those who work in medical units, and those with a child have higher perception levels of glass ceiling syndrome.

Keywords: Glass Ceiling Syndrome, Career Barriers, Female Healthcare Professionals, Female Managers.

JEL Classification Codes: M10, J70, M50, I19

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INTRODUCTION

Over the course of two decades, there has been a noteworthy rise in the presence of women in the workforce, mirroring the global economic, social, and cultural advancements. Working life for women also includes various obstacles as well as many advantages. "These obstacles manifest themselves both in factors affecting the decision-making processes of women in entering the business life, in the difficulties they face when searching for a job in the labor market and the recruitment process, and in front of their promotion to management positions in institutions" (Gülbay, 2012; Irmak, 2010). Similarly, Maume (1999) stated that there are barriers to gender and race in front of promot ion to a management position.

According to the United Nations Gender Social Norms Index Report, there are prejudices regarding gender worldwide, regardless of the level of human development. One of these prejudices is the belief that men make better business executives and political leaders than women (UNDP, 2023). There are other supporting data that reinforce the findings of the mentioned report. Among 67 nations surveyed in 2019, Iceland exhibited the most noteworthy rate of male labor force engagement among individuals aged 15 and above, reaching 84.9%, whereas Moldova demonstrated the lowest rate at 47%. Iceland boasted the highest rate of female labor force participation at 77.4%, while Jordan had the lowest, with only 13.4% of female participating in the workforce. The female workforce rates in some other countries are as follows; USA 57.4%, Germany 56.6%, China 66.7%, Italy 41.3%, the UK 58.5%, and France 51.3%. The ILO estimated approximately the same year that the proportion of female managers worldwide is 27.9%, 22.4% in low-income countries, and 35% in high-income countries. According to ILO's "Women in Management in 2019" data, the highest rate of middle and senior management were in Iceland at 44.3%, and the lowest was in Jordan at 13.4% (International Labour

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Organisation Statistic (ILOSTAT, 2020). When examining the representation of individuals within managerial roles and the proportion of female in the labor force, both within the context of Turkey and globally, it is evident that in the year 2019, the labor force participation rate stood at 72% for men and 34.4% for women in Turkey (TSI, 2020).

In spite of the increasing participation of women in the labor force, both within Turkey and on a global scale, there persists a necessity to enhance the level of female representation within executive leadership positions to align with the envisaged proportions. According to the research, many reasons prevent women from promoting to managerial positions. One of these rationales pertains to the glass ceiling barrier, a subject of scholarly investigation in recent times (Mizrahi & Aracı, 2010; Stainback et al., 2016).

Substantial strides have been taken in Turkey towards mitigating disparities in women's education and workforce participation. Aycan (2006) asserts that there is a noticeable rise in the presence of women within the Turkish industrial sector; nonetheless, these individuals encounter specific impediments in their path towards attaining executive roles. Moreover, this situation is not unique to Turkey. Numerous scholarly investigations have consistently highlighted the limited presence of women in prominent management positions, exhibiting a pattern of underrepresentation that spans diverse cultures and countries on a global scale (Alobaid et al., 2020; Budhwar et al., 2013; Desvaux et al., 2007). Considering the fundamental principles of human resource management, such as equality, diversity, career, selection, development, and representation in management (Ahammad, 2017; Sharma, 2023), the inability of women to attain executive positions is an unexpected situation in today's world. Particularly, the investigation of this situation in the health care sector, which is predominantly female-oriented, has become a subject of interest (Johns, 2013). This increasing interest, constitutes the fundamental motivation behind the cross-sectional screening study we conducted in hospitals.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Glass Ceiling and its Causes

Glass ceiling is employed to typify the impediments that impede the progression of women, irrespective of their accomplishments, and which are both elusive in discernibility yet resistant to resolution. This concept emerged in the USA in the 1970s (Wirth, 2001). Consistent with the provided information, the conceptualization of the "Glass Ceiling" metaphor pertains to imperceptible obstructions that stem from ingrained organizational biases and established paradigms, necessitating adept women to surmount these barriers in their pursuit of ascending to elevated echelons within the professional hierarchy (Buscatto & Marry, 2009; Wirth, 2001).

Glass ceiling is symbolically represented by its transparency akin to glass, affording women a perceptual insight into upper echelon positions attainable within an organizational hierarchy. However, its transparency does not change that the barrier is a ceiling that prevents women from reaching these positions (Morrison & Von Glinow, 1990).

It can be said that even in today's advanced societies, working life is characterized by the ideologies of the powerful ruling class and the constantly ongoing gender barriers (Hoobler et al., 2010). For this reason, many women complain that their qualifications and professional competencies are subject to a double standard in the work environment. Many women experience a sense of frustration in the professional field. This situation is expressed as an invisible obstacle, "a glass ceiling" built by men and society for women (Ailes & Kraushar, 2000). Rarely these glass ceilings are cracking in some sectors, but injustices such as unequal salaries stand out (Commission & Labor, 1995; Kräft, 2022).

In theory, the categorization of barriers pertaining to the glass ceiling varies. From an integrative point of view, glass ceiling barriers combine three primary factors: individual, organizational, and social barriers. Personal obstacles encompass the various roles individuals juggle and the personal inclinations and viewpoints of women. On the other hand, institutional hindrances involve factors like the culture and politics within an organization, the absence of mentorship, and the challenge of engaging in informal communication networks. Social barriers are explained as occupational segregation and stereotyping (Taşkın & Çetin, 2012). Melanie Lockert confirms the existence of the glass ceiling in her article on Business Insider, suggesting that these barriers may stem from social norms, patriarchal culture, women's preferences for flexible jobs, and their tendency to negotiate less in terms of work and salary (Lockert, 2022).

Smith et al. (2012) predicts that the glass ceiling in business life globally will continue for many years.

Cassirer and Reskin (2000) found that women do not care about promotion opportunities as much as men. Hoobler et al. (2010), who conducted a meta-analysis based on 96 studies, concluded that conflicts carried from work to home and from home to work constitute a glass ceiling. It has been concluded that mainly family-work conflict negatively affects work performance. Cech and Blair-Loy (2010) delved into the determinants that underlie the inadequate presence of femail in management positions across the domains of technology and science. The outcomes of their study revealed that the primary factors influencing the presence of the glass ceiling are the organizational culture and managerial dispositions. They also found that different careers and different family situations differentiated the situation. The aforementioned research revealed that women possessing advanced educational qualifications and occupying leadership positions at the highest echelons of an organization are susceptible to heightened levels of gender-based disparities.

Snavely (1993) investigated the reasons for the poor management skills of female managers. In that research, it was concluded that factors such as women not being included in the informal communication network by their male friends within the organization, evaluating their management performances with different criteria, having conflicts between manager and family roles, and defining career and job descriptions suitable for men's values cause women's management skills to be weak. Bagues and Esteve-Volart (2010) investigated whether there was any gender discrimination in recruitment in the interview commissions in Spain between 1987 and 2007. This study has concluded that women's chances are lower when a woman or man candidate applies for the same position.

Interestingly, the same research revealed that most women evaluators in the interview commission resulted to the detriment of women because women often evaluate the qualifications of male candidates at a higher level than they are. In their research conducted in 157 countries, Ferber and Lowry (1977) argued that one of the indicators of gender discrimination is the separation of jobs into "male's" and "female's" jobs." They stated that the business lines in which women work extensively differ from country to country, but this is caused by management style, culture, and religion, not gender. Kee (2006) concluded that the primary determinant of the wage disparity is gender, and a more pronounced glass ceiling phenomenon exists within the puclic sector as opposed to the private in the context of Australia. Women highlighted their family responsibilities and paid more attention to their families' needs than their career goals (Jones & Oppenheim, 2002).

The main aim of this study is to ascertain potential variations in the perception of the glass ceiling phenomenon drawing upon the socio-demographic characteristics of women employees working within secondary and tertiary healthcare institutions situated in Trabzon. The subsequent hypotheses, formulated for the purpose of empirical examination, are delineated as follows.

Many researchers have demonstrated that married women have a high glass ceiling perception due to their responsibilities (Buddhapriya, 2009; Jordan & Zitek, 2012). Research findings indicate that unmarried women are considered more compatible with consulting firms compared to their married counterparts. This inclination is attributed to their perceived dedication to career advancement, adeptness in achieving professional success, limited engagement in social obligations, and greater willingness to invest extended periods of work. The study further asserts that the commitment and occupational efficacy of women tend to decline following recent marriage; conversely, newly married men exhibit an augmentation in commitment levels and job performance (Jordan & Zitek, 2012). Owing to the dedication required for familial obligations which exert a notable impact on their professional trajectories, it has been found that married and widowed or divorced women face difficulties in business life and more barriers in their career development than single women (Buddhapriya, 2009). This current study proposes the following hypothesis:

$H_{1:}$ Glass ceiling syndrome varies according to marital status.

Enid Kiaye and Maniraj Singh (2013) found that women in Durban adopt the idea that they do not have the desired experience and education to take management positions. Sampson and Moore (2008) found that although women have the same education and experience as men, glass ceilings are common in the UK, women take fewer senior positions, and women are paid less. Cech and Blair-Loy (2010) found that women with higher degrees are more exposed to gender inequality. Akyurt (2018) found a difference in glass ceiling syndrome according to education status. However, Kılıç

and Çakıcı (2016) and Uysal and Ak (2020) argued that the glass ceiling syndrome does not change according to education status. This study proposes the following hypothesis:

H_2: Glass ceiling syndrome varies depends on educational status.

The research conducted by Köksal (2016) as well as Akkum and Ulusoy (2019) underscored the significance of occupational distinctions in contributing to the phenomenon of the glass ceiling syndrome. Parallel conclusions were drawn in the investigation carried out by

In the study by Soysal and Baynal (2016), it was established that the glass ceiling syndrome exhibits a more prominent manifestation within the medical doctor profession. Albrecht et al. (2003) shed light on the persistent existence of the glass ceiling across various sectors and occupational categories in Sweden throughout history. This study puts forth the subsequent hypothesis:

H_3: Glass ceiling syndrome varies depending on the profession.

Jones and Oppenheim (2002) found that women did not encounter any obstacles until their forties, but glass ceilings were formed for them after that age. Sever (2016) found that the rate of exposure to glass ceiling syndrome in older people decreased. Uysal and Ak (2020) suggested that glass ceiling syndrome does not differ according to age. This study proposes the following hypothesis:

H_4: Glass ceiling syndrome varies depending on age groups.

Soysal and Baynal (2016) determined that women working in the administrative unit have higher glass ceiling perceptions. This study proposes the following hypothesis:

H_5: Glass ceiling syndrome varies depending on the duty area.

Jackson (2001) states that family life is also an obstacle because women prefer their families over their careers. Sever (2016) identified an inverse relation between the quantity of offspring and the prevalence of the syndrome. He argued that women with more children were exposed to fewer glass ceilings. This study proposes the following hypothesis:

H_6: Glass ceiling syndrome depends on the number of having children.

METHOD

Participants

The research population consists of all female employees (doctors, nurses, managers, administrative staff, and other health technicians) working at six hospitals in Trabzon city center. The research aimed to reach the whole population without using the sampling method. However, the number of volunteering employees has been limited to 708 people because health institutions' service cannot be postponed and is continuous. In 2021, the data were obtained by survey. All female employees in the hospitals where the research was conducted were invited to the study one by one. Everyone who participated voluntarily was included, and no one was excluded. Although the response rate is 20%, it is known that the predictive power of a sample of 708 people at the 95% confidence interval is high.

Data and Analysis

The survey consists of 42 questions, two parts, and nine sub-dimensions. In the first part, there is a "Personal Information Form" to obtain the socio-demographic information of the female employees. In the other part, there is a "5-Likert Scale" to determine glass ceiling syndrome of female employees. The questionnaire form used in the research was developed by Irmak (2010), using scales Karaca (2007) and Sezen (2008) in their master theses. After the changes and additions made by Irmak (2010), a reliability analysis was made, and it was calculated as 0.826. The scale has nine sub-dimensions.

Analysis of Data

The SPSS 25 program was utilized for conducting the analysis. Initially, the program was employed to compute descriptive statistics pertaining to the study participants. Subsequently, the program was utilized to determine the standard deviation (sd) and mean (x) values of the scale and its constituent dimensions. The subsequent step involved the examination of disparities in the means of the variables relating to socio-demographic and occupational factors, as outlined in the initial section of the data collection tool. Given the absence of normal distribution assumptions within the study data, non-parametric methods were employed for the subsequent analysis.

RESULTS

The total number of participants is 708 people. It was determined that 37.3% of the participants (264) were between the ages of 26-35, 36.2% (256) were between the ages of 36-45, 68.5% (485) were married, 47.6% of them (337) had a bachelor's degree, 25.6% (181) had 21 years or more of experience, 59.6% (422) worked in medical units, 38.3% (271) were other staff and 37.1% (263) were nurses.

Table 1. Socio-Demographic Variables of the Participants

Variables		N	%
Age	25 and below	68	9,6
	26-35	264	37,3
	36-45	256	36,2
	46-55	109	15,4
	56 and above	11	1,6
Educational Degree	Primary Education	24	3,4
	High School	106	15,0
	Associate Degree	175	24,7
	Undergraduate	337	47,6
	Postgraduate	66	9,3
Marital status	Married	485	68,5
	Single	200	28,2
	Other	23	3,2
Working Area	Medical Unit	422	59,6
	Administrative Unit	120	16,9
	Other	166	23,4
Profession	Doctor	56	7,9
	Nurse	263	37,1
	Manager	17	2,4
	Administrative Staff	101	14,3
	Other	271	38,3
Number of Children	No	241	34,0
	1	124	17,5
	2	241	34,0
	3	90	12,7
	4 and above	12	1,7
Professional Experience Period (years)	1-5	136	19,2
	6-10	138	19,5
	11-15	142	20,1
	16-20	111	15,7
	21 and above	181	25,6

The glass ceiling syndrome scale characteristics, which consist of 9 sub-dimensions, are given in Table 2. According to the research, the overall mean of the scale was found to be 1.94. In dimension of glass ceiling syndrome with the highest mean was "Mentoring," with 2.46, and the lowest average was "Negative Prejudices against Women," with 1.069.

Distinction" dimension mean scores was found to be significant. On the other hand, it was found that the mean scores of the Negative Prejudices against Women, Family Life, Gender Discrimination, and Obstacles in the Advancement of Women in Career Levels did not show a significant difference at the level of 0.05 according to the education degree.

Table 2. Glass Ceiling Syndrome Sub-Dimensional Characteristics

Scale and Dimensions		**Mean**	**Sd**	**Cr. A.**
Individual	Factors in the Promotion of Women's Career Ladder (FPWCL)	2,32	0,93	0,740
	Family Life (FL)	2,27	0,73	0,573
Organizational	Obstacles Caused by Upper Management (OCUM)	2,01	0,78	0,201
	Organizational Culture and Policies (OCP)	2,04	0,87	0,733
	Informal Communication Networks (ICN)	2,28	0,74	0,351
	Mentoring (M)	2,46	1,21	
Social	Gender Discrimination (GD)	1,66	0,61	0,586
	Negative Prejudices Against Women (NPAW)	1,06	0,69	0,595
	Professional Distinction (PD)	2,32	0,99	0,493
Total		1,94	0,44	0,812

Table 3 shows the standard deviation (sd) and mean values of glass ceiling syndrome perception levels according to various variables such as marital status, education degree, occupation, age, unit of work, and the number of children. In addition, statistical analysis results are included in determining the differences between the means for each variable.

The statistical analysis revealed that there was no statistically significant disparity observed in the glass ceiling syndrome and its associated sub-dimensions based on marital status. As a result of the analysis, the initial hypothesis H1 was refuted, indicating that there existed no discernible divergence in the levels of the syndrome among female healthcare professionals in relation to their marital statuses.

Table 3 shows the test statistics on whether the difference in the perception of glass ceiling syndrome of female healthcare workers according to their education degree is significant. According to the education degree of female health workers, the difference between the "Mentoring", "Barriers Arising from Senior Management", "Organizational Culture and Policies", "Informal Communication Networks", and "Occupational

The mean score of the Barriers Arising from Senior Management sub-dimension of the female healthcare professionals with a postgraduate degree is higher than the others. The mean score of female healthcare professionals with undergraduate degrees is also higher than high school graduates. Organizational Culture and Policies sub-dimension mean score of female healthcare professionals with a postgraduate degree was higher than that of primary and high school graduates.

Furthermore, the study revealed that the average scores of individuals who have completed their undergraduate studies surpass those of high school graduates, while the average scores of high school graduates exceed those of primary school graduates. Moreover, the research findings indicated that within the subgroup of female healthcare professionals holding postgraduate degrees, the mean score pertaining to the Informal Communication Networks sub-dimension was higher compared to those with primary and high school education. Additionally, individuals possessing an undergraduate degree exhibited a higher mean score in this sub-dimension compared to their counterparts with only a high school education. In the sub-dimensions of

Table 3. Means of Glass Ceiling Syndrome Scale and Dimensions in Terms of Various Variables

Variables		N	Individual				Organizational								Social						Total	
			FPWCL		FL		OCUM		OCP		ICN		M		GD		NPAW		PD			
			x̄	s	x̄	s	x̄	s	x̄	s	x̄	s	x̄	s	x̄	s	x̄	s	x̄	s	x̄	s
Marital Status	Single	200	2,40	0,87	2,26	0,75	2,01	0,74	2,06	0,83	2,34	0,69	2,43	1,24	2,66	0,62	1,04	0,74	2,42	0,99	1,95	0,43
	Married	485	2,27	0,95	2,29	0,73	2,02	0,80	2,04	0,88	2,27	0,77	2,48	1,19	1,67	0,62	1,08	0,68	2,28	1,00	1,94	0,45
	Other	23	2,76	0,87	2,05	0,76	1,84	0,70	1,93	1,00	2,15	0,74	2,46	1,44	1,67	0,59	1,13	0,56	2,33	1,14	1,93	0,44
	Sig. (p)		**0,017**		0,291		0,520		0,815		0,611		0,904		0,936		0,384		0,233		0,853	
	Post Hoc		2,3																			
Educational Status	Primary	24	2,62	0,96	2,24	0,81	1,51	0,77	1,54	0,82	1,99	0,57	1,50	1,47	1,68	0,59	1,12	0,78	1,38	1,33	1,75	0,483
	High Sc.	106	2,43	0,96	2,13	0,86	1,75	0,77	1,70	0,79	2,03	0,80	2,36	1,34	1,66	0,69	1,04	0,76	2,13	1,14	1,82	0,49
	College	175	2,29	0,89	2,29	0,75	1,96	0,77	2,02	0,83	2,27	0,75	2,50	1,20	1,64	0,61	1,01	0,72	2,32	0,95	1,92	0,43
	Bachelor's	337	2,27	0,94	2,29	0,70	2,07	0,75	2,14	0,88	2,35	0,73	2,52	1,15	1,68	0,62	1,11	0,68	2,40	0,95	1,98	0,44
	Post Graduate	66	2,44	0,93	2,41	0,57	2,44	0,78	2,33	0,84	2,56	0,65	2,64	1,12	1,67	0,57	1,04	0,56	2,57	0,74	2,09	0,34
	Sig. (p)		0,164		0,257		**0,001**		**0,001**		**0,001**		**0,010**		0,962		0,390		**0,000**		**0,000**	
	Post Hoc						(5-1,2,3,4)		(5-1,2,3,4)		(5-1,2)		(1-2,3,4,5)						(5-1,2,3,4)		(5-1,2)	
Profession	Physician	56	2,63	0,86	2,44	0,55	2,52	0,70	2,25	0,77	2,57	0,68	2,52	1,18	1,59	0,51	0,94	0,49	2,47	0,90	2,07	0,34
	Nurse	263	2,23	0,91	2,38	0,72	2,07	0,73	2,12	0,86	2,33	0,74	2,51	1,14	1,71	0,61	1,17	0,71	2,42	0,96	1,99	0,43
	Manager	17	2,46	0,91	2,29	0,61	2,18	0,61	2,20	0,98	2,29	0,84	2,24	1,30	1,65	0,64	1,11	0,95	2,18	1,25	1,98	0,44
	Adm. Staff	101	2,32	1,00	2,17	0,82	1,95	0,82	2,02	0,91	2,23	0,73	2,41	1,32	1,73	0,64	1,05	0,72	2,23	1,09	1,92	0,47
	Others	271	2,35	0,93	2,18	0,75	1,86	0,80	1,93	0,87	2,21	0,76	2,46	1,25	1,62	0,64	1,00	0,68	2,23	1,00	1,87	0,46
	Sig. (p)		**0,033**		**0,002**		**0,001**		**0,007**		**0,010**		0,949		0,192		**0,033**		0,112		**0,001**	
	Post Hoc		(1-2,4,5)		(2-1,3,4,5)		(1-2,4,5)		(2-1,3,4,5)		(1-2,4,5)						(2-1,3,4,5)				(1,2-3,4,5)	
Age	25-	68	2,51	0,78	2,33	0,75	2,09	0,71	1,95	0,70	2,35	0,55	2,56	1,14	1,75	0,58	1,03	0,76	2,53	0,90	1,99	0,39
	26-35	264	2,34	0,93	2,40	0,71	2,03	0,79	2,04	0,86	2,31	0,74	2,52	1,19	1,66	0,56	1,09	0,65	2,40	0,98	1,97	0,41
	36-45	256	2,21	0,97	2,21	0,74	1,97	0,76	2,02	0,87	2,26	0,73	2,44	1,21	1,67	0,64	1,09	0,72	2,33	1,00	1,91	0,46
	46-55	109	2,43	0,93	2,14	0,74	2,03	0,84	2,17	0,96	2,32	0,85	2,35	1,29	1,64	0,70	1,02	0,70	2,03	1,02	1,92	0,50
	56+	11	2,43	0,78	1,86	0,77	2,06	1,09	1,91	1,10	1,74	1,13	2,46	1,57	1,65	0,91	0,71	0,57	1,86	1,36	1,75	0,57
	Sig. (p)		0,060		**0,001**		0,843		0,494		0,411		0,801		0,627		0,303		**0,006**		0,384	
	Post Hoc				(2-,3,4)														(1,2-4)			
Working Area	Medical	422	2,34	0,91	2,31	0,71	1,07	0,69	2,08	0,86	2,33	1,18	2,47	1,18	1,68	0,6	2,05	0,78	2,38	0,95	1,96	0,43
	Administrative	120	2,25	0,95	2,17	0,73	1,07	0,7	2,08	0,86	2,39	1,25	2,39	1,25	1,66	0,6	2,08	0,76	2,28	1,00	1,92	0,45
	Other	166	2,32	0,96	2,24	0,78	1,06	0,68	1,91	0,81	2,49	1,26	2,49	1,26	1,62	0,65	1,85	0,77	2,19	1,08	1,87	0,46
	Sig. (p)		0,781		0,085		**0,004**		0,076		0,068		0,765		0,481		0,989		0,131		**0,027**	
	Post Hoc						(1,2-3)														(1-3)	
Number of Children	No	241	2,40	0,89	2,22	0,75	2,04	0,74	2,04	0,85	2,34	0,69	2,37	1,23	1,62	0,62	1,01	0,68	2,38	0,97	1,93	0,44
	1	124	2,38	0,88	2,44	0,71	2,08	0,83	2,20	0,91	2,39	0,74	2,66	1,18	1,78	0,59	1,13	0,61	2,61	0,89	2,06	0,43
	2	241	2,29	0,97	2,27	0,74	2,02	0,81	2,03	0,87	2,26	0,81	2,53	1,19	1,67	0,62	1,07	0,73	2,21	1,05	1,93	0,45
	3	90	2,13	1,01	2,25	0,67	1,86	0,73	1,92	0,83	2,13	0,67	2,41	1,21	1,66	0,63	1,20	0,71	2,21	0,96	1,88	0,42
	4 and over	12	2,48	0,86	1,95	0,82	1,81	0,92	1,60	0,95	1,81	0,95	1,67	1,44	1,49	0,53	0,73	0,62	1,29	0,99	1,62	0,48
	Sig. (p)		0,134		**0,047**		0,311		0,088		**0,010**		**0,038**		0,076		**0,040**		**0,001**		**0,002**	
	Post Hoc				(2-1,5)						(2-5)		(2-5)				(3-1)		(1,2-5)		(2-1,3,4,5)	

Mentoring and Professional Distinction, the mean scores of female healthcare professionals with postgraduate, undergraduate, and associate degrees are higher than those with primary education. It was determined that the syndrome levels in female healthcare professionals with a postgraduate degree are higher than in primary and high school graduates.

It was determined that the difference in the glass ceiling syndrome perception levels of female health professionals depending on the education degree was statistically significant at 1%, and the H2 hypothesis was accepted.

Table 3 also shows the test statistics on whether the difference in the perception of glass ceiling syndrome of female healthcare workers according to their profession is significant.

It was found that the difference between the mean scores of Barriers Arising from Senior Management ($p<0,01$), Negative Prejudices against Women ($p<0,05$), Family

Life (p <0,01), Obstacles in the Promotion of Women in Career Steps (p<0,05), Organizational Culture and Policies (p<0,01), Informal Communication Networks (p<0,05) sub-dimensions and Glass Ceiling Syndrome (All) (p<0,01) was statistically significant according to the professions of female health professionals. In addition, it was concluded that there was no significant difference in Gender Discrimination, Mentoring, and Occupational Discrimination sub-dimensions according to the professions variable.

According to their professions, the physicians' mean scores were higher than the nurses, administrative and other female health professionals in the sub-dimensions of "Obstacles Arising from Senior Management", "Obstacles in the Advancement of Women in Career Steps", and "Informal Communication Networks". It was determined that the mean scores of nurses were higher than other female health professionals in the sub-dimensions of "Negative Prejudices against Women", "Family Life", "Organizational Culture and Policies". At the perception levels of glass ceiling syndrome, it was determined that the mean scores of doctors and nurses were higher than other female healthcare professionals.

As a result of the analysis, it was determined that the difference in the glass ceiling syndrome perception levels of female health professionals according to the professions was statistically significant at 1%, and the H3 hypothesis was accepted.

The test statistics on whether the difference in the perception of the glass ceiling syndrome of female healthcare professionals according to their ages is significant or not is presented in Table 3. The table determined that the difference between the mean scores calculated for the determined age ranges of female healthcare professionals only for the Family Life and Occupational Discrimination sub-dimensions was significant at a 1% level.

According to age groups, the Family Life subscale means a score of female healthcare professionals between the ages of 26-35 was determined to be higher than those between the ages of 36-45 and 46-55. When the mean scores of Occupational Distinction were examined, it was determined that female healthcare professionals under 25 and between the ages of 26-35 had a higher mean score than those between 46-55.

It was concluded that the difference between the mean scores calculated for glass ceiling syndrome and sub-dimensions by age groups was not different. Therefore, the H4 hypothesis was rejected.

Significant distinction was observed solely in the mean scores pertaining to "Obstacles Arising from Senior Management" and the cumulative scores of the "Glass Ceiling Syndrome," with respect to the occupational domains of female healthcare practitioners. Conversely, it was deduced that there existed no statistically notable distinction across the remaining sub-dimensions with regard to the domains of responsibility.

According to the results of the Bonferroni post-hoc analysis, which was conducted to determine the sources of differences that occur according to the field of duty of female health professionals, it was determined that the mean scores of the Barriers Arising from the Senior Management sub-dimension of female healthcare professionals in medical and administrative units were higher than other personnel. In addition, the glass ceiling syndrome perception level of female healthcare professionals in medical units was higher than those working in other units.

Based on the analysis conducted, it was established that a statistically significant disparity exists at a significance level of 5% in the perception levels of the glass ceiling syndrome among healthcare workers, contingent upon their respective fields of duty. Consequently, the H5 hypothesis was affirmed.

Test statistics on whether the difference in the perception of glass ceiling syndrome according to the number of children of female healthcare professionals is significant or not is presented in Table 3. According to the test results, the differences between the mean scores of "Negative Prejudices against Women", "Family Life", "Informal Communication Networks", "Mentoring", "Professional Discrimination" sub-dimensions and "Glass Ceiling Syndrome" (total) according to the number of having children of female healthcare professionals was found to be significant. However, it has been determined that there is no difference in the sub-dimensions of "Obstacles Arising from Senior Management", "Barriers to the Advancement of Women in Career Steps", "Organizational Culture and Policies, and Gender Discrimination" according to the number of children.

Mean score of Negative Prejudices against Women of female healthcare professionals who have three children was higher than those without any children. Family Life means the score of female healthcare professionals with one child was higher than those with no children and those with four or more children. The Informal Communication Networks mean score of female healthcare professionals with one child was higher than

those with three children, and their Mentorship mean score was higher than those with four or more children. Mean score of Professional Discrimination of female healthcare professionals with no children and one child was higher than those with four or more children. The glass ceiling syndrome perception levels concluded that those with one child had higher mean scores than those with two, three, four, or more children.

Consequent to the conducted analysis, a statistically significant variation in the levels of the glass ceiling syndrome among female healthcare professionals was ascertained in relation to children they have, reaching a significance level of 1%. Accordingly, the H6 hypothesis was corroborated and accepted.

DISCUSSION AND CONCLUSION

The health sector increasingly continues to be a sector dominated by women. Despite the overwhelming majority of women in preventive healthcare services and hospitals where treatment services are concentrated, the number of women healthcare professionals in management positions is insufficient. In this respect, determining the sub-dimensions that are thought to affect the glass ceiling syndrome the most and socio-demographic characteristics can be an effective guiding tool in solving this problem.

It was determined that the opinions of women working in hospitals in Trabzon regarding glass ceiling syndrome were at a moderate level ($\bar{x} = 1.94 \pm 0.44$). The investigation revealed that the "Mentoring" sub-dimension of the glass ceiling syndrome exhibited the highest mean score, recording a value of 2.46. This situation indicates that women agree with the idea that "there are not enough female managers to be role models for women." On the other hand, it was determined that the lowest average of 1.069 is the "Negative Prejudices Against Women" sub-dimension. This situation indicates that the participants disagree with the thought that there are negative prejudices against women in hospitals in Trabzon. In light of this, there is a prevailing belief that effective mentorship and robust support are essential factors in breaking down the barriers of the glass ceiling. This is also emphasized in McKinsey's report (Desvaux et al., 2007). The report suggests actions such as providing external coaching services for women, offering leadership development programs, initiating initiatives to nurture potential women leaders, and creating networks specifically tailored for women.

Perceived level of glass ceiling syndrome differs depending on the education status, profession, age, duty area, and the number of children of female healthcare workers. The research has unveiled that the glass ceiling phenomenon is more pronounced among female healthcare professionals pursuing postgraduate education, in comparison to those who have completed primary and high school education. Similarly, it was found that attitudes toward female managers differ according to their education degree the study by Akkum and Ulusoy (2019). However, Kılıç and Çakıcı (2016) argued that the perception of the glass ceiling does not change depending on the education degree. At the glass ceiling syndrome perception level, the mean scores of doctors and nurses are higher than other female health professionals. The studies of Köksal (2016) and Akkum and Ulusoy (2019) found that occupational difference is practical at the perception level of glass ceiling syndrome. Similar findings were reached in the study of Soysal and Baynal (2016), and the research revealed that the extent of glass ceiling syndrome perception was more pronounced among physicians compared to their counterparts in the broader healthcare profession. In the study conducted by Cech and Blair-Loy (2010), it was concluded that workers with higher education are exposed to more gender inequality. According to the field of duty, syndrome levels of female healthcare workers in medical units were found to be higher than those working in other units. Contrary to this result, Soysal and Baynal (2016) found that women working in administrative units had a higher perception level of glass ceiling syndrome. According to the number of children, it was concluded that the glass ceiling syndrome level was higher in those with one child than in those with two, three, four, or more children. This finding contradicts the belief that females may experience the syndrome due to challenges in balancing work-family life.

Changes at the perception level of glass ceiling syndrome depending on the individual, organizational and social factors are presented below. It was determined that there is a difference according to socio-demographic characteristics in all sub-dimensions of the glass ceiling except for the "Gender Discrimination" sub-dimension.

Changes in the glass ceiling syndrome perception level depending on individual factors are evaluated according to the sub-dimensions of "Factors in the Promotion of Women's Career Ladder" and "Family

Life" and are presented below. Glass ceiling syndrome differs depending on marital status and occupation according to the "Factors in the Promotion of Women's Career Ladder" sub-dimension. According to the profession, the scores of the doctors were higher than the nurses, administrative, and other female health professionals. According to marital status, the scores of divorced or widowed female health professionals were higher than those of married. Similar to the results of this study, Öztürk and Bilkay (2016) found that the perceived level of glass ceiling syndrome is higher in widowed or divorced women. Married women feel fewer obstacles in becoming managers. This situation could also be an indicator of the continuous support they would receive from their husbands.

On the contrary, Kılıç and Çakıcı (2016) found that married female employees experience a lower perception level of glass ceiling syndrome than single women. It has been determined that the perceived level of glass ceiling syndrome that occurs depending on the "Family Life" sub-dimension differs depending on the profession, age, and number of children. Nurses' family life sub-dimension scores were higher than other female healthcare workers. According to age, the score of female health professionals between the ages of 26-35 was determined to be higher than those between the ages of 36-45 and 46-55. Those with one child had higher scores than those with no children and four or more children. In the investigation conducted by Doğru (2010), it was brought to light that prevailing glass ceiling barriers are primarily attributed to individual factors. Parallel findings were drawn by Sezen (2008), who observed that a substantial proportion of employees encounter glass ceiling obstacles attributable to individual factors. Furthermore, Ünal (2015) asserted that the preeminent determinant giving rise to the glass ceiling phenomenon is indeed individual-oriented factors.

Similar to our findings, in Akyurt (2018), a notable disparity in the perception of the glass ceiling was observed based on the sub-dimension of organizational culture and policies, contingent upon variations in educational attainment. It has been determined that the level of the Informal Communication Networks sub-dimension differs depending on the education degree, profession, and the number of children. According to their educational status, the informal communication networks score of postgraduate female health workers is higher than those of primary and high school graduates; those with a bachelor's degree were higher than those with a high school degree. According to the profession, the doctors' informal communication network score was higher than that of nurses, administrators, and other female health personnel. According to the number of children, the score of those with one child was higher than those with three. Snavely (1993) stated that the problems faced by female employees in the management arena are that they are not included in the informal communication network by their male friends in the organization, and they experience conflicts between family roles.

It has been determined that the perceived level of glass ceiling syndrome, which occurs depending on the mentoring sub-dimension, differs depending on the educational status and the number of children. Mentoring scores of those with one child are higher than those with four or more children. According to educational status, the mentoring score of female health professionals with graduate, undergraduate, and associate degree graduates was higher than those with primary education graduates.

Likewise, Akyurt (2018) identified a notable distinction in the perception of the glass ceiling within the mentoring sub-dimension, contingent upon one's level of education. In the research conducted by Karcıoğlu and Leblebici (2014), elements such as organizational culture, institutional policies, scarcity of mentorship opportunities, and instances of professional discrimination emerged as the pivotal factors attributing to the phenomenon of the glass ceiling.

The study determined that female health workers with graduate, undergraduate, and associate degree graduates were exposed to occupational discrimination more than those with primary education graduates. It has been determined that female health workers under 25 and between the ages of 26-35 are exposed to occupational discrimination more than those between the ages of 46-55. Contrary to this research, Jones and Oppenheim (2002) suggested that women did not encounter any obstacles until their forties, but glass ceilings formed after this age. It has been determined that female health workers with no children and one child are exposed to occupational discrimination more than those with four or more children.

On the other hand, Ferber and Lowry (1977) showed that the occupations in which women work intensively differ from country to country, but this is caused by factors such as management style, culture, and religion, not gender. It has been determined that the level of Negative Prejudices Against Women differs depending on the profession and the number of children. It has been determined that nurses face higher levels of negative prejudice than other female health workers, and those with three children are more likely to face negative prejudice than those with no children. Similarly, Kiser (2015) and Moldovan (2015) showed in their studies that there are prejudices about women being managers. Hoşgör et al. (2016) found that female health workers with a master's degree were more exposed to negative prejudice than those with a high school degree. In their respective studies, Inel et al. (2014), Özyer and Orhan (2012), and Karaca (2007) have all underscored the societal impact on the manifestation of the glass ceiling phenomenon. Similarly, Akdöl's (2009) research has highlighted the role of social factors in the genesis of the glass ceiling. These scholarly inquiries collectively assert that the perpetuation of stereotypes, particularly directed at female employees, substantiates the glass ceiling.

It is essential for top managers in the health sector to support female health workers and adopt a management approach that will help highly motivated, determined, and talented workers overcome the career barriers faced by female health workers. On the other hand, although overcoming the glass ceiling obstacles requires a social and organizational effort, female health workers need to develop their self-confidence and show dedication to reach their goals to cope with this problem. Considering professional effects beyond supporting and training women in managerial positions, addressing the presence of women executives within the medical community at a policy level, and implementing quotas, will make the glass ceiling more fragile.

LIMITATIONS OF THE RESEARCH

The fact that the research was conducted only in 2nd-level, medium capacity and 3rd-level high-capacity education hospitals in the city center of Trabzon, private hospitals and clinics were not included, the research was cross-sectional, and lastly, male employees were not included in the sample are important limitations. In addition, this study does not aim to explore the causes of glass ceiling perception in society in depth. In future qualitative studies for this purpose, the staff's views on the glass ceiling could be examined in more detail. These studies might state different reasons and proposed solutions. Additionally, occupational groups could have distinct dynamics regarding the glass ceiling barriers and being managers. Conducting studies that consider this distinction could enrich the research in the healthcare sector.

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The Effect of Accounting Conservatism on Corporate Social Responsibility: Evidence from the Corporate Governance Index in Türkiye

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ABSTRACT

The purpose of this study is to measure whether the companies listed in the BIST Corporate Governance Index have conservative accounting policies and examine the impact of this conservatism on Corporate Social Responsibility (CSR) and its components. Panel data analysis was used in the study. Between the years 2013 and 2022, a total of 59 companies listed on the BIST Corporate Governance Index, for which complete data has been obtained, were included in the study. Out of these, 29 companies were included in the research, resulting in a total of 290 observations. The results mean that companies listed on the BIST Corporate Governance Index prioritize conservative accounting policies and apply them in their financial reports. Additionally, it has been determined that accounting conservatism has a positive impact on companies' CSR scores and their components, with a stronger influence on board of directors scores and stakeholder scores. This finding suggests that companies with conservative accounting policies prioritize the interests of internal management while also valuing external stakeholders.

Keywords: Accounting Conservatism, Corporate Social Responsibility, Stakeholder Theory, Agency Theory.

JEL Classification Codes: M41, M14

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INTRODUCTION

Accounting conservatism proposes an ideal reporting approach that safeguards the rights of parties involved in both explicit and implicit contracts in relationships among company stakeholders such as clients, suppliers, vendors, staff, and society at large. Researchers have provided valuable insights into the impact of capital structure, firm size, liquidation risk, growth opportunities, bargaining power, management mechanisms, and the gender of CEOs and CFOs on the level of conservative reporting (Ahmed & Duellman, 2007; LaFond & Watts, 2008; Francis et al., 2015). However, there is limited study on whether companies that prioritize corporate social responsibility and its applications also prioritize conservative reporting.

Stakeholder Theory (Friedman, 1970; Cennamo et al., 2008; Bhandari & Javakhadze, 2017) suggests that companies with a stakeholder-oriented approach prioritize the interests of their stakeholders in their corporate strategies. This includes protecting stakeholders from risks and fulfilling their responsibilities. Accounting conservatism and CSR both align with this theory by emphasizing the protection of stakeholders and considering their well-being beyond financial concerns. Legitimacy theory (Kuznetsov et al., 2009; Garanina & Aray, 2021) suggests that companies should behave in line with established norms, values, and societal expectations. This theory supports both CSR and stakeholder theory, emphasizing the importance of meeting informal moral norms and protecting stakeholder interests. Accounting conservatism and CSR can be seen as complementary approaches in protecting stakeholder rights and preventing managerial opportunism, with CSR operating based on moral considerations and accounting conservatism adhering to accounting rules.

Agency theory (Lins et al., 2017; Anagnostopoulou et al., 2021) opposes both CSR practices and accounting conservatism. Some studies indicate that companies may use stakeholder relationships to serve their own interests and employ CSR activities as a means to conceal wrongdoings and manage stakeholder perceptions. Managers may engage in CSR activities mainly for show, under stakeholder pressure. Additionally, CSR practices can lead to agency problems, and CSR activities may

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contribute to aggressive accounting practices due to knowledge asymmetry between internal and external stakeholders. Conservatism violates the principles of impartiality and documentation in accounting, leading to biased financial information and potentially larger problems in companies. However, despite these opposing views, conservatism practices do not harm stakeholder interests. Therefore, it is expected that there may be an inverse relationship between CSR and accounting conservatism.

The aim of this study is to measure whether the companies listed on the BIST Corporate Governance Index have conservative accounting policies and examine the effect on companies' conservatism on CSR and its components. To achieve this objective, data from companies listed on the BIST Corporate Governance Index between 2013 and 2022 were utilized. The study provides theoretical information on accounting conservatism and CSR. It then explores the relationship between these two concepts and describes the measurement methods for each. Following the literature review, the study presents an empirical research design and the findings. The study concludes with a section on results and recommendations.

THEORETICAL BACKGROUND

Accounting conservatism can be characterized as a precautionary approach that aims to protect the company against the risks and uncertainties inherent in its operations. It suggests that when the likelihood of a positive or negative outcome regarding future collections or payments is equally likely, the more cautious option should be chosen due to conservatism. However, if the probabilities of these outcomes are not equal, conservatism does not necessitate favoring the worse situation over the other (FASB: 1980: 37). It is essential to observe that conservatism in financial reporting does not imply a consistent and intentional understatement of net profit and assets. Rather, conservatism advocates for a prudent approach in financial statements, especially in relation to uncertainties for instance, the possibility of recovering doubtful debts and the estimation of useful lives of fixed assets (Lin and Chen, 1999: 519; IASB, 2002: Par. 37). In light of these explanations, accounting conservatism can be defined as follows:

A prudent approach to uncertainties and risks that may impact the presentation of financial information necessitates the suitable reporting of assets, liabilities, income, and payments. It involves prioritizing the least optimistic situation, considering potential losses rather than potential gains, for the benefit of company owners (Bellikli & Dastan, 2021: 334).

In the study conducted by Beaver & Ryan (2000), a different perspective on accounting conservatism was presented, distinguishing it into two categories: "conditional conservatism" and "unconditional conservatism". Conditional conservatism refers to situations where the book value of assets is not fully recognized in financial statements when it benefits the company, but it is recognized when it poses risks or disadvantages. On the other hand, unconditional conservatism involves the prudential consideration of potential expenses and losses while recognizing probable income and profits, shaping the balance sheet in accordance with accounting principles and materiality.

However, as evident from the explanations, the specific definition of this prudent approach has not been clearly stated, and the responsibility and authority in this regard have been delegated to the companies. Based on the aforementioned definitions and explanations, four elements related to accounting conservatism can be identified as prominent (Accounting Advisory Forum, 1995: 10).

- The concept of conservatism should be considered when conducting valuations.
- Only income and profits that exist as of the balance sheet date should be taken into account.
- Predictable expenses and losses from previous or current periods, whether or not they are reflected in the financial reports as of the balance sheet date, should also be considered.
- All depreciation allowances should be recognized in the financial reports as of the balance sheet date, regardless of their impact on the period's profit or loss.

Research has demonstrated that accounting conservatism can mitigate conflicts of interest by reducing knowledge asymmetry between internal and external stakeholders, thereby enhancing the effectiveness and efficiency of financial reporting (Watts, 2003; García Lara et al., 2009; Ruch & Taylor, 2015;). This allows shareholders to have confidence in the management of the company without constant monitoring, while company managers are held accountable. Additionally, conservatism helps to limit unnecessary and unproductive investments, mitigates market overreactions to good and bad news, and reduces the risk of stock price collapse, thereby

lowering the cost of equity (Ahmed et al., 2002). Ultimately, accounting conservatism acts as a mechanism that facilitates the alignment between shareholders and management by providing them with high-quality and useful information about the company (Ruch & Taylor, 2015).

Conservative reporting, as explained earlier, comes with costs for companies. This is due to the precautionary measures taken by companies that adopt conservative reporting to mitigate potential losses resulting from contract violations (Beneish & Press, 1993; Zhang, 2008). By recognizing potential losses in a timely manner and promptly recording them, companies can prevent operating losses stemming from contract violations, which naturally lead to increased operating expenses (Ball & Shivakumar, 2005; Zhang, 2008). Moreover, conservatism incurs costs for managers as well. Conservative accounting practices result in lower profits and a reduced book value of equity. Consequently, managers receive lower profit shares, incentives, and bonuses. Therefore, it can be argued that managers occasionally avoid conservative accounting policies since their dividends, bonuses, and premiums are influenced by the accounting process (Kim et al., 2013).

In summary, accounting conservatism serves as protect the interests of company shareholders, mitigate knowledge asymmetry between internal and external stakeholders, and align the interests of equity holders and lenders, thereby addressing agency problems. However, managers may choose to avoid conservative accounting policies due to the associated costs, as they are tasked with balancing the knowledge asymmetry between themselves and external stakeholders (Khan & Watts, 2009; LaFond & Watts, 2008; Kim et al., 2013).

The subsequent phase of this study focuses on Corporate Social Responsibility (CSR). CSR, which defines the boundaries of companies' economic, legal, moral, and voluntary responsibilities, has been a timely and ongoing topic in both academic literature and the business world for a considerable period of time. CSR can be defined as *the commitment of a company to enhance its reputation and ensure long-term sustainability by fulfilling legal and ethical obligations. It involves protecting the interests and well-being of all stakeholders, including employees, society, and the environment in which the company operates. The goal is to improve living standards, contribute to the economy, and uphold the dignity of stakeholders* (Dastan & Bellikli, 2015: 179-180).

Empirical evidence suggests that Corporate Social Responsibility (CSR) offers companies several advantages, including enhanced knowledge, increased investor confidence, and the ability to achieve long-term goals (Flammer & Bansal, 2017; Yu & Zheng, 2020). CSR activities also contribute to a company's local and international recognition and legitimacy (Parsa et al., 2021). Companies that prioritize CSR tend to have longer-term goals and have a diminished chance of engage in unethical or opportunistic behaviors (Burke et al., 2020; Gao et al., 2014). Therefore, CSR encompasses actions that generate social benefits beyond legal requirements and company interests, impacting not only shareholders and debtors, but also clients, society, social organizations, and other non-investor stakeholders are involved in the investment process. (Buchanan et al., 2018: 75). It is widely recognized that socially responsible activities not only satisfy stakeholders but also safeguard the company's image and reputation by deterring opportunistic actions (Gras-Gil et al., 2016).

Managers who prioritize corporate social responsibility go beyond legal obligations and act in a morally responsible manner within the company. This ethical approach also positively influences the quality of financial reporting (Carroll, 1979; Choi et al., 2013; Cheng & Kung, 2016). Therefore, CSR emphasizes the importance of considering not only financial activities but also social responsibility activities of organizations.

Corporate social responsibility models provide frameworks for defining and implementing social activities in companies in a structured and systematic manner (Dastan & Bellikli, 2015: 181). There are several CSR models discussed in the literature, but this study focuses on five significant ones. The CSR pyramid model examines corporate social responsibility across four scopes: economic, legal, ethical, and charitable responsibilities, determining which areas are necessary, expected, or desired for companies. The social performance model emphasizes analyzing changing societal expectations, developing systematic approaches to address social demands, and finding appropriate solutions to social problems. The social responsibility model is based on five assumptions that explain why and how companies engage in activities that protect and enhance societal well-being and why they bear responsibility. The social sensitivity model, proposed by Robert W. Ackerman, emphasizes the importance of sensitivity as the primary goal of a company's social efforts rather than mere responsibility. The six-option model, developed by Philip Kotler, presents six options

for companies to demonstrate social responsibility through charitable actions (Ackerman & Bauer, 1976; Carroll, 1991).

In summary, corporate social responsibility (CSR) holds significant importance for companies aiming to establish a respected position in society and enhance their reputation among customers, suppliers, competitors, and various stakeholders, including the government. Success in CSR not only builds trust in companies but also has a positive impact on sales as customers' value socially responsible practices. Therefore, achieving company sustainability is closely tied to the effectiveness of CSR initiatives.

The Relationship Between Accounting Conservatism and CSR

The relationship between accounting conservatism and corporate social responsibility (CSR) is grounded in two extensively studied theories: Stakeholder Theory and Agency Theory.

According to Stakeholder Theory, companies that adopt a stakeholder-oriented approach consider their corporate strategies as a commitment to benefit their stakeholders. This includes protecting stakeholders from risks and ensuring their well-being. Companies with conservative financial reporting practices can be seen as protecting their stakeholders from potential risks by exercising caution and reporting their financial information accordingly. Conservative reporting takes into account various negative scenarios and safeguards stakeholders' interests (Friedman, 1970; Cennamo et al., 2008; Bhandari & Javakhadze, 2017).

CSR also falls within the scope of Stakeholder Theory, as it emphasizes that companies should not only prioritize financial concerns but also fulfill their responsibilities towards all stakeholders. Therefore, based on this theory, it is possible to argue that there is a positive relationship between accounting conservatism and CSR, as both concepts aim to protect stakeholders and promote their well-being.

The legitimacy theory, which encompasses commercial and economic perspectives, is one of the theories that conceptually relates to corporate social responsibility (CSR). It suggests that companies should behave in ways that are deemed appropriate and desirable within established norms, values, beliefs, and social patterns. The theory emphasizes the importance of companies acting in accordance with informal morally defined norms in their interactions with stakeholders, going beyond formal obligations (Kuznetsov et al., 2009; Garanina & Aray, 2021).

CSR, in line with the legitimacy theory, serves as a control mechanism within the company, preventing managerial opportunism and safeguarding the interests of stakeholders (Harjoto & Laksmana, 2018). In light of these theories, it can be inferred that both accounting conservatism and CSR aim to protect stakeholder rights and mitigate opportunistic behaviors of management. However, CSR operates based on moral considerations, while accounting conservatism operates within the framework of accounting rules and regulations.

The agency theory, in contrast to CSR practices and accounting conservatism, presents a different perspective. Research studies have shown that companies may use stakeholder relationships to serve their own interests and hide their policies (Lins et al., 2017; Anagnostopoulou et al., 2021). Additionally, there is evidence that companies engage in CSR activities to hiding unethical practices and manipulate stakeholder beliefs (Hemingway & Maclagan, 2004; Choi et al., 2013). Managers often engage in CSR activities primarily to meet stakeholder expectations, sometimes as mere displays (Graafland & Smid, 2019).

Moreover, Friedman (1970:15) argues that a company's sole responsibility is towards its shareholders, with the primary objective being profit maximization. According to him, CSR practices can create agency problems. It is proposed that CSR activities can cause similar problems due to the knowledge asymmetry between internal and external stakeholders, which can result in aggressive accounting practices (Cheng et al., 2014).

Critics of conservatism claim that it undermines the principles of impartiality and accurate documentation in accounting, leading to biased financial information and exacerbating problems within companies, particularly the conflict of interest problem (Feltham & Ohlson, 1995; Zhang, 2000; Chi et al., 2009; Xie, 2015). These arguments adopt to the agency theory, suggesting that conservative accounting policies are detrimental to the company. However, it should be emphasized that conservatism practices do not necessarily harm stakeholder interests or create adverse situations for them, despite these opposing views. From this perspective, an inverse relationship between corporate social responsibility and accounting conservatism can be expected.

The Measurement of Accounting Conservatism and CSR

To measure conservatism, this study utilized *the asymmetric timeliness of earnings,* which is a well-known measurement method widely used in the literature. Additionally, other commonly used measurement methods in the literature include *the market-to-book ratio (MTB), asymmetry of accruals and cash flows, hidden reserves, and negative accruals* (Bellikli & Daştan, 2021). These methods help capture and review the level of conservatism in financial reporting.

The asymmetric timeliness of earnings measurement method involves accounting for negative news more promptly than positive news. In this method, the focus is on the degree of asymmetry in the timeliness of earnings, where greater asymmetry indicates higher accounting conservatism. To estimate the level of accounting conservatism, a cross-sectional regression equation, as depicted in Equation 1 (Basu, 1997: 13), was developed. This equation allows for quantifying and analyzing the extent of conservatism in financial reporting.

$$EPS_{it}/SP_{it}=\alpha_0+\alpha_1 DM_{it}+\beta_0 SR_{it}+\beta_1 SR_{it}\times DM_{it}+\varepsilon_{it} \quad (1)$$

EPS_{it} : earnings per share of entity i in year t,

SP_{it} : stock price of entity i in year t,

SR_{it} : stock return of entity i in year t,

DM_{it} : dummy variable i in year t.

In this measurement method, the linkage between earnings and stock returns is used to assess the response of earnings to good and bad news. A dummy variable is employed to differentiate between good news and bad news, allowing for the estimation of separate coefficients. When stock returns are positive or zero (good news), the dummy variable is 0, and the coefficient associated with good news is denoted as β_0. Conversely, when stock returns are negative (bad news), the dummy variable is 1, and the coefficient associated with bad news is $\beta_0+\beta_1$. The β_1 coefficient in the equation is a sign of accounting conservatism, with a larger coefficient indicating a greater level of conservatism for the company (Basu, 1997: 14).

When reviewing the literature, it is evident that the measurement method of asymmetric timeliness of earnings is widely used in empirical studies focusing on accounting conservatism. Consequently, this method was also employed in the present study to measure conservatism.

The BIST Corporate Governance Index in Turkey provides a favorable opportunity for assessing corporate social responsibility. This index includes companies listed on the Main Market and Sub-Market that have achieved a corporate governance compliance rating of at least 8 out of 10 for overall compliance and at least 7 out of 10 for each main category. The assessment of compliance with Corporate Governance Principles is conducted by authorized rating agencies under the supervision of the Capital Market Board (CMB) (https://borsaistanbul.com/tr/sayfa/163/kurumsal-yonetim-endeksi).

The rating agencies authorized by the CMB assign scores to companies based on four main principles of corporate governance. These principles encompass *shareholders, public disclosure and transparency, stakeholders, and the board of directors.* Sub-criteria are established for each principle, and rating agencies assign separate scores to each sub-criterion. Ratings are given on a scale of 1 (weakest) to 10 (strongest). To determine the overall rating, the following weights are applied to each main principle in accordance with the CMB's Corporate Governance Principles:

- Shareholders 25%
- Public disclosure and transparency 25%
- Stakeholders 15%
- The board of directors 35%

The last score of a company is calculated by applying these weights. The scores obtained from the corporate governance rating can also be considered as scores related to the CSR activities of the companies. This is because the principles encompass all stakeholders within the scope of CSR activities. In this study, the scores assigned to companies by the rating agencies were used as a basis for measuring CSR.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Indeed, the financial failures and scandals in the past have highlighted the significant conflicts of interest between companies and their stakeholders. Misleading financial statements have played a central role in such situations, causing severe harm to companies and their stakeholders. Cases like WorldCom, Parmalat, and Enron serve as stark reminders of the consequences of unethical financial practices. They have resulted in significant financial losses, bankruptcy, and the erosion of trust in the corporate sector. These examples underscore the importance of transparency, ethical financial reporting,

and accountability to ensure the protection of the interests of stakeholders and ensure the long-term sustainability of companies.

According to stakeholder theory, the management of a company's interactions with its stakeholders, which encompass auditors, creditors, shareholders, employees, and society, is essential to the success of the company (Freeman, 1984; Caplan, et al., 2013). Considering the accounting scandals in question, the importance of stakeholder theory and the accounting conservatism and CSR it supports can be better understood.

Researchers have provided valuable insights into the impact of capital structure, firm size, liquidation risk, growth opportunities, bargaining power, management mechanisms, and the gender of CEOs and CFOs on the level of conservative reporting (Ahmed & Duellman, 2007; LaFond & Watts, 2008; Francis et al., 2015). However, limited study has been conducted on whether companies that prioritize CSR and its applications also prioritize conservative reporting. This study discusses some of the existing literature that explores this question.

Ahmed and Duelman (2007) investigated the relationship between corporate governance and accounting conservatism. It was determined that conservatism is negatively related to internal management within the enterprise and positively related to its external stakeholders.

LaFond and Watts (2008) focused on knowledge asymmetry and accounting conservatism, and found that accounting conservatism raises knowledge asymmetry. Kung et al. (2008) examined the relationship between the institutional structures of countries and accounting conservatism, and found that the institutional structures of countries have a strong interaction with accounting conservatism.

García Lara et al. (2009a) investigated the relationship between corporate governance and accounting conservatism and found a positive relationship between the two variables in only one method, despite using three different measurement methods. Hui et al. (2009) discussed the relationship between knowledge asymmetry and accounting conservatism, and determined that conservatism reduces knowledge asymmetry, thereby reducing the need to receive bad news.

Yunos et al. (2014) examined the effect of companies' boards of directors and audit committees on accounting conservatism. The study found that independent board members and the ratio of financial expertise had a positive effect on conservatism.

Polat (2016) conducted research on the relationship between corporate governance and accounting conservatism. The study revealed a positive relationship between corporate governance and accounting conservatism.

Gor and Tekin (2018) examined the relationship between corporate governance practices that improve the independence of boards of directors and conservatism. The evidence of the study presents a negative relationship between conservatism and corporate governance practices that promote board independence.

Guo et al. (2020) examined the relationship between accounting conservatism and CSR, and observed that there is a positive relationship between the level of conservatism in financial reporting and the extent of social responsibility activities assumed by companies.

Anagnostopoulou et al. (2021) investigated the relationship between accounting conservatism and CSR and found a negative relationship between the level of conservatism and the orientation of companies towards CSR activities. Noor et al. (2021) examined the relationship between CSR and accounting conservatism, considering conservatism as a mediating variable. The study revealed that CSR practices have an effect on conservatism.

In their study on the effect of corporate governance and social responsibility on accounting conservatism, Mardiana et al. (2022) observe that corporate governance and social responsibility activities did not have a significant effect on conservatism.

Garanina & Kim (2023) examined the relationship between CSR and accounting conservatism and concluded that companies prioritizing CSR practices exhibit a higher level of conservatism in their financial reporting.

Research on the relationship between accounting conservatism and CSR has revealed that the relationship between the two variables can be both positive and negative. Considering the two theories (Stakeholder and Agency Theories) described in *the title of The Relationship between Accounting Conservatism and CSR* in this article, these results are quite acceptable. Therefore, for this study, as in many previous studies, we developed the hypotheses in the light of these two theories. However, while developing the hypotheses, we did not question

whether the relationship between the two variables is positive or negative, contrary to previous studies and consistent with the accounting conservatism measurement method. Whether there is a same or inverse relationship between accounting conservatism and CSR revealed the hypotheses of this research. Therefore, our first hypothesis based on Stakeholder Theory is as follows:

H_{1a}: There is a positive relationship between accounting conservatism and CSR.

The second hypothesis, which is based on the Agency Theory, is constructed as follows:

H_{1b}: There is a negative relationship between accounting conservatism and CSR.

Especially the fact that this subject has been studied in foreign literature in recent years, but a few study in the domestic literature is the focus of this study. A few study on the relationship between accounting conservatism and CSR in the domestic literature is a key aspect of this study.

EMPIRICAL RESEARCH DESIGN AND METHODOLOGY

Sample Selection, Data and Using Method

The purpose of this study is to measure whether the companies in the BIST Corporate Governance Index have conservative accounting policies and to examine the impact of companies' conservatism on CSR and its components. There are 53 companies listed in the BIST Corporate Governance Index. However, all 29 companies for which complete data was obtained were included in the research and 290 observations were obtained. Because it was not possible to obtain data for all companies during the period of 2013-2022, which formed the basis of the research. Among the reasons for this situation are the fact that some of the companies included in the BIST Corporate Governance Index are newly established, and some were included in the index at a later stage. As a result, the CSR scores could not be calculated retrospectively.

One of the most important stages of econometric research is the collection of data for variables. In addition to collecting data accurately from reliable sources, collecting data in a manner that is appropriate for the chosen model significantly influences the reliability of the estimates. In this context, three kinds of data can be mentioned in econometric analysis: time series, cross-sectional, and panel data (Tatoglu, 2016: 1). In this study, panel data analysis has been used as it allows for the union of time series and cross-sectional data.

The Study Models

The research model in this study is based on the accounting conservatism measurement method developed by Basu (1997). The measurement method developed by Basu (1997) has been mentioned earlier in the study. In the measurement method, the high coefficient indicating accounting conservatism and the occurrence of asymmetric timeliness with respect to stock returns are considered as indicators of conservatism in firms. Firstly, the cross-sectional regression equation developed by Basu (1997) was used to examine whether companies have conservative accounting policies. Secondly, by replacing the independent variable with CSR and its components, five additional equations were created in the relevant equation. Therefore, the test was conducted to determine whether the conservatism coefficient has the same effect on CSR and its components. Considering of the explanations, the research model is shown in Figure 1.

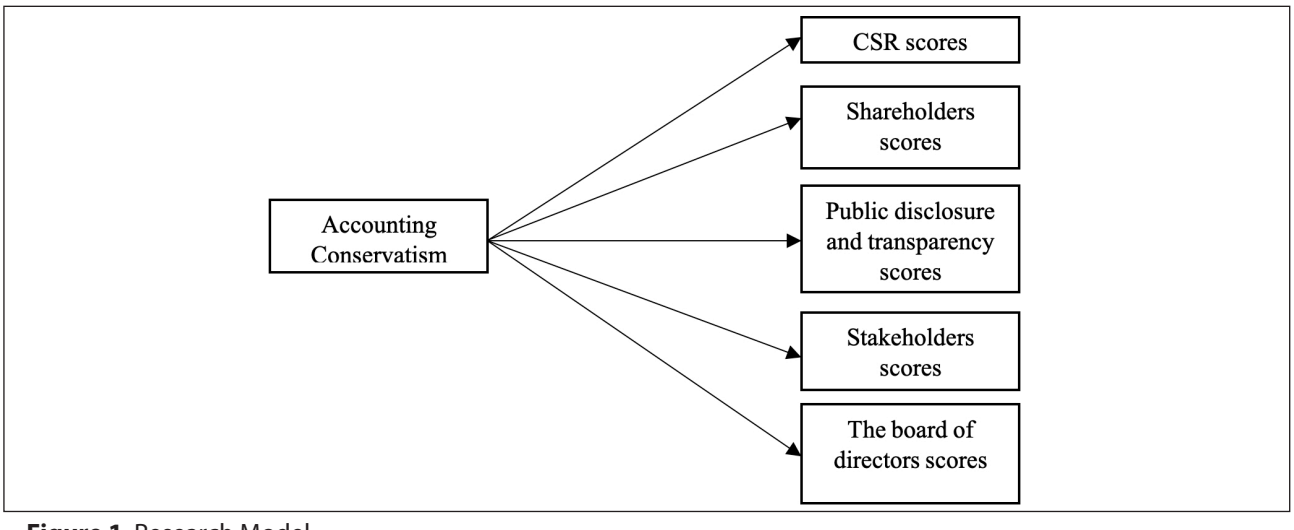

Figure 1. Research Model

Table 1. Study Models

Models	Equations
1	$EPS_{it}/SP_{it}=\alpha_{it}+\beta_1 DM_{it}+\beta_2 SR_{it}+\beta_3 SR_{it}\times DM_{it}+\mu_{it}+\varepsilon_{it}$
2	$CSR_{it}=\alpha_{it}+\beta_1 DM_{it}+\beta_2 SR_{it}+\beta_3 SR_{it}\times DM_{it}+\mu_{it}+\varepsilon_{it}$
3	$SHOLD_{it}=\alpha_{it}+\beta_1 DM_{it}+\beta_2 SR_{it}+\beta_3 SR_{it}\times DM_{it}+\mu_{it}+\varepsilon_{it}$
4	$PDT_{it}=\alpha_{it}+\beta_1 DM_{it}+\beta_2 SR_{it}+\beta_3 SR_{it}\times DM_{it}+\mu_{it}+\varepsilon_{it}$
5	$STAKE_{it}=\alpha_{it}+\beta_1 DM_{it}+\beta_2 SR_{it}+\beta_3 SR_{it}\times DM_{it}+\mu_{it}+\varepsilon_{it}$
6	$TBOD=\alpha_{it}+\beta_1 DM_{it}+\beta_2 SR_{it}+\beta_3 SR_{it}\times DM_{it}+\mu_{it}+\varepsilon_{it}$

The equations related to the study are shown in Table 1:

The terms in the equations can be explained as follows:

α_{it} constants,

β_1, β_2, β_3 coefficients,

μ_{it} error terms components according to year or firm,

ε_{it} error terms

The variables shown in Table 1, explanations about the variables and the sources from which the variable was obtained are shown in Table 2.

Empirical Results

Table 2. Variables of Study Models

Variable	Explanation	Source
EPS	Earnings per share	Financial or Income Statements
SP	Stock price	Financial websites
DM	Dummy variable	Good news 0 or bad news 1
SR	Stock return	Income Statements
CSR	Corporate Social Responsibility points	Corporate governance rating reports
SHOLD	Shareholders points	″
PDT	Public disclosure and transparency points	″
STAKE	Stakeholders points	″
TBOD	The board of directors points	″

Before conducting statistical analyses on time series data, it is necessary to examine whether the underlying process of that series is stationary over time, i.e., the stationarity of the series needs to be investigated. Working with non-stationary series and drawing conclusions based on them can lead to unreliable results in traditional t-tests, F-tests, and R-squared values. Non-stationary series can exhibit trends, seasonality, or other patterns that violate the assumptions of these tests, potentially leading to misleading or inaccurate results. Therefore, it is crucial to address the issue of non-stationarity appropriately before conducting statistical analyses on time series data (Tatoglu, 2016: 199).

In cases where the sample size (N) in the research is greater than the time periods (T), a suitable test called the Harris-Tzavalis (1999) first-generation panel unit root test is used. This test is appropriate for panel data analysis and helps decide the existence of unit roots in the data, addressing the issue of non-stationarity in panel datasets. The test results show that the null hypothesis (H_0) suggests the presence of unit roots in the panels, while the alternative hypothesis suggests that the panels are stationary. The tests results are shown in Table 3.

The test results indicate that the null hypothesis is rejected and the alternative hypothesis is accepted, it implies that there is evidence to suggest that the panels are stationary rather than containing unit roots. This suggests that the time series data in the panels exhibit a stable and consistent behavior over time.

Table 3. The Harris-Tzavalis Test

	EPS/SP	SR	SR×DM	CSR	SHOLD	PDT	STAKE	TBOD
statistic	0,0103	0,0229	0,3427	0,1825	0,1492	0,1944	0,1934	0,1975
p value	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000

Table 4. Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.	Skewness	Kurtosis
EPS/SP	290	0,2578	0,6682	-0,8321	6,8839	5,7023	46,7774
DM	290	0,1483	0,3560	0	1	1,9795	4,9183
SR	290	1,8144	6,6393	-19,28	69,41	5,9046	51,6072
SR×DM	290	-0,2272	1,6465	-19,28	0	-10,8152	123,9556
CSR	290	8,9447	1,6452	0	9,81	-4,9985	27,3172
SHOLD	290	8,8920	1,6533	0	9,82	-4,8328	26,1662
PDT	290	9,1470	1,7013	0	9,95	-4,8348	26,1327
STAKE	290	9,0639	1,7300	0	9,98	-4,4866	23,6019
TBOD	290	8,7806	1,6166	0	9,81	-4,9761	27,2097

After conducting panel stationarity analysis, descriptive statistics have been provided. These statistics provide insights into the distribution and variability of the variables in the panel dataset. The descriptive statistics are shown in Table 4.

When considering descriptive statistics, it is evident that companies prioritize CSR and its components. The emphasis placed on CSR and its components suggests that companies recognize the importance of social responsibility and are actively focusing on areas such as environmental sustainability, community engagement, ethical practices, and stakeholder relationships. This observation aligns with the growing global awareness of corporate social responsibility and the increasing expectations from various stakeholders for companies to carry out activities in a socially accountable manner.

It is observed that the ratings given by rating agencies for corporate social responsibility and its components are generally close to or above 9. Such high ratings suggest that these companies are actively demonstrating their commitment to corporate social responsibility and are meeting or surpassing the expectations set by the rating agencies.

Variance Inflation Factor (VIF) values were examined in the study to assess the issue of multicollinearity among the variables used. VIF values less than 5 indicate the absence of multicollinearity problem among the variables. The relationship between the variables and the correlation table indicating the direction of this relationship are shown in Table 5.

Within the scope of the research, with the intention of determine which estimator among the classical pooled

Table 5. Pearson Correlation

	EPS/SP	DM	SR	SR×DM	CSR	SHOLD	PDT	STAKE	TBOD
EPS/SP	1								
DM	-0,2990	1							
SR	0,4643	-0,2107	1						
SR×DM	0,1067	-0,3313	0,2906	1					
CSR	0,0158	0,0602	0,0674	-0,0481	1				
SHOLD	0,0057	0,0593	0,0600	-0,0415	0,9873	1			
PDT	-0,0102	0,0748	0,0458	-0,0409	0,9888	0,9679	1		
STAKE	0,0190	0,0431	0,0848	-0,0509	0,9811	0,9601	0,9657	1	
TBOD	0,0398	0,0581	0,0803	-0,0561	0,9940	0,9731	0,9794	0,9682	1

Table 6: The Tests of Choose an Estimation Method

Models	1	2	3	4	5	6
Firm Effect	3,74 (0,00) Yes	2,03 (0,07) Yes	5,68 (0,01) Yes	1,30 (0,13) No	8,93 (0,00) Yes	1,35 (0,12) No
Time Effect	0,68 (0,73) No	22,39 (0,00) Yes	23,75 (0,00) Yes	23,58 (0,00) Yes	18,70 (0,00) Yes	5,56 (0,00) Yes
Hausman	23,48 (0,00)	0,56 (0,91)	0,45 (0,93)	0,49 (0,92)	0,64 (0,89)	-

Table 7: The Basic Assumption Tests

Models	1	2	3	4	5	6
Wald Test/ LBF Test	11,52 (0,00)	6,0601 1,4684 2,8100	5,6606 1,3918 2,4589	6,0638 1,4375 2,8700	5,8198 1,5296 2,7610	30,74 (0,00)
Bhargava D-W Test*	1,4802	0,9870	1,0302	0,9801	0,9815	0,9678
Baltagi Wu LBI*	2,0896	1,6688	1,7322	1,6447	1,6491	1,6417
Pesaran CD	1,0470 (0,2952)	32,8560 (0,0000)	23,5220 (0,0000)	24,3440 (0,0000)	15,7350 (0,0000)	22,6770 (0,0000)

*The critical value for tests is 2. If the test results are less than 2, it indicates the presence of autocorrelation issue.

Ordinary Least Squares (OLS), fixed effects, or random effects estimators is valid, several tests were conducted. First, the F (Chow) test was performed, followed by the Breusch Pagan (1980) test, and based on the results of these tests, the Hausman test was conducted. Choose an estimation method is shown in Table 6.

According to the results in Table 6, it is understood that fixed effects are valid for Model 1 and Model 6, and random effects are valid for other models.

After determining the estimators, basic assumption tests were conducted to identify issues such as heteroscedasticity, autocorrelation, and cross-sectional dependence in the models. In fixed effects models, the Modified Wald Test was used to detect the issue of heteroscedasticity. In random effects models, the Levene-Brown Forsythe Test was employed for the same purpose. For the detection of autocorrelation in both fixed effects and random effects models, tests such as the Bhargava et al. Durbin-Watson (DW) test and the Baltagi-Wu LBI test were utilized. The Pesaran test was employed to assess cross-sectional dependence in the models. The basic assumption tests are shown in Table 7.

According to the test results, only Model 1 does not exhibit autocorrelation but shows issues with heteroscedasticity and cross-sectional dependence. Additionally, all other models demonstrate problems with heteroscedasticity, autocorrelation, and cross-sectional dependence. In panel data analysis, it can be stated that the obtained results are reliable when the basic econometric assumptions are met. When the assumptions are tested and econometric issues are identified in panel data analysis, it is necessary to use robust estimators to address these problems. Therefore, in Models 1-5, the Arellano, Froot, Rogers robust estimators were used to address the identified issues, and robust standard errors were obtained. In Model 6, the Driscoll-Kraay estimator was employed to mitigate the problems, and robust standard errors were calculated accordingly.

The conservatism status of the companies included in the BIST Corporate Governance Index has been primarily evaluated in the research. When examining the research results in Table 8, it is important to determine whether companies exhibit asymmetric timeliness of earnings in the context of good and bad news, based on the

Table 8: The Effect of Accounting Conservatism on CSR and its Components

Models	1	2	3	4	5	6
Variables	**EPS/SP**	**CSR**	**SHOLD**	**PDT**	**STAKE**	**TBOD**
C	0,2607[a] (0,0375)	8,8549[a] (0,1408)	8,8105[a] (0,1510)	9,0568[a] (0,1415)	8,9710[a] (0,1613)	8,7150[a] (0,2634)
DM	-0,4715[a] (0,1023)	0,2513 (0,1566)	0,2576 (0,1448)	0,3257[b] (0,1650)	0,2212 (0,1948)	0,1165 (0,1662)
SR	0,0312[b] (0,0156)	0,0220[a] (0,0083)	0,0193[b] (0,0080)	0,0182[b] (0,0088)	0,0248[a] (0,0079)	0,0189[c] (0,0095)
SR×DM	-0,0456[b] (0,0247)	-0,0556[a] (0,0147)	-0,0493[a] (0,0129)	-0,0390[b] (0,0151)	-0,0661[a] (0,0195)	-0,0620[b] (0,0237)
R^2	0,4591	0,0681	0,0436	0,0608	0,0568	0,0060
Observations	290	290	290	290	290	290

The robust standard errors are provided in parentheses.
a, b, and c represent the significance levels of 1%, 5%, and 10%, respectively.

measurement method adopted in the study. According to this, when news is good, the dummy variable takes a value of 0, and the impact of conservatism coefficient on the dependent variable EPS/SP (0.0312-0 = 0.0312) is positive. In the case of bad news, the dummy variable takes a value of 1, and the impact of the conservatism coefficient on the dependent variable EPS/SP (-0.0144) is negative (0.0312-0.0456 = -0.0144). Yes, earnings exhibit asymmetric timeliness in both cases of good and bad news. Therefore, *it can be concluded that the companies included in the study prioritize conservative accounting policies and apply them in their financial statements.* Does the conservatism coefficient have the same effect, i.e., asymmetric timeliness, on the corporate social responsibility score and its components? According to the research results, the answer to this question is Yes. This situation is summarized in Table 9.

When examining Table 9, it can be observed that the conservatism coefficient induces asymmetry on all dependent variables. However, it is observed that the largest impact is exerted on the board of directors score and stakeholders score. This situation implies that companies with conservative accounting policies prioritize the interests of internal management while also valuing external stakeholders. Therefore, in line with stakeholder theory, the *H1a hypothesis is accepted,* indicating that *the hypothesis H1b is rejected.* The obtained results align with findings from studies conducted by García Lara et al. (2009a), Hui et al. (2009), Yunos et al. (2014), Polat (2016), Gor and Tekin (2018), Guo et al. (2020), and Garanina & Kim (2023) in the literature. However, there is a lack of alignment between the results of this study and those of studies conducted by Ahmed and Duelman (2007), LaFond and Watts (2008), and Anagnostopoulou et al. (2021) in the literature. In the other examined studies, as mentioned in the literature, a statistically significant relationship between accounting conservatism and corporate social responsibility or corporate governance could not be established.

Table 9: The Effects of Good and Bad News.

	EPS/SP	CSR	SHOLD	PDT	STAKE	TBOD
Good News	0,0312	0,0220	0,0193	0,0182	0,0248	0,0189
	Positive	Positive	Positive	Positive	Positive	Positive
Bad News	-0,0144	-0,0336	-0,0300	-0,0208	-0,0413	-0,0431
	Negative	Negative	Negative	Negative	Negative	Negative
Asymmetry	Yes	Yes	Yes	Yes	Yes	Yes

CONCLUSION AND RECOMMENDATIONS

Accounting conservatism protects the interests of the company shareholders, reduces the knowledge asymmetry between the internal and external stakeholders of the company, ensures the harmony between the interests of the equity holders and the lenders of the company, and thus finds solutions to the agency problems. Managers can avoid conservative accounting policies. Because managers have to bear the mentioned costs as a result of conservative reporting, and therefore company managers are in an effort to create a balance by maintaining the knowledge asymmetry between them and external stakeholders. CSR is of great importance for all companies that want to gain a more respected place in the society, and to raise their reputation to higher levels in the eyes of customers, suppliers, competitors and all stakeholders such as the government. While success in corporate social responsibility increases the trust in companies, this trust of customers also reflects positively on sales. For this reason, it can be stated that ensuring company sustainability depends on the success achieved in corporate social responsibility.

The results of this study indicate that the examined firms adhere to conservative accounting policies, and these policies have an impact on earnings asymmetry. Furthermore, it is observed that the conservatism coefficient has a greater effect on specific stakeholders such as the board of directors score and customer benefits score. The conservatism coefficient indicates that firms reflect their earnings more cautiously in their financial statements, leading to different reactions of earnings to good and bad news.

Based on these findings, it is recommended that companies continue to implement conservative policies and maintain their responsibilities towards stakeholders. Additionally, it is important to establish and sustain effective governance boards to maintain a balance among stakeholders and prevent conflicts of interest. This emphasizes the importance for companies to make decisions that consider both internal management interests and the needs of external stakeholders.

These findings provide valuable guidance to companies in maintaining conservative accounting policies and preparing their financial statements to reflect the needs of stakeholders. Additionally, it highlights the significance of establishing effective corporate governance structures and increasing transparency and accountability to achieve a balance among stakeholders.

Future research could delve into exploring the impact of conservatism policies on other stakeholders in more detail. Comparative analyses with the results of similar studies conducted in different sectors and countries could also be beneficial.

In conclusion, it is crucial for companies to uphold conservative accounting policies, considering both internal management interests and responsibilities towards external stakeholders. This is a critical factor in developing a sustainable company strategy and achieving long-term success. However, it is important to consider the limitations of this research. The study has focused on a specific sample, and different results may be obtained in other industries or countries. Furthermore, the impact of conservatism policies on other stakeholders remains an area that requires further research.

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The Significance of Participation in the Global Production Network to Economic Development: An Econometric Analysis of BRICS+T Countries

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ABSTRACT

With globalization, the international fragmentation of production (IFP) splits the production process of final goods and services into several stages undertaken in different countries integrated into global production networks. BRICS + T countries have rapidly participated in the (IFP) process, especially after the 2000s. The main purpose of this paper is to analyze the nexus between BRICS+T countries' participation in the global production networks and their economic development. As an indicator of this participation, the vertical specialization rate had been calculated utilizing OECD Input-Output Tables. Subsequently, the development index was calculated utilizing economic-technological and cultural-institutional indicators published by World Bank. The vertical specialization's impact on development was estimated utilizing the CS-ARDL estimator. The results revealed that while vertical specialization has a statistically significant positive impact on development in the short term, a positive but not statistically significant impact was recorded in the long term. Konya's (2006) causality test was performed to examine the causal relationship among the selected variables. The results revealed a one-way causality from development to vertical specialization in China and Turkey and a one-way causality from vertical specialization to development in Brazil. No causality relationship could be detected in other countries included in the analysis.

Keywords: Economic Development, Vertical Specialization, Globalization, Input-Output Models, BRICS+T, CS-ARDL.

JEL Classification Codes: C01, C67, F02, F63, F60

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INTRODUCTION

Globalization has led to the free movement, transfer and flow of increasingly integrated goods, services, production factors, technological accumulation and financial resources among countries. It can be defined as the articulation of national economies with the world markets (Şenses, 2004; Şubaşat, 2004; Şenses, 2009; Yeldan, 2016). The development trends in the world economy are characterized by the rapid augmentation of globalization, especially after 1980 (Şenses, 2004: Şenses: 2009: Rodrik 2011: Yeldan, 2016). Along with the globalization trends, an important loss of development policies had been experienced in the world economy during the post-1980 period. However, during the pre-1980 period, development and industrial policies come to the forefront, especially in developing countries. The interpretation of such policies may be that the developing countries that attained their independence after World War II sought to close the growing gap with the developed ones (Keyder, 2004). The developed countries are characterized by self-sustaining growth, structural change in production, technological innovation, social, political and institutional innovation, and improving people's living conditions (Myrdal, 1974). In the aftermath of 1980, the world economy has undergone major changes such as replacing the policies of import substitution and inward-looking industrialization and development strategies, that had been applied during the period from 1945 to 1970, with those of outward growth and liberalization (Şenses, 2004: Şenses: 2009: Rodrik 2011: Yeldan, 2016). Furthermore, developments in international trade had been experienced in the post-1980 period. Moreover, international trade has grown faster than income and global production in the post-1980 period compared with the previous one (Tekin-Koru, 2020). According to Tekin-Koru (2020: 55), the ratio of international trade to the gross world product has doubled since the liberalization of international trade after 1980. One of the most significant economic reasons for international trade growth and development is the decrease in the costs of information and communication technologies, transportation, and trade during that

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period. This matter led to fragmenting the production of goods and services between countries vertically and increasing firms' participation in the global value chains and global production networks (Tekin-Koru, 2020). Similar to Tekin-Koru (2020), Amador and Cabral (2009; 2016) stated that international trade experienced fairly strong growth and underwent major changes in the post-1980 period. Trade integration into the world economy has encouraged companies to develop new production strategies. The companies' new production strategies include benefiting from the internal local advantages such as low labor cost and proximity to the market and fragmentation of the production of goods and services into two or more stages that can be performed in different countries (Clark, 2010; Hess & Yeung, 2006). Bialowas and Budzynska (2022) also emphasized that the international fragmentation of the production process is one of the most significant trends in the modern world economy. Therefore, international trade is referred to as the multiple cross-border goods flow process which increasingly depends on the exchange and intermediate input goods rather than the production of final goods and services (Bialowas and Budzynska, 2022). Thus, economic globalization has recently been characterized by the fragmentation of international production. Fragmentation of the production process relates every country or every region to the world economy (Duan et al., 2018; Greffi and Wu, 2020; Antràs, 2020). Thus, an organization that produces goods and services across multiple geographical locations for worldwide markets emerges, and accordingly, a global production network is formed within the global economy (Coe & Yeung, 2015). The international fragmentation process of production or global production network (Coe, Dicken & Hess, 2008; Yeung, 2015) is associated with trade in intermediate inputs across borders and integration of the imported intermediate inputs with export-oriented production (Greffi, 2015). Similarly, the global production network is a network process in which the production, distribution and consumption of goods and services become interconnected with the global economy, and this framework allows for geographical variation in producer-consumer affairs (Henderson et al., 2002). Global production networks, that emerged and rapidly expanded after 1980, not only integrate global production into structures that blur traditional organizational barriers but also integrate national economies (or parts of such economies) in ways that have immense implications for national development (Dicken & Hassler, 2000). The matter connects countries or regions through commercial interdependence (Amador and Cabral, 2009). Greffi (2015) argues that some countries, in particular emerging market economies, play a significant role in the international fragmentation of production. With this respect, the main motivation of this paper is to investigate the extent to which countries' participation in the global production network affects their development. Hence, the research question of this paper is investigating the nexus between the participation of BRICS (Brazil, Russia, India, China, and South Africa) and Turkey in the process of fragmentation of international production and the development of these countries, especially after the important role they played in the world trade (Greffi, 2005) with the acceleration of globalization since the 2000s. To achieve our goal, the BRICS and Turkey's vertical specialization rate, which measures the rate of participation in the international production process, had been calculated utilizing OECD Input-Output Tables. Subsequently, the development of these countries had been calculated using various economic-technological indicators (industrialization, life expectancy and total patent applications) and cultural-institutional indicators (control of corruption, government effectiveness, political stability and absence of terrorism, regulatory quality, rule of law and accountability). An econometric analysis of panel data had been utilized to investigate the impact of vertical specialization on BRICS+T countries' development during the period of 1995-2018. The method of obtaining the data employed in the empirical analysis can make a significant contribution to the development of the literature. In another aspect, the study is expected to contribute to the literature by providing an econometric analysis of the nexus between countries' development and their participation in the global production network. To the best of our knowledge, the literature on global production networks generally analyzes the positions of countries in global production networks and to what extent they participate in these networks. This paper not only estimates the participation of BRICS+T countries in global production networks but also sheds light on how these countries' participation in global production networks affects their development. This research also provides the historical development of the dependent variable means economic development. Furthermore, the HIY method proposed by Hummels, Ishii & Yii (1998; 2011) had been applied to I-O tables to calculate the explanatory variable means vertical specialization. This paper is made up of four sections. The first section includes the introductory part. In the second section literature review is structured. The third section includes data, methodology and findings. The fourth section is about evaluating the results and conclusion.

LITERATURE REVIEW

The acceleration of the process of liberalization and globalization in the post-1980 period has been accompanied by significant changes in the structure and nature of international trade characterized intrinsically by the international fragmentation of production. In this sense, one of the most striking features of the post-1980 period is the geographic and organizational fragmentation of the production of goods and services. The most important reason for this is the search for not only capital but also cheap labor, especially by transnational companies. By developing their employability skills and new resources, companies continue to finance their activities and gain competitive power. (Coe et al., 2010; Coe & Hess, 2013; Neilson, Pritchard & Yeung, 2014). The process that started after 1980 gained an important dimension in the 1990s. In the 1990s, global production was further fragmented and spread over a wider geography. From this period onwards, global production networks have become an important determinant of the world economy (Coe & Yeung, 2015; Hess & Yeung, 2006; Yeung & Coe, 2015). Other important factors that accelerated and expanded globalization and global production networks were digitalization, e-commerce, and information and communication technologies. These factors have become natural elements of global production networks (Coe & Yeung, 2019; Henderson et al., 2002). Dicken & Hassler (2000) state that Indonesian performance in long-term global production networks slightly improves production. At the same time, they state that global production networks have a positive effect, especially on knowledge and technology acquisition. However, despite these positive features, Dicken & Hassler (2000) state that global production networks create negative effects in times of crisis, thus, Indonesian ready-made garment manufacturers have become increasingly dependent on US and European markets. Therefore, Dicken & Hassler (2000) and Henderson et al., (2002) argue that longer-term position within global production networks depends on developing an even stronger and deeper production base of technology and skills. Coe, Lai & Wójcik (2014) state that global production networks are managed by firms rather than official institutions. However, companies that are included in this network are at risk of being affected by foreign currency, interest rates, and contracts. According to the authors, this situation aggravates the negative effects of financialization. Coe, Lai & Wójcik (2014) and Coe et al. (2010) argue that global production networks can cause income inequality between regions. Neilson, Pritchard & Yeung (2014) and Coe & Yeung (2015) emphasize that after the 1980s, global production networks become more intense, especially in sectors such as clothing, electronics, consumer goods, and automotive assembly. The authors state that developed countries (especially the USA) shift their production in these sectors to lower-cost developing countries. In this sense, similar to Coe, Lai & Wójcik (2014), Nelison, Pritchard & Yeung (2014) argue that global production networks manufacture global debt and imbalance conditions. Likewise, Yeung (2014) and Coe et al. (2010) state that the leading firms in developed countries make the firms of developing countries dependent on them through global production networks, and the interests of these companies may not be fully consistent with national development. In other words, local firms act in the interests of multinational firms. However, Yeung (2014) argues that participation in the global production network leads East Asian countries to achieve significant gains, especially in the field of ICT. The rapid rise in the global economy seen not only in the rise of China and Asian tiger economies but also in Brazil and India associated with the new forms of state involvement, most notably China's tentacular Belt and Road Initiative have created strong geographical shifts in terms of production (Coe & Yeung, 2019). Despite the gains that had been achieved from the global production networks, Yeung (2021) related socioeconomic inequalities to global production networks. After explaining the development and effects of the global production networks, their emergence can be summarized as follows: The international fragmentation of production occurs when the production process of a particular good or service is fragmented into two or more stages that can be performed in different countries or regions. Put differently, each country specializes in a different stage of the production process of a good or service. Such transformation in international trade creates a strong economic dependency between the countries specialized in different stages of the production process (Henderson et al., 2002; Hummels, Ishii & Yi, 2001; Alexander, 2012). The interpretation of such economic dependency entails utilizing the imported intermediate inputs to produce goods and services and then exporting the obtained final products to the countries specialized in any stage of the production process of those goods and services. This gradual process continues until the produced goods and services reach the final consumer. In the literature, this gradual production process that takes place in international trade is defined as vertical specialization (Coe & Yeung, 2015; Hummels, Ishii & Yii, 1998; Hummels, Ishii & Yii, 2001; Lamonica, Salvati &

Carlucci, 2020). Hummels, Ishii & Yi (1998; 2001) stated that three conditions must be held for vertical specialization to occur: firstly, a certain good should pass through two or more sequential stages. Secondly, two or more countries must provide value-added to the production process of that good. Finally, at least one country should use imported intermediate inputs in the production process and export some of the output (Chen, Kondratowicz & Yi, 2005; Dağıstan, 2009). In general, input-output tables are used to measure vertical specialization in the literature (Duan, et al., 2018). The works of Hummels, Ishii & Yi (1998; 2001) became the pioneering research that calculated vertical specialization rates utilizing input-output tables. In their work, the authors emphasized that global trade became increasingly integrated and economically interdependent. They revealed that vertical specialization increased significantly in Europe and East Asia during the period from 1968 to 1990. Similar to the conclusions obtained by Hummels, Ishii & Yi (1998; 2001), Chen, Kondratowicz & Yi (2005) also stated that the world's vertical specialization showed an increasing trend during the period from 1968 to 1998. Their results revealed that the vertical specialization rate was higher in small countries such as Denmark and the Netherlands compared with the large ones such as the USA, Japan, and Australia. Examining a similar period (1967-2005) to the aforementioned three studies, Amador and Cabral (2009) concluded that vertical specialization had generally increased in the world. Moreover, their results revealed that vertical specialization was higher in Asian countries. Dean, Fung & Wang (2011) and Yang et al. (2011) argued that the participation of the Chinese economy in global production activities has increased continuously in the 2000s. Along with China, Yang et al. (2015) stated that vertical specialization increased drastically in the world during the period from 1995 to 2005. Amador, Cappariello and Stehrer (2015) postulated that the Eurozone owes much of its economic weight to the global value chains. They revealed that its vertical specialization has increased significantly, except for the 2009 crisis period. Solaz (2018) demonstrated that during the period from 1995 to 2011, vertical specialization has generally increased worldwide except for Russia and Canada. Yu and Luo (2018) concluded that vertical specialization had increased in countries worldwide world including Canada and Russia. Their results revealed that the country with the lowest vertical specialization was Brazil but that with the highest one was South Korea. Furthermore, they claimed that the manufacturing industry's vertical specialization was higher than the total economy's one. Yin and Liu (2019) argued that vertical specialization had increased in high-tech sectors in China during the period from 1992 to 2009. They demonstrated that the vertical specialization rate in these sectors was higher than that in the medium- and low-tech sectors. Pahl and Timmer (2019) analyzed a large group of countries and revealed that participation in global production networks had rapidly increased during the period from 1970 to 2013 and especially after 1980. Constantinescu, Mattoo & Ruta (2019) revealed that vertical specialization across the world had increased till the 2000s. Although the vertical specialization rate decreased after 2000, it showed an increasing trend until the 2009 global financial crisis. Constantinescu, Mattoo & Ruta (2019) argued that till 2000 the vertical specialization rate in the manufacturing industry was below that of the total economy, but it exceeded the total vertical specialization rate after 2000. Similar to Pahl and Timmer (2019), Pedilla et al. (2019) also stated that vertical specialization in the world economy follows a continuously increasing trend. Lamonica, Salvati & Carlucci (2020) utilized the WIOD to calculate the vertical specialization covering 40 countries during the period from 1995 to 2011. The results revealed that during the period from 1995 to 2011, the vertical specialization remained stable in Bulgaria, Cyprus, and Indonesia. Moreover, it decreased in Canada, Estonia, Malta, Portugal and Russia. In general, the world economy has become more dependent in the post-1980 period and this process has accelerated especially after the 2000s. With this respect, Xiao et al. (2020) emphasized that the fragmentation process of production changed the nature of international trade. They argued that almost more than two-thirds of today's world trade crosses the border of at least one country before production takes its final form and this process takes place through the global production networks. Literature review showed that participation in global production networks has increased in the world economy in the post-1980 period and especially after the 2000s. The policies that had been applied after 1945 such as import-substitution, inward-looking and industrialization strategies had been replaced with outward, export-oriented strategies and integration into global production the matter which increased the interdependence between countries. Chang (2016) and Chang and Grabel (2016) defined the period of 1945-1975 as the world's golden age, especially for the developing countries which implemented intensive industrialization, import substitution and inward-looking policies the matter that played a significant role in achieving economic growth. It had been argued that open and outward-oriented policies

became the engine of economic growth and development in the post-1980 period. Gereffi (2015) argues that participation in global production networks is significant for economic development. According to Gereffi (2015), joining global production networks increases investments in connecting (either constructing or developing) economies' physical infrastructures such as seaports, canals, airports, roads and information and communication technologies. Olczyk and Kordalska (2017) and Goldar et al. (2020) provide empirical evidence that export performance has been positively affected by vertical specialization and thus the inclusion in global value chains drives export growth. Participation in global production networks increases productivity (Constantinescu, Matooo & Ruta, 2019) and affects foreign direct investment positively (Martinez-Galan and Fontoura, 2019). Moreover, Pahl and Timmer (2020) affirmed that participation in global production networks affects firm productivity strongly and positively but does not affect job creation positively. They revealed that it affects productivity positively in developing countries. Furthermore, participation in global production networks stimulates economic growth (Jangam and Rath, 2021) and positively affects total factor productivity and firm productivity in the manufacturing industry (Banga, 2021). Orhangazi (2020) states that in the global value chain system, the developed countries specialize in stages that require higher technology due to their qualified workforce and capital structures, on the contrary, the developing countries specialize in labor-intensive and low-tech stages of the production process and, in such manner, a significant portion of the produced value flows to developed countries. Orhangazi (2020) emphasizes that the income gap between developed and developing countries will keep widening even if the developing countries make progress thanks to their global value chains. Put differently, a disparity among countries in the levels of economic development will occur as the level of vertical specialization increases in the long run. However, the capacity to produce and export is increasingly dependent on imports. Similar to Orhangazi (2020), Bakır et al. (2017) emphasize that the global value chains constitute a dual structure of "centralized economies" and "factory economies". In the process of fragmentation of international production, a significant portion of the produced value flows to the "centralized economies" since these economies specialized in industrial production that requires qualified labor and high technology; however, the labor-intensive and low-tech industrial production is transferred to the "factory economies". Accordingly, the "factory economies" cannot close the welfare gap with the "centralized economies". Moreover, Wigley, Mıhcı & Ataç (2018) emphasize that income inequality may increase and the countries may be more sensitive to external shocks in the early stages of integration with the global production network. In general, the literature analyzes the degree of countries' participation in the global production networks, that is, the vertical specialization rate and the direction of participation in the global value chains. With this respect, there are some studies, albeit limited, on the analysis of the extent to which the countries' participation in the global production network affects the macroeconomic indicators such as Olczyk and Kordalska (2017); Goldar et al. (2020); Constantinescu, Matooo & Ruta (2019); Martinez-Galan and Fontoura (2019); Pahl and Timmer (2020); Jangam and Rath (2021) and Banga (2021). It is expected that this work will significantly contribute to the literature since it investigates the effect of vertical specialization on development econometrically.

DATA AND METHODOLOGY

In this research, we tried to investigate the dynamic relationships between economic development and vertical specialization in BRICS-T Countries utilizing annual panel data for the period from 1995 to 2018. Unlike the literature, the dependent variable means the economic development variable had been represented by an index reconstructed by the PCA method (Principal Component Analysis) utilizing 10 different variables. The explanatory variable means the vertical specialization ratio had been calculated utilizing the method of input-output analysis. The fixed capital formation had also been included in the model as a control variable. Institutional quality variables included in the Development Index were obtained from the World Governance Indicators (WGI) published by the World Bank. The sub-data had been obtained from the World Development Indicator (WDI) published by the World Bank. The explanatory variable means the vertical specialization rate was calculated utilizing the OECD input-output tables. The control variable means the fixed capital formation variable was obtained from the World Development Indicator (WDI) published by the World Bank. The structured model is shown in equation (1):

$$DI_{i,t} = \beta_0 + \beta_1 VS_{i,t} + \beta_2 FC_{i,t} + \varepsilon_{i,t} \qquad (1)$$

Where DI denotes the development index; VS denotes the vertical specialization rate; FC denotes the fixed capital formation. represents the constant, and represent coefficients of the independent factors. The subscripts i

and t represent the horizontal section of countries and the time dimension, respectively. The method used to obtain the data in the empirical analysis of this study will significantly contribute to the development of the literature. Moreover, the historical development of the dependent variable means the economic development DI has been taken into consideration. Furthermore, the explanatory variable means the vertical specialization rate VS was calculated by applying the HIY method proposed by Hummels, Ishii & Yii (1998; 2011) to I-O tables. Let's define the variables we will be working with.

Development Index (DI)

Although the concept of economic growth is used interchangeably with that of economic development, these two concepts are very different. According to the Human Development Report (1996), economic growth is one of the important components of economic development which is the ultimate goal of any economy. Economic growth refers to an increase in the production of goods and services in an economy. Economic development seeks to increase the individuals' life quality in the fields of socioeconomic, cultural, legal and political fields along with providing economic growth (World Development Report, 2013). Therefore, the development indicator cannot be reduced to a single variable and/or parameter. Godo (2005) discusses the concept of development by analyzing the dependency relationship between the cultural and economic subsystems. Whereas the cultural subsystem includes the value judgments and the institutions; the economic one includes technology and production factors. In this research, both the World Development Report's definition of development as the indicator that increases the individuals' life quality, as well as the development of multidimensionality shown in Godo's (2005) study, are taken into consideration. Table (1) represents information about the variables of the DI created by the PCA method. The Indicators of the Development Index in Table 1 indicate that development in this study does not depend solely on economic growth. It encompasses a perspective ranging from concepts including technology, productivity, and production to concepts of sociocultural and institutional quality, and including growth.

Vertical Specialization Rate

The vertical specialization rate in BRICS+T Countries was calculated by applying the HIY method proposed by Hummels, Ishii & Yii (1998; 2011) to I-O tables. The vertical specialization rate shows the extent to which the studied countries participate in the global production process. In short, vertical specialization denotes the rate of imported intermediate goods and services produced for export. Such a rate represents the degree of countries' participation in the global production networks. The main motivation of the work is to investigate how the countries' participation in the global production network affects the development of these countries. To achieve our goal, the vertical specialization rate had been calculated for BRICS+T Countries. The OECD input-output tables of these countries were employed to calculate the vertical specialization rate during the period from 1995 to 2018[1].

Horizontal Section Dependence-Slope Homogeneity

The horizontal section dependence test is critical in the empirical panel data research of countries that have similar economic characteristics such as developing, emerging, and transition ones. An economy is vulnerable to other countries' shocks stemming from the internationalization of trade, financial integration and globalization. Thus, cross-section dependence analysis is required in empirical panel data research. The standard panel data methods assume that there is no dependence between cross-section units and assume that the slope coefficients are homogeneous. Ignoring the cross-section dependency may lead to incorrect inferences (Chudik and Pesaran, 2013). The estimated coefficients may differ between cross-section units. For this reason, the pre-tests of cross-sectional dependence and slope homogeneity will be conducted in the empirical analysis. As a first step, the Pesaran (2004) CDLM and the biased adjusted LM test (Pesaran et al., 2008) were applied. These methods are valid when N>T and T>N. The statistics of these tests are as follows:

$$CD_{LM} = \sqrt{\frac{N}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T\,\hat{\rho}_{ij}{}^{2} - 1) \quad (2)$$

$$LM_{adj} = \sqrt{\frac{2}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \frac{(T-k)\hat{\rho}_{ij}{}^{2} - \mu_{Tij}}{V_{Tij}} \quad (3)$$

Equation 3 and 4, represents the statistical equations of the Pesaran (2004) CDLM and the biased adjusted LM test (Pesaran et al., 2008) respectively. The term $\hat{\rho}_{ij}$ denotes the correlation between cross-sectional units, the term μ_{Tij} denotes the cross-sectional averages and the term V_{Tij} denotes the variance. For both tests, the null and the alternative hypotheses are as follows:

H_0: There is no horizontal section dependence.

$H_{1:}$ There is a horizontal section dependence.

[1] The calculation method of the vertical specialization rate is given in Appendix-1

Table 1. Indicators of Development Index

	Indicator Name	Explanation	Source
Economic-Technological Indicators	Industrialization	Industry (including construction), value added (% of GDP)	World Bank-World Development Indicators
	Life Expectancy	It shows the number of years a newborn is expected to live if the mortality patterns at the time of its birth remain constant in the future.	
	Per Capita Income	GDP per capita is based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates.	
	Total Patent Applications	Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office.	
Cultural-Institutional Indicators	Control of Corruption	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	World Bank-Worldwide Governance Indicators
	Government Effectiveness	Government Effectiveness captures perceptions of the quality of public services, and the degree of its independence from political pressures.	
	Political Stability and Absence of Terrorism	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.	
	Regulatory Quality	Regulatory quality measures the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	
	Rule of Law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	
	Accountability	Accountability captures perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and free media.	

Note: World Bank-World Development Indicators and Governance Indicators https://databank.worldbank.org/source/world-development-indicators# and https://databank.worldbank.org/source/worldwide-governance-indicators respectively obtained from the links.

The homogeneity test is to determine whether a change in one country causes a change in the other countries covered by the panel analysis. Therefore, the countries' economic status is significant. The issue of data homogeneity concerns the shape of the unit root tests to be applied. With this respect, to test the homogeneity/heterogeneity, the Delta test developed by Pesaran and Yamataga (2008) was applied. The hypothesis is as follows

$$H_0: \beta_i = \beta$$

$$H_1: \beta_i \neq \beta$$

The rejection of the null hypothesis indicates the heterogeneity of the slope coefficients. To examine the stability of the data series, the Cross-sectionally Augmented Dickey-Fuller unit root test (CADF) had been applied.

Unit Root Test

It is important to test the stationary of the data series in the econometric analysis to avoid spurious regression results. There are many generations of unit root tests in the literature. Based on the sample size and the power

of the test; each unit root test has some advantages and disadvantages (Narayan and Narayan, 2010). Moreover, the existence of the cross-sectional dependency in the panel determines the unit root test to be applied. Since there is a piece of evidence suggesting the presence of cross-sectional dependence between units in the BRICS-T panel; the second generation of the unit root tests that take the cross-sectional dependency into account were utilized. With this respect, the Cross-sectionally Augmented Dickey-Fuller unit root test (CADF) developed by Pesaran (2007) had been applied. It is calculated as follows:

$$\Delta y_i = a_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + \sum_{j=0}^{p} d_{ij} \Delta \bar{y}_{t-j} + \sum_{j=1}^{p} \delta_{ij} \Delta y_{i,t-j} + e_{i,t} \quad (5)$$

Where; denotes the mean of all N sections at time T. CADF test are used to determine the stationarity of the series of each cross-section, but not the stationarity of the entire panel data. To determine the stationarity of the whole panel, the arithmetic mean of the CADF t statistics had been calculated for each horizontal cross-section. The calculated arithmetic mean represents the statistic of the CIPS (Cross-Sectionally Augmented IPS (CIPS)). The CIPS statistic is computed as follows:

$$CIPS = N^{-1} \sum_{i=1}^{N} CADF \quad (6)$$

The statistics of CADF and CIPS tests obtained utilizing equation 5 and equation 6 had been compared with the values in the study of Pesaran (2007) to decide whether to reject the null hypothesis stating that the series has a unit root or not. If the absolute value of the test statistic is greater than the critical value, then we reject the null hypothesis and conclude that the series does not have a unit root, meaning it is stationary.

Coefficient Estimation: The CS-ARDL Model

In this research, the cross-sectionally augmented autoregressive distributed lag (CS-ARDL) model developed by Chudik and Pesaran (2015) was used to estimate the long and short-run coefficients. The main advantage of the CS-ARDL estimator is that it does not interfere with the consistency of the estimations even if the series are cointegrated and stationary at different levels. Moreover, since the Common Correlated Effects (CCE) approach is implemented in the context of the panel ARDL version means that it is based on the lagged dependent variable and the lagged cross-sectional mean, it considers the cross-sectional dependence (Chudik & Pesaran, 2015). Furthermore, it allows mean group estimations with heterogeneous slope coefficients. The mean-group version of the CS-ARDL model is based on increasing the ARDL estimates of each cross-section with the cross-section means as representative of unobserved common factors and their lags (Chudik et al., 2017). This technique also performs well for the weak externality problem stemming from including the lagged dependent variable in the model. The CS-ARDL estimation is based on the following regression model:

$$y_{it} = \alpha_i + \sum_{l=1}^{p_y} \lambda_{l,i}\, y_{i,t-1} + \sum_{l=0}^{p_x} \beta_{l,i}\, x_{i,t-1} \sum_{l=0}^{p_\varphi} \varphi'_{i,l}\, \bar{z}_{i,t-1} + \varepsilon_{i,t} \quad (7)$$

Where; denotes the lags of the horizontal cross-sectional averages. The following equation is used in the long-run coefficient estimation for the mean group estimation:

$$\hat{\theta}_{CS-ARDL,i} = \frac{\sum_{l=0}^{p_x} \hat{\beta}_{l,i}}{1-\sum_{l=1}^{p_y} \hat{\lambda}_{l,i}} \,, \hat{\theta}_{MG} = {}^{1}\!/_{N} \sum_{i=1}^{N} \hat{\theta}_i \quad (8)$$

Where; $\hat{\theta}_i$ denotes the predictions for each cross-section. Chudik and Pesaran (2013) suggested that the CCE group mean estimator, with lagged increases, performs well in terms of bias, size, and power. However, the authors observed a negative bias when T<50. To correct for small sample time series bias, Chudik and Pesaran (2015) suggested the recursive mean adjustment (REC) of So and Shin (1999) or the split-panel jackknife of Dhaene and Jochmans (2015). The REC method was preferred in this paper because it gave more consistent results. The REC method is based on the following equations:

$$\hat{y}_{i,t} = y_{i,t} - \frac{1}{t-1} \sum_{s=1}^{t-1} y_{i,s} \quad (9)$$

$$\tilde{\omega}_{i,t} = \omega_{i,t} - \frac{1}{t-1} \sum_{s=1}^{t-1} \omega_{i,s};\ \omega_{i,t} = (x'_{i,t}, g'_{i,t})' \quad (10)$$

Where $\hat{y}_{i,t}$ and $\tilde{\omega}_{i,t}$ denote the mean group estimate of the first and second half of the sample, respectively.

The time dimension of this study is 24 (T<50). Therefore, the results of bias correction with the REC method of CS-ARDL estimation will also be reported. After estimating the CS-ARDL model, panel causality analysis was carried out to analyze the long-run causality relationships.

Bootstrap Panel Granger Causality Analysis

The analysis in this work follows the Bootstrap Panel Granger Causality Analysis proposed by Konya (2006). This method considers the seemingly unrelated regression (SUR) model which avoids the problem of cross-sectional dependence. Moreover, this method does not require pre-testing for unit roots and cointegration (Konya 2006; Kar et al, 2011). Konya's (2006) bootstrap panel causality analysis is based on the estimation of the following systems of equations:

$$DI_{1t} = \alpha_{11} + \sum_{l=1}^{p_1} \lambda_{11l} DI_{1t-1} + \sum_{l=1}^{p_1} \beta_{11l} VS_{Nt-1} + \varepsilon_{11t}$$
$$DI_{1t} = \alpha_{11} + \sum_{l=1}^{p_1} \lambda_{1Nl} DI_{Nt-1} + \sum_{l=1}^{p_1} \beta_{1Nl} VS_{Nt-1} + \varepsilon_{1Nt} \quad (10)$$

$$DI_{1t} = \alpha_{11} + \sum_{l=1}^{p_1} \lambda_{11l} DI_{1t-1} + \sum_{l=1}^{p_1} \beta_{11l} FC_{Nt-1} + \varepsilon_{11t}$$
$$DI_{1t} = \alpha_{11} + \sum_{l=1}^{p_1} \lambda_{1Nl} DI_{Nt-1} + \sum_{l=1}^{p_1} \beta_{1Nl} FC_{Nt-1} + \varepsilon_{1Nt} \quad (11)$$

$$VS_{1t} = \alpha_{11} + \sum_{l=1}^{p_1} \lambda_{11l} VS_{1t-1} + \sum_{l=1}^{p_1} \beta_{11l} DI_{Nt-1} + \varepsilon_{11t}$$
$$VS_{1t} = \alpha_{11} + \sum_{l=1}^{p_1} \lambda_{1Nl} VS_{Nt-1} + \sum_{l=1}^{p_1} \beta_{1Nl} DI_{Nt-1} + \varepsilon_{1Nt} \quad (12)$$

$$FC_{1t} = \alpha_{11} + \sum_{l=1}^{p_1} \lambda_{11l} FC_{1t-1} + \sum_{l=1}^{p_1} \beta_{11l} DI_{Nt-1} + \varepsilon_{11t}$$
$$FC_{1t} = \alpha_{11} + \sum_{l=1}^{p_1} \lambda_{1Nl} FC_{Nt-1} + \sum_{l=1}^{p_1} \beta_{1Nl} DI_{Nt-1} + \varepsilon_{1Nt} \quad (13)$$

Where N denotes the number of cross sections (i=1,…,N); t denotes the period (t=1,…,T) and *l* denotes the length of the delay. If the calculated country-specific Wald test statistics exceed the bootstrap critical value, then the null hypothesis of no causality will be rejected. Since the estimations conducted by this method are specific to a single cross-section, means a single country, it allows for heterogeneous slope coefficients.

Empirical Findings

Within the scope of the empirical model, both cross-sectional dependence and homogeneity are considered to obtain consistent estimates. The results of the CDLM test (Pesaran, 2004), Bias Adjusted LM tests (Pesaran et al, 2008) and the Delta test (Pesaran and Yamagata, 2008) are given in table 2.

studied panel data model. In the analytical process, the econometric techniques that are vigorous to cross-sectional dependence and slope heterogeneity were employed. The results of investigating the stationarity properties of the variables utilizing the CIPS Panel unit root test are given in table (3). Moreover, the results of applying the unit root at the level and first difference taking the constant and the constant plus trend are reported in the table (3).

The DI variable is stationary at the first difference considering both constant and constant-trend models at the 5% significance level. The level value of the VS variable is stationary considering both constant and constant-trend models at a 5% significance level. The FC variable is stationary at the first difference considering the constant model at a significance level of 1% and stationary considering the constant-trend model at a significance level of 10%. To summarise, DI, VS and FC are stationary at I(1), I(0) and I(1) levels, respectively. According to the CS-ARDL approach, the stationarity levels of the variables being I(0) or I(1) do not pose a problem for the next step of the analysis.

The CS-ARDL approach was utilized to calculate the values of long- and short-run coefficients. The CS-ARDL approach handles the issues of cross-sectional dependence and different degrees of stationarity. The CS-ARDL mean group estimator was employed to obtain

Table 2. The Results of Cross Section Dependence and Homogeneity Test

Test	Statistics	Prob.
CD_{LM}	5.865***	0.000
LM_{adj}	5.884***	0.000
$\tilde{\Delta}$	6.399***	0.000
$\tilde{\Delta}_{adj}$	6.982***	0.000

*** denotes that the null hypothesis is rejected at the 1% level.

Table 3. Results of CIPS Panel Unit Root Test

	Level		**First Difference**		**Result**
	Constant	**Constant -Trend**	**Constant**	**Constant -Trend**	
DI	-0.362	-0.830	-2.216**	-2.964**	*I(1)*
VS	-2.473**	-2.898**	-	-	*I(0)*
FC	-1.530	-1.199	-2.710***	-2.820*	*I(1)*

Note: ***, ** and * denote that the null hypothesis is rejected at the 1%,%5 and %10 levels respectively. Constant model's critical values (Pesaran, 2007: 280): %1: -2.60, %5: -2.34, %10: -2.21. Constant plus trend model's critical values (Pesaran, 2007:281): %1: -3.15, %5: -2.88, %10: -2.74. The maximum lag length has been determined according to SIC and the maximum lag length is 3.

Table 4. The results of CS-ARDL

KE = *f* (DUO, SSO)					
	CS-ARDL (2,3,2)			*CS-ARDL$_{REC}$* (2,3,2)	
	Coefficient	t-Statistics		Coefficient	t-Statistics
Short-run					
ΔDI_{t-1}	-0.265*	-1.69		-0.451***	-3.41
ΔVS	1.066	1.26		1.249**	1.94
ΔFC	0.933**	2.24		1.270***	2.56
Long-run					
VS	0.409	0.39		0.095	0.14
FC	0.460*	1.68		0.485**	2.69
Error-correction	-0.823	-5.02***		-0.693	-7.90***
F Stat.		5.28***			4.09***
Adjusted R-squared		0.82			0.79

Note: ***,** and * denote that the null hypothesis is rejected at the 1%,%5 and %10 levels respectively.

the country-specific coefficients on the horizontal cross-section. The optimum lag structure was determined by the F-test methodology of general-to-specific. Moreover, the recursive mean adjustment (REC) developed by So and Shin (1999) was employed to correct for small sample time series bias. The results are summarized in Table 4.

The results revealed that according to the short-term bias correction method (REC), the VS has a positive effect on DI at the 5% significance level. A 1% increase in VS increases DI by 1.24%. The FC variable, which had been added to the model as a control variable, had a positive impact on DI. According to CS-ARDL estimation, a 1% increase in FC increased development by 0.93% at the

Table 5. Results of Konya's (2006) Panel Causality Test

	DI ⇏VS				VS ⇏DI			
	Wald-Stat.	Bootstrap Critical Values			Wald-Stat.	Bootstrap Critical Values		
		%1	%5	%10		%1	%5	%10
Brazil	0.090	3.067	1.660	1.075	2.933*	4.791	3.087	2.353
Russia	1.953	31.27	20.559	16.108	1.489	7.48	4.034	2.798
India	0.210	9.368	6.479	5.309	1.124	15.185	10.033	8.217
China	2.598**	3.176	2.000	1.470	0.064	3.086	1.504	1.059
S.Africa	0.017	20.688	13.658	10.814	3.670	29.486	21.203	17.589
Turkey	4.210*	7.106	4.575	3.429	0.810	4.714	2.393	1.500
	DI ⇏FC				FC ⇏DI			
	Wald-Stat.	Bootstrap Critical Values			Wald-Stat.	Bootstrap Critical Values		
		%1	%5	%10		%1	%5	%10
Brazil	7.686***	3.798	2.763	2.256	1.724	9.279	5.338	3.493
Russia	25.120***	22.179	17.071	14.479	0.513	10.055	5.352	4.267
India	43.587**	57.009	39.126	33.710	0.095	53.802	36.631	28.842
China	10.624**	12.069	10.181	8.945	4.034*	9.128	5.061	3.474
S.Africa	0.826	18.122	13.232	11.329	2.926	28.281	19.673	15.869
Turkey	2.734**	3.637	2.329	1.727	7.822***	5.966	3.927	2.864

Note: ***,** and * denote that the null hypothesis is rejected at the 1%,%5 and %10 levels respectively.

5% significance level. According to the bias correction estimation, a 1% increase in FC increased development by 1.27% at the 1% significance level. The results of the long-run estimation are similar to those of the short run. The impact of fixed capital formation means the control variable, on development is positive and significant in the long run. The impact of vertical specialization on development is positive and significant in the short run but an insignificant positive impact of vertical specialization on development had been accounted in the long run. Finally, the error correction terms of the CS-ARDL and CS-ARDL$_{REC}$ estimates were negative and significant at the 1% significance level. This result revealed a long-run equilibrium process. According to the CS-ARDL estimator, the velocity of the equilibrium is 82.3% per period; and the CS-ARDL$_{REC}$ predicted an adjustable rate being 69.3% per period. In the fourth part of the analysis, the bootstrap panel Granger-causality of Konya (2006) had been employed to investigate the long-term causality relationship. This method was found to be appropriate due to the presence of horizontal cross-sectional dependence and slope heterogeneity in the studied model. Moreover, it gives consistent results regardless of whether the variables are stationary or not. Furthermore, it allows for determining causality for each country in the studied sample separately. The maximum lag level was determined as 3 and the optimum lag order was determined by Schwarz Information Criterion (SIC). Bootstrap critical values are achieved in 10.000 cycles. The results of the bootstrap panel Granger-causality of Konya (2006) are given in table (5).

The results in table 5 revealed that China and Turkey had one-way long-term causality running from development to vertical specialization at the level of significance of 5% and 10%, respectively. Only Brazil had one-way long-term causality running from vertical specialization to development at the level of significance of 10%. A stronger causal link running from development to fixed capital formation had been accounted in the long run. Causality had been reported in Brazil and Russia at the level of significance of 1%. It had been reported also in India, China and Turkey at the 5% significance level. Causality running from fixed capital formation to development had been reported in China and Turkey at the significance level of 10% and 1% respectively. The results revealed a two-way causality between development and fixed capital formation variables in China and Turkey. A long-term consistency had been detected according to the estimation results of CS-ARDL and and those of Granger causality analysis. Based on the estimation results of , vertical specialization affects development positively in the short run but no effect can be reported in the long term. Although a causality running from vertical specialization to development has been detected in Brazil, this relationship is not very strong (10% significance level); the fact that causality could not be detected in other studied countries supports this result.

CONCLUSION

With the acceleration of globalization trends, significant changes have taken place in the structure of world trade. One of the most distinctive features of this change is the fragmentation of the production process of goods and services. In the world economy, instead of producing a final good or service in one single country, more than one country specializes in one or more certain stages of the production process until this good and service take its final form. That is, the international fragmentation process of production or the global production network. Developing countries, in particular, heavily participate in the international fragmentation of production and some of the emerging market economies play a significant role in it. BRICS+T countries have also participated significantly in the global production process, especially after the 2000s. In this paper, the vertical specialization ratio has been calculated to see the extent to which BRICS+T countries participate in the global production network. Moreover, the development index had been calculated utilizing various economic and sociocultural indicators of these countries. Furthermore, the vertical specialization's impact on development in BRICS+T countries was analyzed utilizing the CS-ARDL model. The results revealed a statistically significant positive impact of vertical specialization on development in the short-run. Although vertical specialization has a positive effect on development in the long run, this result is not statistically significant. Finally, Konya's (2006) causality test has been applied for checking the causal relationship among the selected variables. The results revealed a one-way causality running from development to vertical specialization in China and Turkey. A causal relationship running from development to vertical specialization could not be detected in Brazil, Russia, India and South Africa. The one-way causality relationship running from vertical specialization to development was seen only in Brazil, while no causality relationship could be detected in other countries included in the analysis. The results of Konya's (2006) causality test revealed a one-way causality running from development to vertical specialization in China and Turkey. A causal relationship running from

development to vertical specialization could not be detected in Brazil, Russia, India and South Africa. The one-way causality relationship running from vertical specialization to development was seen only in Brazil, while no causality relationship could be detected in other countries included in the analysis. Participation in global production networks may not always have positive effects on the country's economy and development. As explained in the literature review, global production networks can lead to inequalities or make a country more vulnerable to crises. In addition, it can make companies dependent on leading companies. The empirical findings obtained in this study show that although the global production network positively affects countries' development in the short run, it does not have a serious effect on the development of countries in the long run. For this reason, to move through participation in global production networks to positions of producing higher value-added, it is necessary to encourage technology, foster innovation, and benefit from the technological innovations that have already been developed and used in developed nations. In addition, the production of technology-based goods and services should be encouraged. Moreover, incentive and orientation policies should be applied to sectors considered important in the global production network process. In this sense, the government can play an active role. The applied policies should deepen benefiting from the knowledge and experience of the leading companies further than being dependent on them. Thus, developing countries come to the stage at which their participation in the global production network becomes not only a determinant of this process but also independent from the developed countries, and as a result, positive effects, in the long run, can be achieved in the developing countries.

Appendix-1: Vertical Specialization's Calculation Method

The vertical specialization of each sector in an economy was calculated by applying the HIY method proposed by Hummels, Ishii & Yii (1998; 2011) to I-O tables. Under the assumption that there are n sectors in the economy, the input-output model is created as follows (Yin and Liu, 2019: 453):

$$\begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} \text{x} \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix} + \begin{bmatrix} f_1 \\ \vdots \\ f_n \end{bmatrix} = \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} \quad (1)$$

A summary notation for equation (1) is:

$$\text{X.A} + \text{F} = \text{X} \quad (2)$$

To obtain equation (3), we need to isolate the X variable:

$$\text{X} = (\text{I-A})^{-1} + \text{F}^2 \quad (3)$$

Equation (3) symbolizes the equilibrium level of output in an economy consisting of n sectors (Miller and Blair, 2009: 11-15). $\mathbf{X}$ $nx1$ denotes the output vector, $\mathbf{A}$ nxn represents the matrix of technical coefficients, $\mathbf{I}$ nxn represents the identity matrix, $\mathbf{F}$ $nx1$ denotes the final demand vector and $\mathbf{(I-A^d)}$ nxn represents the Leontief inverse matrix. The technical coefficients matrix ($\mathbf{A}$) is made up of the sum of the domestic technical coefficients matrix ($\mathbf{A^d}$) and the imported coefficient matrix ($\mathbf{A^m}$) (Xiao et al., 2020: 543):

$$\begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix} = \begin{bmatrix} a_{11}^d & \cdots & a_{1n}^d \\ \vdots & \ddots & \vdots \\ a_{n1}^d & \cdots & a_{nn}^d \end{bmatrix} + \begin{bmatrix} a_{11}^m & \cdots & a_{1n}^m \\ \vdots & \ddots & \vdots \\ a_{n1}^m & \cdots & a_{nn}^m \end{bmatrix} \quad (4)$$

A summary notation for equation (4) is:

$$\text{A} = \text{A}^{\text{d}} + \text{A}^{\text{m}} \quad (5)$$

Utilizing the equations derived above, the sectoral vertical specialization rates in an economy can be estimated utilizing the HIY method proposed by Hummels, Ishii, and Yi (2001) (Hummels, Ishii and Yi, 2001: 78-82):

$$\frac{VS_i}{X_i} = \frac{u.A^m.X}{X_i} \quad (6)$$

Equation (6) expresses the rate of direct imported intermediate input used in the production process of exporting goods. The total vertical specialization (direct + indirect) ratio of any sector in any *i* country can be calculated. It could be obtained as follows (Hummels, Rapoport and Yi, 1998: 96; Hummels, Ishii and Yi, 2001: 78-82; Dağıstan, 2019: 8-10):

$$\frac{VS_i}{X_i} = \frac{u.A^m[I-A^d]^{-1}.X}{X_i} \quad (7)$$

$(\text{I-A}^{\text{d}})^{-1}$ denotes Leontief inverse matrix. Equation (7) represents the basic equation to calculate the vertical specialization rate.

[2] $(\text{I-A})^{-1}$ denotes Leontief inversion matrix. (See Miller and Blair, 2009; Aydoğuş, 2015). The final demand vector (F) denotes the sum of domestic final demand and foreign final demand

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Young Labour Force and Labour Market Harmony in A Developing Economy: Turkey TRB2 Region Survey

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ABSTRACT

The aim of this study is to discover the root causes of the labor market adjustment problem, which has not been resolved for a long time in Turkey, on the most fundamental basis and by observing in the least developed region. The study is based on data obtained from qualitative and quantitative field studies that lasted approximately nine months as part of a research project supported by the Eastern Anatolia Development Agency (DAKA). According to the results, social skills deficiencies have been identified among the causes of labor market conflicts and vocational skill deficiencies in regions with low socio-economic development. Contrary to most studies on education-employment fit, the results of this study show that central education remains a habit for the labor market parties but does not meet the expectations of both parties.

Keywords: Regional Development, Vocational Education, Education Policies, Labour Force Adaptation, Labour Market.

JEL Classification Codes: J21, J24, J23

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INTRODUCTION

Development is the main aim of all countries. Utilising the current potential at the most appropriate level with the effective use of scarce resources is one of the main topics of discussion today. At the 75th General Assembly meeting of the United Nations, it was highlighted that it should be more sensitive to sustainable development goals and focus on regional development policies (UN, 2020).

Development is directly related to welfare, quality of life, and economic growth. However, the fact that development constitutes a multi-component problem area makes its analysis of economic growth only insufficient. For this reason, many components are included in development plans, from poverty to education, health to clean energy, and decent work to gender equality.

Human capital, which expresses the knowledge, skills, and experiences of labour through education (Becker, 1993), is one of the essential components of economic development. Therefore, human resources that are better educated and have qualifications compatible with market needs have an indispensable place in the development process together with physical capital (Karataş and Çankaya, 2010).

Among NUTS Level-2 regions, the classification of Turkish Statistical Region Units TRB2 (Bitlis, Hakkari, Mus, and Van provinces) is the least developed Region in "development labor market problems" and "labor market-vocational education incompatibility problems" in Turkey. Therefore, problems regarding human capital in the region constitute an essential obstacle to regional development (Celikkaya, et al. 2018).

To sustain the regional development process competently and produce effective policies, in-depth studies need to be conducted that allow the potential to be accurately determined in regions where labour market mismatch is intense. Based on the need mentioned, the research was carried out in provinces with low socio-economic development, such as Bitlis, Hakkari, Mus, and Van, within the scope of a project with the Eastern Anatolia Development Agency (DAKA). The research

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This study is based on the results of the Project "TRB2 Labor Market and Vocational Education Harmonisation Research on Supply and Demand" (2019-2020) conducted with the Eastern Anatolia Development Agency (DAKA). The project was carried out with the support of Halil İbrahim Güray, the General Secretary of DAKA, and Emin Çakay, Head of the Human Capital and Entrepreneurship Policies Department. Although the research results were used in the region's strategic plan, it has not been published anywhere. This study has been prepared to disseminate the results and contribute to the region's development.

consists of four stages: (1) Current Situation Analysis, (2) Identification of Problems with Stakeholders and SWOT Analysis Workshop, (3) Fieldwork, (4) Compilation of Results, Reporting, and Action Plan. Each stage was carried out with the broad participation of public institutions and organizations, the private sector, and worker representatives.

This study covers the results obtained in the 1st, 2nd and 3rd stages of the research.

BACKGROUND OF THE SUBJECT AND LITERATURE

Based on the regional development issue, which has a rich scientific literature, it is primarily emphasized that the structural characteristics of the regions have a significant role in the development and that the human capital potential must be correctly determined for the regional development to move to be successful (Illeris, 1993; Ferrari et al., 2012; Pike, et al., 2010; Frédéric and Daviet, 2010). Research has demonstrated that central policies alone are insufficient to create the expected benefits in development, therefore the need for practical cooperation and sharing with local actors to identify and support regional dynamics (France PACA, China Regional development, Indonesia, France, and Spain regional development experiences. (Hirschman, 1958; Mrydal, 1971; Hansen, 1990; Hill, 1998; Hummelbrunner and Lukesch, 2008; Lang-Görmar, 2019).

Hummelbrunner and Lukesch (2008), whose concrete classification on the subject is suitable for the purpose and scope of our study, attributes the success of regional development processes to the following conditions: (1) The economic, social, cultural, and physical resources in a region should be maintained in interaction and cooperation, (2) public and private policies must be implemented in a mixed manner, (3) the demands and interests of regional social actors must be fully understood and taken into account, (4) region-specific products and services must be segregated and highlighted with emphasis on uniqueness, (5) all policies should be sustainable, and planned and implemented at a level that can be transferred to the future.

Regional development discussions in Turkey have been on the agenda since the beginning of the planned period. Although regional sensitivity is clearly emphasized in development plans, it is seen that the desired success has not been achieved. Therefore, it was decided to establish Development Agencies throughout Turkey in 2006 to support regional development. Development agencies in Turkey have been established within the framework of the EU harmonization process. The Eastern Anatolia Development Agency (DAKA) responsible for the TRB2 region, which includes the provinces in the sample of our research project (Bitlis, Hakkari, Mus, and Van), was established in 2008. Thus, conducting research that allows the region's potential to be accurately determined to sustain the regional development process competently and produce effective policies has become more accessible. DAKA has also created the infrastructure of this research on the labour market.

To ensure the efficiency and effectiveness of labour markets, various policies and strategies are being developed to address fundamental problems such as reducing unemployment, establishing the education-employment balance, preventing underemployment, increasing the supply of qualified labour, combating youth unemployment and eliminating the youth trend neither in employment nor in education and training (NEET). Under the influence of global competition, efforts have been made to find solutions to the problems of labour supply and demand mismatch in qualification and skill needs due to high unemployment and the prevalence of unregistered employment areas, especially in the labour markets of developing countries. (Kanbur and Svejnar, 2009).

It is seen that unemployment is increasing day by day due to structural reasons in developing countries such as Turkey. However, this problem differs by region, and the level of incompatibility changes due to interregional inequalities in development. For example, while the high skill balance draws attention in regions where the manufacturing sector and technology-intensive production are concentrated, it is seen that the low skill balance trap occurs in less developed regions where labour-intensive production areas are common such as agriculture and animal husbandry (OECD, 2017). Therefore, adapting to different strategies of the labour market requires different strategies in these regions with low skills and creates a low-skill balance trap. Because of this, it is essential to develop national policies and strategies to ensure that the balance of education and employment is regionally oriented in line with local needs (Rees, 2006).

TRB2 region provinces included in the Employment and Talent Strategies OECD Report have been shown as a low-skill equilibrium trap area in Turkey (OECD, 2017). According to the 2017 Social and Economic Development Index study prepared by the Ministry of Development, TRB2 region provinces are residual. TRB2 region provinces are the provinces with a high level of

education-employment conflict in line with the goal of "restructuring vocational education within the scope of Industry 4.0" in the 100-Day Execution Program published by the Presidency of the Republic of Turkiye the Ministry of National Education's industrial and vocational secondary education mapping. These reports and studies reveal the urgency of creating a project and action plan to harmonize the labour market with vocational education in the TRB2 region. Central education-employment policies developed for all development levels do not work as development moves away from the general. For this reason, this study aims to develop policies specific to the regions with the lowest development level instead of central policies; It is expected to contribute to regional development policies in other developing countries significantly.

METHODOLOGY

It is observed that the labour market needs cannot be met at the desired level with vocational training throughout Turkiye and in the region where the study is conducted (DAKA, 2018). Considering this problem that has been going on for years, research questions have been determined as follows:• What is the reason for vocational education-employment mismatch despite all efforts?

- Why has the desired success not been achieved despite the studies and arrangements made for vocational training?
- Is making vocational and technical education more qualified enough to achieve the targeted adaptation?
- With the current vocational training system, can young people adapt to the labour market effectively?

On the axis of these questions, a research project has been initiated to discover labour market incompatibilities within the framework of the views of all actors and develop realistic suggestions with vocational training, which is highly important to support the labour market in regional development. A mixed approach that integrates qualitative and quantitative methods was followed in the fieldwork. Mixed research is a method that combines both quantitative and qualitative methods to produce the expected results (Creswell and Clark, 2017). This method was preferred because the results attempted to be obtained within the parameters of the investigation were multidimensional. The data were collected using original questionnaires developed within the scope of the research.

The interview questions used in the qualitative research were formed by utilizing the SWOT analysis results. The reliability of the questions within the scope of qualitative research was tested at the Vocational Education Van Model workshop held between 18-20 November 2019 in cooperation with the Van Provincial Directorate of National Education and Eastern Anatolia Development Agency (DAKA). On the third day of the workshop, which was held with the participation of public and private sector representatives, qualitative research questions were asked to the parties regarding their opinions, determinations and solution suggestions regarding the problems in the region in general. Evaluations were made regarding the project of harmonizing the labor market and vocational education in the TRB2 region and unnecessary, vague and difficult to understand questions were removed.

Through the pilot interviews conducted at the workshop, the content of the questions in the semi-structured interview forms, the language used, clarity, subject-question appropriateness, and the length of the interviews were checked. In this context, questions that repeated each other and led the participants give similar answers were removed from the interview form to use the time correctly, and some expressions used in the questions were changed to be more understandable.

Fieldwork

Field studies within the scope of the research were carried out in two directions:

1. SWOT Analysis is carried out to determine the Strengths-Weaknesses and Opportunities-Threats regarding the current situation of the labour market in the TRB2 Region.
2. Demand-oriented determination of the perceptions, attitudes and behaviors of sector representatives, employers, and presidents of chambers of commerce and industry with employment potential using the qualitative method,
3. Supply-oriented determination of the opinions of the textile employees, tourism sector employees, employees in organized industrial zones and small industrial sites, and students continuing their education in vocational high schools using the quantitative method.

During the SWOT Analysis some essential topics related to the labor market, such as labor market problems, the importance of vocational training, unemployment and employment, youth unemployment, gender, qualification mismatch, underemployment, and R&D, were introduced to the participants, and opinions were collected in line with the following questions:

- What are the "strengths" in the current situation?
- What are the "weaknesses" in the current situation?
- Which "opportunities" can be utilized in the relevant external environment?
- Which "threats" can be considered in the relevant external environment?

Five separate tables were formed for the Construction, Health, Agriculture, Textile, and Tourism sectors, which are included in the National Employment Strategy and whose participants were determined with the support of DAKA. The selection of the relevant sector representatives determined by DAKA was based on the criteria of "employment potential in TRB2 Region" and "need for labour force with vocational training".

All participants were given adhesive papers in different colors to write their strengths and weaknesses. They were asked to write a single proposition on each paper. These propositions were pasted on the boards next to each table so everyone could see them. The participants were informed that a single score sticker should be attached to each topic. The topics were ranked from the most points to the most minor points.

During the demand-oriented fieldwork, focus group meetings and in-depth interviews were held with the heads of chambers of commerce and industry, company owners, and/or representatives in the region. In the first stage, meetings were held with the heads and the delegation of the Van and Tatvan Chambers of Commerce and, and the subject was explained, and their opinions were collected. In the second stage, 28 employers or representatives from 11 different sectors operating in the region were interviewed within the scope of the questions prepared previously.

The focus group interview method allows the creation an adequate data set by increasing the effectiveness of group dynamics' responses to questions according to individual interviews. There are differences between individual behavior and behavior within the group. While individuals maintain their normative patterns between groups, they also represent the culture and system of values they live in. Groups can look from a broader perspective than individuals (Aksu, 1996; Gönüllü, 2001). Thus, it can create more options for problem-solving. Considering the aforementioned advantages, the first phase of the TRB2 region labour demand research was initiated with a focus group meeting with the relevant people.

In selecting samples, representatives of priority sectors in provinces and districts with high employment and production potential in the region, employers, and chambers of commerce and industry were used in line with the recommendations of DAKA. Open-ended questions directed to the participants in the focus group and the meeting was open for discussion individually, and all participants could speak.

In the supply-oriented field study, questionnaires prepared for individuals in employment representing the labour force supply profile in the TRB2 region and vocational education students who will not be included in the labour force due to their continuing education and will enter the labour market were applied. The first level of the supply-oriented fieldwork was conducted with a total of 882 people, including textile city workers (140 people), tourism sector employees (166 people), employees in the organized industrial zone (OIZ) and small industrial sites (SIS) (576). The second level of research was conducted with 675 students continuing their education in vocational high schools. Both sample numbers are more than those calculated with a 95 percent confidence interval (5% significance level) (Saunders, 2019).

In determining the first level research sample, individuals employed in companies in textile cities, tourism, organized industrial zones, and small industrial sites in provinces and districts with high employment and production potential were taken into consideration in line with the recommendations of DAKA and regional chambers of commerce.

Analysis of Data

SPSS 23.0 (Statistical Packages for Social Sciences) package program was used to analyse and interpret the collected quantitative data. In the analysis of the data obtained from the quantitative research, the frequency values and percentage shares for the questions in the questionnaire are presented in tables.

The quantitative research question form was organized under the heading below;

- Demographic questions (12 questions)
- Questions to determine the labor force situation (11 questions in total, including yes-no (10) and sector selection (1))
- Questions for qualification (20 triple Likert-type questions)
- Perception questions on vocational education (18 triple Likert-type questions)
- Questions to determine future expectations (5 open-ended questions)

Chronbach's alpha calculations within the framework of numerical data sets except demographic questions;

- For the questions on the determination of labor force status, 867
- For questions related to the determination of qualifications, 871
- For the questions on perception towards vocational education, 768
- For the questions on determining future expectations, 787
- The average Chronbach's alpha coefficient was calculated, 823.

Questions were clustered close to the form design in frequency distribution.

The qualitative data collected were transferred to the computer environment simultaneously with the interviews, and the relevant transfer was shared and confirmed with the participants. As a result of the focus group meeting, a balance was observed between systematic information and participants' comments while writing the report. Feedback was given to the participants about the report draft. The data were then analysed, classified, discussed, and reported with an inductive approach.

FINDINGS

The findings within the scope of the research are classified under three main headings; SWOT analysis results, demand-oriented data collected by qualitative method and supply-oriented data collected by quantitative method.

SWOT Analysis Results

Strengths of the region;

- Tourism potential of the region,
- Presence of trainable young population and low labor costs,
- Widespread agriculture and animal husbandry,
- Geopolitical position,
- Open communication channels with the region and its districts,
- Restructuring of public institutions after the earthquake.

Weaknesses of the region;

- Negative image of the region throughout Turkiye,
- Ineffective use of the labor force potential in the region,
- Inadequate promotion of the region and inadequate utilization of tourism potential,
- Inadequacy of general education and vocational training,
- Undeveloped industry,
- Unplanned urbanization, population growth, and lack of infrastructure,
- Inadequacy in public and private sector co-operation,
- Lack of social solidarity and co-operation,
- Ineffective utilization of agriculture and animal husbandry potential,
- Economic problems and the cost of living.

Opportunities of the region;

- Characteristics favorable for investment,
- Cultural and historical tourism potential,
- Potential in terms of agriculture and animal husbandry,
- Underground and surface resources,
- Efforts to train skilled labour force and institutional support in this regard,

- Improvement of co-operation between public institutions and public services,
- Increasing recognition of the region.

Threatens of the region;

- Security and terrorism,
- Social problems due to ecological degradation and lack of green space,
- Moral erosion due to drug and substance abuse,
- Failure to retain qualified people in the region,
- Disorders in the merit system and related administrative failures,
- Poor standards of education,
- Failure to protect the natural brand values specific to the region,
- Income inequality and unemployment,
- Prevalence of gender discrimination,
- Unplanned economy and low investment rates,
- Geopolitical position of the region and events in neighbouring countries,
- Social aids and supports push individuals to laziness,
- Being a disaster area.

Qualitative Research Findings

The sectoral distribution of the companies participating in the research is shown in Table 1. It is seen that textile and tourism come to the fore in the sectoral distribution of the companies within the scope of qualitative research in the region. The companies interviewed were determined by considering the sectoral distribution density and diversity in the labour market of the TRB2 region.

The firms within the scope of the research differ in terms of institutionalisation level, workforce profile, and firm size. Therefore, although it is thought that the labour force demands of the companies will also differentiate, similar thoughts have been found in their approach to vocational training.

Perceptions and Attitudes Regarding Vocational Education and Labour Supply in the Region

All participants in the qualitative research, shown in Table 1, stated that "*despite the quantitative expansion of vocational education graduates in the TRB2 region, their needs and expectations are not met qualitatively*".

All of the participants support vocational training activities. In this sense, it is understood that they provide an opportunity for workplace training to carry out institutional activities related to the required competence levels, primarily through the development of school-industry cooperation.

Table 1. Sectoral Distribution of the Companies Participating in the Research

Sector	F	%
Textile	8	28,6
Tourism	5	17,9
Automobile maintenance, repair, and spare parts	4	14,3
IT and Media	3	10,7
Construction	2	7,1
Drill pipe manufacturing	1	3,6
Steel door manufacturing	1	3,6
Packaging	1	3,6
Food	1	3,6
Retail	1	3,6
Aluminum manufacture	1	3,6
Total	28	100

Perception Regarding the Reasons for Unavailability of the Needed Workforce in the Region

Almost all participants responded negatively to the question, "*Can you easily find the qualified workforce you need in the region?".* The following responses were also provided to the question"*Why do you think it cannot be found?*":

- The vocational education system in the region is insufficient to train the qualified labour force needed by the private sector,
- The vocational education system is designed without taking into account the needs of the production process and labour force demand,
- Higher education is too academic and leads to over-education,
- They stated that most employers provide training in the workplace because the qualifications and skills needed by the private sector are not offered in schools.
- From these answers, it is understood that the training either provides quality above the market need or is insufficient to meet the needs.

The Definition of Ideal Workforce Profile and Expectations in Regard to the Needs

Almost all participants think that "*having educational documents such as high school, vocational high school, associate degree or bachelor's degree does not mean having the qualifications required by the job*". In this context, as stated before, there is an opinion among the participants that" *"theoretical education received by new graduates is not generally related to the practice."*

The order of skills that participants demand when defining their ideal workforce varies by sector. However, "*business ethics, honesty, business ownership, taking responsibility, work discipline*" stand out as standard variables for all sectors (table 2). It was emphasised that the lack of professional skills could be eliminated practically in workplaces. Still, skills such as work ethics, keeping promises, responsibility, and honesty must be gained in formal education.

Participants have a decisive judgment that the young population potential of the region is not used sufficiently. Among the main reasons are the vocational training incompability with the labour market and the characteristics of generation Y, which are difficult to overcome with the standard curriculum in schools.

Table 2: Skill Sets Expected from the Ideal Workforce (in order of priority-First 3)

Sector / Business	Technical Skills
Textile	1. Professional/technical knowledge and experience 2. Social media management 3. Creativity and design
Tourism	1. Taking responsibility 2. Oratory and diction 3. Problem-solving
Automobile maintenance, repair, and spare parts	1. Business ethics 2. Communication and expression ability 3. Oratory and diction
IT and Media	1. Professional/technical knowledge and experience 2. Oratory and diction 3. Communication and expression ability
Construction industry	1. Business ethics 2. Taking responsibility 3. Physical and physical competence
Manufacture	1. Entrepreneurship 2. Business ethics 3. Sales management and marketing
Packaging	1. Business ethics 2. Creativity and design
Food	1. Social media management 2. Sales management and marketing 3. Persuasion

Quantitative Research Findings

The supply-oriented research has been carried out in two dimensions, targeting individuals in employment and students receiving vocational training.

Quantitative Research Findings for Employees

According to TURKSTAT Household Labour Force Survey Level-2 results, female labour force participation in the region is generally low (27.4%) and below Turkiye's average (53%). As a reflection of this situation, only 12% of those employed and participated in the research are women.

70% of the participants are 34 years old and younger. This situation is a reflection of the density of the young workforce in the region.

Almost half of the participants (47.7%) have high school-level education. Approximately 30% were primary school graduates, while 20% had a university degree. Almost half of the university graduate participants have a postgraduate education.

It is seen that more than half of the employed individuals participating in the research (54.1%) have families of 5-7 people. Despite this, the number of people working in the family is between 1 person (37.4%) and two persons (36.1%). This situation shows that the number of dependents in the households in the region is high.

When the variables related to the participant's employment status are examined, it is seen that 79.3% of them work full-time. On the other hand, 48.6% of the participants work informally (without insurance). This data confirms that the region's unregistered employment rate is above the Turkiye average of 34.5% (SGK). Participants' average monthly wages are also low, in line with the prevalence of unregistered work. Accordingly, approximately 1 out of every 3 participants (31.9%) works with a wage below the minimum wage. Considering that the number of people living in the same household in the demographic variables is concentrated in the range of 5-7 people and the number of employees in the household is mainly 1 to 2, average wage data show that poverty is expected in the region.

Table 3. Skill/qualification levels that the employed people think they have

Skill / Attribute	Level (%)		
	Low%	Mid%	High%
Professional/technical knowledge and experience	4,3	23	71,2
Physical and physical competence	3,1	14,6	80,6
Teamwork predisposition	3,9	14,5	80,4
The ability to communicate and express	4,2	19,6	74,9
Problem solving	2,4	16,4	79,9
Work ethic	1,4	12,2	84,6
Oratory and diction	11,7	28,2	58,5
Taking responsibility	2,5	15,3	80,7
Basic computer skills	42,3	29,4	24,5
Advanced computer skills	72	15,2	9,1
Foreign language	72,1	17,5	6,5
Sales management and marketing	12,4	24,8	59
The ability to persuade	3,1	26,3	68,5
Advertising	29,7	19	47,1
Social media management	24,5	23,9	47,8
Calculation	6,5	19,7	70,6
Creativity and design	17	24,6	54,6
Entrepreneurship	11,8	22	62,7
Project-based work	21,7	21,7	52,6
Panic management (ability to work under stress and pressure)	10,8	18,8	67,2
I am generally skilled	3,5	14,7	78,9

N = 882

When the data on the sector in which work is examined, according to the order of density in the region, professional, scientific, and technical activities (21.1%), accommodation and food services activities (17.6%), and manufacturing (16.4%) are in the top three.

In the previous stage, employers' expected skill sets from the ideal workforce were determined. Relevant skills were added to the supply-oriented quantitative research questionnaire, and individuals' perceptions of employment towards their qualification levels were also measured. Table 3 shows the proportional values obtained from the Triple Likert scale regarding the participant (individuals in employment) perceptions of ordinary skills using a graduated scale.

As a result of the analysis, the employees think that the employers have most of the technical skills they want, but (as seen in the previous research phase) employers think that the employees do not have these skills. In this case, either the employers do not consider their employees' skills as sufficient, or the employees cannot show their skills to the employers sufficiently. The perception mismatch can make the programs and implementation efforts to overcome the skill deficiency inefficient.

Apart from the relevant skill data set,*"If a center is established to develop and support vocational training in the region, do you request training from here to complete the skills you find yourself lacking".* Again, 80% positive answer was received to the question. This result supports previous findings.

Quantitative Research Findings for Students Receiving Vocational Education

In the second stage of the quantitative research, Findings regarding the questionnaire applied to the sample group of 675 students from the vocational education institutions in the provinces of the TRB2 region (Bitlis, Hakkari, Mus, and Van) were included.

57% of the students participating in the study are females, and 43% are males. According to the Ministry of National Education statistics, 51.2% of the students who receive vocational and technical high school education in the TRB2 region are male, and 49.8% are female. In this context, it is seen that the gender distribution of the students participating in the research is compatible with the distribution in the region.

Considering the age distribution of the students participating in the study, it is seen that 93.6% of them are between the ages of 14-18 because they are vocational high school students.

It is seen that more than half of the students participating in the study (60.9%) have families of 5 to 7 people. Despite this, the number of people working in the family is between 1 person (66.2%) and two persons (15.4%). The proportion of those with no employees in their families is 9.9%. Due to the structure of the region, considering the density of dependent people in households, the effects of the unemployment rate of 9.9% are also growing.

The students were asked whether they had sufficient financial means to continue their education. Only 32% stated they have sufficient financial means (43% stated they have partial financial means).

Most (90%) of the students participating in the study think they will have better living conditions by getting an education. However, most students (83%) stated that their families supported them in continuing their education. Based on these results, it can be said that the negative picture of schooling and continuing education in the region have started to change positively.

In the previous research stage, a sub-question form was created for the students using the skill set asking to the employers.. The purpose of this questionnaire is to clear students' perceptions of whether they have skills that employers think they need more and do not exist in their employees. Students; think they have a high level of "o" *"physical and physical competence, ability to work in teams, work ethics, problem-solving and taking responsibility"*. "They stated that they have medium-high-level skills of "i" *"rhetoric and diction"* ."They stated they have medium-level skills such "a" *"sales management and marketing, entrepreneurship, advertising, social media management, and project-based work "* ."They think they have" *"basic computer skills, advanced computer skills, and foreign language" skills at a low level.*

As a result of the analysis made, vocational education students think that employers have most of the skills they want, but employers think students do not have these skills. In this case, either the employers do not consider the skills of the vocational high school graduates to be sufficient, or the employees who are vocational high school graduates cannot adequately show their skills to the employers. Like the employees' results, the perception mismatch here can also make the programs and implementation efforts to eliminate the skill deficiencies inefficient.

According to the findings obtained from the Triple Likert scale regarding the expectations of the students participating in the research on vocational education, the students think that the education they have received meets their expectations at a limited level while 57.8% of them highly agree that vocational education is important in finding a job. As an extension of this result, when the students were asked whether their schools' physical education equipment is sufficient, only 24.7% stated that it was highly sufficient. In comparison, 55.9% gave a limited enough answer. This result confirms the insufficiency of physical capacity within the institutional capacity dimensions of vocational high schools.

The issue frequently emphasized in the literature and policy documents (e.g. 11th Development Plan) regarding vocational education is related to the insufficiency of the implementation dimension (Ulus, et al. 2015; Pillay et al. 2014; Lillis, and Hogan, 1983). Research results also support this inadequacy. For example, 21.8% of the students stated that the application dimension of their education was insufficient, and 52.3% stated that it was at a limited level. Approximately one-fourth think it is sufficient (25.6%).

Another important finding is related the students' intentions regarding the frequency of job change. In the qualitative part of the research, among the factors that shape the employers' negative perceptions towards the workforce are high turnover rates and the tendency of young workforce to change their jobs frequently. However, this determination does not coincide with the intentions of the students who receive vocational training within the scope of the research. Often, vocational high school students' intention to change jobs is not so high as stated by their employers. It can be explained by the change in the perceptions of different generations on working life, and it also shows that students' intentions can change as they get a start in working life actively.

CONCLUSION

In this research, three questions were asked and tried to be answered:

- What is the reason for vocational education-employment mismatch despite all efforts?
- Why is the desired success not achieved despite the studies and arrangements made for vocational training?
- Is making vocational and technical education more qualified enough to achieve the targeted adaptation?

As a result of all findings;

Despite all the efforts, it is understood that vocational education-employment incompatibility is the simultaneous and dynamic incompatibility of the education and employment relationship.

Despite many studies and arrangements for vocational training, the desired success cannot be achieved quickly and effectively due to the inadequacies in meeting regional and current needs.

It has been observed that making vocational and technical education over-qualified is not sufficient to achieve targeted compliance. The experience of a private vocational high school established in the region has also shown that making the education more qualified than the need, besides meeting the demand for intermediate staff due to the excessive education trap, turns it into a step that prepares students for qualified universities. In vocational training, it is understood that the education system should be established by taking both the employers' demands and the students' opinions. Apart from this, it has been revealed from the statements of students and employees that employers have incorrect or incomplete information about students at schools and those in employment.

As a result, it is understood that young people cannot get adapted effectively to the labour market with the current vocational education system within the scope of the research.

DISCUSSION AND RECOMMENDATIONS

As a result of the research, it is understood that although there is an apparent disagreement in labour market actors, the parties always perceive the reason for this incompatibility as external. The ease of looking at the problem externally makes the solution difficult and increases incompatibility.

The usual expectation that education still maintains its importance but does not meet market needs was reaffirmed in this study. Both employers, employees, and students who have not yet entered working life require flexible and practical vocational training centres to be established in the region.

The World Economic Forum (WEF) Future Jobs 2020 Report; emphasizes that by 2025, 85 million jobs could move between people and machines, and 97 million new jobs could emerge that require unique skill needs. The report also stated that 94% of employers expect their employees to gain new skills in their careers, and about 40% of them estimate that their employees will need new skills in six months or less to stay in employment (WEF, 2020) (According to the report published in 2018, the rate of employers who said that their employees needed to acquire new skills was 65%!). As a result of the research conducted in the region, it has been observed that it is challenging to create new jobs and combat the deficiencies in the labour market adjustment process while the labour force qualification needs for existing jobs cannot be met. This situation strengthens the prediction that the region will remain weak in the national and global competitive power in the future.

Although the students of the region think vocational education is essential in finding a job, employment problems arise due to the training that does not comply with the market requirements and the lack of experience. 88% of students answered positively to the question whether or not they would study if there were a vocational education/certification centre outside the school to improve their skills. Employed persons gave 80% positive answers to the same question. Both students and those in employment need a supportive education centre. While there are well-established institutional organizations such as vocational high schools, it is clear that people need for new training centres is not due to the inadequacy of educational opportunities but from the ineffectiveness of existing practices. It is easy to externalize the problem by attributing the ineffectiveness to the management of vocational high schools or the quality of their teachers. However, as a result of our visits, it has been seen that many vocational high schools in the region have pretty good administrations and a young and dynamic teaching staff that have not yet lost their enthusiasm. However, the fact that the curriculum does not have sufficient flexibility in the face of current developments and that teachers are not given sufficient authority/ responsibility and value other than teaching a certain curriculum can be cited as the reasons for the decline of the system. In order to harmonize vocational education and labour market needs, a wide area should be structured to save teachers from the static structure. During our research, we found that enthusiastic teachers working alongside bored teachers of similar ages felt that nothing could be done anymore.Bored teachers can outperform passionate teachers in their arguments because they receive the same wages, are less tired, and have more time for themselves than their students. Some enthusiastic teachers have not given up the struggle because of their personalities and ideas and continue to strive. However, it can be easily seen that the strength and motivation of most of them are rapidly exhausted. Corrections and improvements in the education system must be handled regarding human values. Within the framework of the results we have reached within the scope of this research, all of our technical suggestions for improving vocational training include improving human values in the infrastructure. Otherwise, no effort or institutional arrangement will succeed.

Suppose it is both costly and challenging to make the curriculum flexible. In that case, this need can be met quickly by establishing vocational training centres with a flexible curriculum at the local level. By means of the communication offices established in vocational training centres, current needs can be determined by continuously exchanging information with employers and their representatives. While the theoretical training that will meet the needs is delivered to students remotely (online), practical training can be carried out at the workplace of the interested employer or can be carried out as a simulation within the scope of three-dimensional applications (these applications are now easier and less costly than before. All working principles of the machine with three-dimensional applications, sections, etc., can be shown in total). Another sub-question asked to those who wanted to establish such a center within the scope of the research was about the method of providing education.Although the participants did not find the distance education

provided over the internet during the Covid-19 period sufficient, they found it valuable in critical situations by this result. Considering the future professional flexibility, speed and distance education are necessary for gaining different competencies. In this context, in addition to face-to-face training in vocational training/ certificate centres, distance education systems must also be included.

Our talented and enthusiastic teachers working in our current vocational high schools can be assigned to these centres. In this way, it may be possible to differentiate people with low added value from those with high. Suppose postings are subject to additional prestige and pay. In that case, they can support the motivation of talented people (in a broken system, there is a risk of employing incompetent teachers to receive additional wages from the centres. However, it is assumed that such nepotic assignments will decrease as the proposed centres will control employers doing business in the market).

Research results have shown that central policies for labour market adaptation in the least developed region of a developing country do not meet the needs. In this context, it can be said that there is a need for a complementary system with a flexible curriculum that will meet the vocational education expectations needed in the region, which is practical (the application dimension of the training is provided in the workplaces) and supported by distance education.

These results are consistent with similar studies in the literature. A one-size-fits-all approach might not be able to adequately handle regional variations in labor market challenges (Koisová et al., 2018). The requirements of the local population are frequently not met by central labor market adaption policies in the least developed areas of developing countries (Blien et al., 2010). This emphasizes the significance of putting in place a supplementary system that fixes the weaknesses in the central policy. One such method might be a flexible curriculum that meets expectations for vocational education and prioritizes hands-on training in actual-life scenarios (Mongkhonvanit, 2017).

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İçindekiler / Contents