Journal of Sustainable Economics and Management Studies (ECOMAN)

From the Editor

ECOMAN, The Journal of Sustainable Economics and Management Studies, is a publication of Istanbul Gelisim University (IGU) which identifies "sustainability" as a teaching, research and community service priority for itself. Respecting the rights of every living being of current and future generations is described by IGU as an ethical and intellectual responsibility. There is not (yet discovered) any second beautiful blue planet for us, so we need to be responsible beings in all kinds of our activities.

For a sustainable world and sustainable educational and scientific environment, our need to produce new knowledge and, most importantly, contribute to the future by utilizing this knowledge is growing in every passing moment. It is why we precisely publish ECOMAN.

In today's world, where the half-life of knowledge in many disciplines has decreased to less than 5 years, ECOMAN describes its mission as to become a platform on steady principles but that constantly renews itself, facilitates production and dissemination of knowledge for a sustainable life.

The number of international peer-reviewed journals approaching 3[1] million with an annual increase of 5 percent[2] is an indicator of the amazing amounts of scientific output produced in the ever-changing world. In order to contribute to ecological, economical and social sustainability the editorial team of this journal strongly believes that ECOMAN should join the chorus in this pool of ideas and scientific discussions.

We certainly will work hard towards and hope that as an outcome ECOMAN, will be a hub of discourse for researchers and readers of and on sustainability. We would like to express our gratitude to many of our peers and the IGU administration who encouraged and unconditionally supported us in this new endeavor. Let's take this opportunity one more time to remind ourselves that *we need to be very very responsible consumers of everything including ideas and science*!

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Editor
Nail ÖZTAŞ, Ph.,D.
Istanbul Gelisim University

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[1] https://ncses.nsf.gov/pubs/nsb20206/data#table-block

[2] R. Buchkremer *et al.*, "The Application of Artificial Intelligence Technologies as a Substitute for Reading and to Support and Enhance the Authoring of Scientific Review Articles," in *IEEE Access*, vol. 7, pp. 65263-65276, 2019, doi: 10.1109/ACCESS.2019.2917719.

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The Relationship Among Employee Emotional Intelligence Levels and Job Satisfactions and Job Performance: A Survey in Ankara Organized Industrial Zones

Nail ÖZTAŞ*, Fatma ULUTÜRK**

Abstract

In this study, data obtained by the quantitative method, which were surveyed to examine the cause-and-end relationship; factor analysis, reliability analysis, ANOVA and regression analyses were carried out with the SPSS statistics program. The population of the research was 6745 people working in the electronics and optics sector in Ankara Organized Industrial Zones and 464 people were sampled from the study. Regression equation results reveal that emotional intelligence has a positive effect on work performance, emotional intelligence affects the job satisfaction of individuals, and it is decisive upon life satisfaction resulting in the total satisfaction of individuals. However, cognitive intelligence (IQ) alone does not affect employee performance. Consequently, high levels of emotional intelligence of individuals also positively affect their social life, job satisfaction and performance. Therefore, the results are supported by the scope of this thesis, domino effect of business satisfaction, employee performance, operating efficiency, business world and country prosperity.

Keywords: *Emotional Intelligence, Job Satisfaction, Job Performance, Business Performance, Conforming Factor Analysis.*

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1. Introduction

The purpose of this study is to analyze the relationship of employees' emotional intelligence levels with job satisfaction and job performance, and the research question of the study is to investigate whether employees are related to emotional intelligence levels and job satisfaction and job performance.

Emotional intelligence is the ability to understand and manage the feelings of other people and himself. Employees should be satisfied with their work to be useful (Bal & Gül, 2016: 117).

The concept of emotional intelligence, job satisfaction, job performance, leadership and organizational commitment can affect variability in business life. Emotional intelligence has social, personal and emotional dimensions of intelligence.

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Emotional intelligence is associated with understanding itself and others in terms of being in harmony with the environment and communicating successfully with people. Emotional intelligence can appear in different ways. These are ability, personality structure or ability to actively use emotional intelligence (Gürbüz & Yüksel, 2008: 176).

The reason for the interest in emotional intelligence in business life is that it is seen as one of the factors that increases business success, such as empathy, effective inter-person communication, developing a positive perspective, and effectively managing other people's feelings and their own emotions. If teamwork, acting together and good human relationships increase success in a workplace, having only academic knowledge in that workplace will not be enough to achieve the desired level of success. Managers with high levels of emotional intelligence evaluate their employees' perspectives, body languages, energized and sound characteristics, while managers with low levels of emotional intelligence use trial and error in their tasks (Chan, 2006: 1044).

The idea that the individual is in businesses as a whole with his physical and spiritual structure, that he or she is not a machine and that it affects businesses to stand out. The needs of individuals are classified as physiological and psychological needs. While psychological needs were found to increase as they were satisfied, physiological needs were found to decrease as they were satisfied. It is thought that ensuring continuity in the job satisfaction of employees will also positively affect their commitment to where they work. In cases of job dissatisfaction; employees

exhibit negative behavior. Due to these behaviors, activity and efficiency are adversely affected. In addition, the deterioration of the health of the employee also brings a burden to the business (Sudak & Zehir, 2013: 142).

Job satisfaction is related to the interactive responses of individuals that pass through the norms, expectations, values system and develop depending on business and business conditions. It is the most crucial factor that affects people's attitudes towards their work positively or negatively. Determining job satisfaction is related to the degree to which the opportunities and opportunities provided at work meet the expectations of individuals. Job satisfaction is also defined as differences between expectations and what happens (Bal & Gül, 2016: 117-118).

Sharing emotional intelligence in the most efficient way between managers and employees; increase love and respect among employees in the business environment, ensure job satisfaction, strengthen organizational citizenship behaviors, increase motivation, reduce staff turnover speed, and improve job performance (Sudak & Zehir, 2013: 142).

People continue their lives and jobs blindly, with minimal consciousness, without understanding themselves. Understanding how a person can affect themselves and their work performance offer individuals the opportunity to perform their tasks in a more meaningful way and meet their business needs (Wheeler et al., 2020: 510).

In the absence of an effective performance evaluation system, research results show that only officers with a high degree of self-motivation and in-depth civic duty have

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reasons to get better at their jobs and improve their performance. Contrary to the expectations of some public administration academics and stakeholders, factors such as organizational commitment and job satisfaction have a significant impact on business performance (Fafaliou et al., 2020: 467).

An individual's satisfaction, performance and success in work and family life vary according to people's different demographic profiles affected by emotional intelligence. The competitive reality in the current scenario poses a major challenge in becoming excellent performers (Vasumati et al., 2015: 59). Following a product's technological innovations by businesses with technology-based products has a positive impact on their performance (Bahl et.al., 2019: 497).

With increased pressure for higher performance and output levels, human resources managers are looking for new ways to match employee competences with job requirements and put employees in the best positions to maximize output. As a result, emotional intelligence seems to play an important role in adapting to customer service workers (Maamari and Shouwiry, 2017: 299).

In a global and complex business environment, the relationship between emotional intelligence and performance is a major concern for both employers and employees. Experimental studies have also been carried out to find the impact of emotional intelligence on work-life balance in order to create better satisfaction and performance (Vasumathi and Sagaya, 2017: 293).

Therefore, in this study, the emotional intelligence level of the employees and the relationship between job satisfaction and job performance were analyzed by the scientific method and the findings were presented for the benefit of private enterprises, non-governmental organizations, public institutions, and researchers.

2. Literature Review

In this section, the conceptual framework for emotional intelligence, job satisfaction and business performance are explained.

2.1. Emotional Intelligence

The effect of the phenomenon of emotional intelligence on business performance is usually made by individuals collaborating with individuals around them while doing their jobs. This also occurs by providing confidence in building good relationships and empathy and obtaining support from those around them. High motivation is provided by the ability of individuals to direct their personal feelings, and thus good mood ensures effective performance (Law et. al., 2008: 58).

Emotional intelligence is the ability to understand and react to the feelings of yourself and others. Emotional intelligence plays an important role in an individual's life. Each individual is unique and each individual's personality type is different. Personality types and emotional intelligence are fundamentally related, and individuals tend to differ in their emotional intelligence due to personality types. This is a crucial concept that needs to be worked on, especially in order to cope with everyday obstacles in today's life (Indradevi, 2015: 361).

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Competency in emotional intelligence is important in one's success and his/her career. Emotional intelligence skills and cognitive skills affect each other. People with superior performance have two types of intelligences. As things get complicated, the importance of emotional intelligence increases. Where things are not too complicated, there may be more or less a connection between people's mental abilities and performance (Aslan & Özata, 2008: 80).

The effect of the phenomenon of emotional intelligence on business performance is usually made by individuals collaborating with individuals around them while working. This also occurs by providing confidence in building good relationships and empathy and obtaining support from those around them. High motivation is provided by the ability of individuals to direct their personal feelings, and thus good mood ensures good performance (Law et. al., 2008: 59).

Factors affecting academic achievement include the student's level of intelligence, bodily development, causes from his family and school environment, and, among other reasons, emotional intelligence level (Wurf and Croft-Piggin, 2015: 77).

The business world is very dynamic and inherently competitive. Therefore, the demand for effective leaders is increasing so that organizational outcomes can be achieved efficiently. Intense work pressure requires the use of a person's cognitive, emotional and physical resources, and therefore emotional intelligence is getting increasingly important in the workplace (Pooja and Kumar, 2019: 211).

Emotional intelligence has many effects on business performance. Relationships between work performance and emotional intelligence affect the performance of working individuals in their business and daily lives. This relationship is also an important element that drives the success of employees and provides interaction and organizational communication so that the quality of management can be measured, which also has an impact on job satisfaction. There are factors that negatively affect motivations that are influenced by emotional intelligence and have an impact on business performance. These elements can be listed as follows (Kılıç, et al., 2007: 209);

Lack of Communication; isolating status.

Excessive Work load; when the amount of work planned to be done is too much. Especially with little support and the work that employees need to complete over time, it causes the employees to become bored.

Injustice; unfair behavior against working individuals. These behaviors are not the only behaviors that can the implementation of different regulations and salary applications.

Lack of Autonomy; high business capacity, but insufficient say in decision-making, causes frustrations. The inability to give responsibility to employees causes negative emotions to arise, but it is disappointing.

Lack of Rewards; low income, non-timely payment of premiums, deductions reduce the performance of working individuals.

In a competitive business environment, the ability to work with emotion is a vital part of any individual's skill set. Excellence in the performance of the work is achieved at

the expense of personal life. Every person wants a perfect life and has to set a balance between business life and family life. Emotional intelligence is a key factor that is more responsible for performance in business and family life but facilitates the minimization of stress (Vasumathi et al., 2019: 1).

The relationship of emotional intelligence with education and business can result in a number of problems. One of the inevitable problems of employees and managers in all areas of the business is spending most of their time solving problems that emerge. Others are identifying problems, creating appropriate strategies for solving them, managing decision-making processes that are about the ability and training of managers. It is effective for managers to recognize the environment of the business, to produce solutions suitable for the problems encountered, to achieve the purpose of the business (Terzi & Atmaca, 2011: 450).

When examining the relationship between emotional intelligence and education, it is possible to consider the following characteristics of emotional intelligence (Özveri & Çakır, 2012: 18);

Emotional intelligence skills can be strengthened or improved through training.

The development of emotional intelligence at all levels of education, from kindergarten to university education, is of great importance.

Learning does not take place regardless of the feelings of individuals or the field of learning.

If emotional intelligence is neglected, the capacity for intelligence is more effective

and more unavailable. Increased success depends on the development of emotional intelligence.

Each individual has emotional intelligence capacity, but individuals participate in business processes with different intelligence profiles.

Different areas of intelligence must be equally cared for by administrators.

Personal skills are necessary for people to exhibit constructive behaviors that may be appropriate for their environment and their role in business life that can improve their emotional intelligence. Personal skills are the skills and abilities for individuals to know and manage themselves. It also increases the strengths of individuals, reduces their weaknesses, makes the best decisions for their lives, and reaches out to them by setting goals. Personal skills consist of 5 sub-dimensions that are self-confidence, self-realization, independence, emotional self-consciousness and self-respect. People with high levels of personal skills are individuals who are aware of their emotions, happy with what they have done in their lives and have high self-confidence. Individuals with high personal skills can express their feelings clearly, they are free to express their beliefs and thoughts, they have high confidence in themselves (Timuroğlu & Serçemeli, 2018: 320).

2.2. Job Satisfaction

In addition to the physical and psychological health of the employees, keeping their motivations high is very important in terms of ensuring job satisfaction. Employees do not only see their business as to where their economic expectations are meet, they want their

social and emotional needs to be satisfied (Tuzcu, 2016: 161).

The concept of job satisfaction is known to be closely related to many concepts. These concepts include examples such as alienation, labor transfer, customer satisfaction, performance, conflict, absence, and organizational citizenship. The fact that the concepts influenced by job satisfaction directly affect both employees and businesses reveals how important job satisfaction is (Oshagbemi, 2000: 331).

The concept of job satisfaction has attracted more attention in recent years. Job satisfaction is a general attitude towards one's work, the difference between the amount employees receive and the amount they believe they should receive. Employees are the backbone of every organization. That is why employee satisfaction is very important (Singh and Singh, 2020: 316).

Good factors affecting employees' job satisfaction enable them to use their performance effectively. As a result of employee job dissatisfaction, there are negative behaviors such as quitting work, indiscism, sabotage and absenteeism. Declines in job satisfaction; can be exampled with reasons such as unfair application in the punishment and reward system, inaccuracies in promotion systems, impropriety in the work environment, the inadequacy of the tools used in the work, physical conditions, and wage injustice. In addition, incomplete or erroneous practices against employees reduce the perception of job satisfaction (Örücü, et. al., 2006: 40).

Managers who want to create a more competitive and successful institution need to implement by increasing their quality-

managed business satisfaction practices (Soysal & Tan, 2013: 45). The constant change of technological and economic conditions and increasing competition require businesses to be more innovative, fast, flexible, and entrepreneurial in order to succeed. It is important to support the creativity of business employees in order to be familiar with these emerging requirements. Creative ideas and products have been found to be over-produced in business environments where people can express their ideas clearly, reach the resources they need, set a method for achieving their goals, and find what they do as meaningful and important issues. (Çekmecelioğlu, 2005: 24).

Job satisfaction can be regarded as a series of managerial and behavioral consequences that will occur in situations where the attitude towards work is positive with a different expression. Business satisfaction is considered an important factor in the concept of "contemporary management". Before all, job satisfaction is a social responsibility and a moral necessity. The working of people is undoubtedly seen as a necessity. The individual is in a situation where he/she wants to work in the workplace for an important part of his or her life. Managers and management ranks are required to make their workplaces comfortable and rewarding. How health shows the general physical state of people and, importantly, work satisfaction is also important in order to reflect the general state of the employees. At the business satisfaction level, as in health, diagnosis is important in treatment. The employee's job satisfaction shows his emotional state. There is a strong relationship between job satisfaction and life satisfaction (Sevimli & İşcan, 2005: 57).

Job satisfaction, emotional commitment and a sense of trust in management affect the performance of employees (Wahid et.al., 2018: 516).

Job satisfaction is the pleasure a person enjoys their job. Job satisfaction has been the focus of social science work since the early 1900s due to its significant impact on employee mental health, as well as its impact on workplace atmosphere and productivity (Vrontis et al., 2019: 516). Whether the issue of job satisfaction is multidimensional is debatable. In one-dimensional job satisfaction, individuals feel either satisfied or dissatisfied with their work. However, being multidimensional expresses situations as in individuals feel dissatisfied with their work for some reason, while being satisfied with other reasons. For example, while the employee is feeling dissatisfied with the management or communication of a job, he is feeling satisfied as a result of the nature of the work (Ergeneli & Eryiğit, 2001: 166).

In order to assess a person's degree of satisfaction with their work, it requires addressing the factors of that employee and the job. Factors of the job include the colleague, salary, manager behavior, promotion opportunities and the job itself. Factors related to the employee's needs, the severity of what they need, the structure and the feelings of the persons (Bekmezci & Mert, 2013: 173) should be addressed as well.

Many negative situations need to be addressed in order to ensure job satisfaction. One of them is loneliness. Loneliness, known as one of the life experiences, can be described as a kind of psychological condition that gives a feeling of unease due to the person's inability to reach the level of social relationship as she/he wants. Loneliness causes an important problem in modern urban life along with developing computer technology, where the increase in population has come to the fore. The phenomenon of loneliness is therefore more of a problem than it is thought under today's circumstances. Working environments are very rich areas in terms of how such emotions are experienced. Individuals in the working environment constitute the ones from indiscriminate greetings to business agreements. Often in the mentioned networks; feelings and feelings such as sadness, anger, happiness, and anxiety are experienced. It can be meaningless to think every moment in the work environment will progress positively (Demirbaş & Haşıt, 2016: 138).

The implementation of a flexible working system in the workplace is important in terms of ensuring job satisfaction. Even if the implementation of flexible working hours for working individuals is generally regarded as a positive method, some negative consequences may emerge for business if the system is not followed well. The working conditions of the business implementing flexible operating systems must be compatible with this system. Flexible working in business life is the different distribution of the time that needs to be worked daily to other days, or the dissolute of the weekly working time to the two-to-four-week time frame in a way that is different from each other (Tozlu, 2011: 101).

Job satisfaction is an expression of employee satisfaction with their work. It is a target for the organization and itself by providing spiritual and material satium in

the workplaces of the employees. It is possible to examine the level of job satisfaction of the employees in two separate groups as external satisfaction, which can be mainly the result of the work, and internal satisfaction that occurs during the work (Özaydın, 2014: 251).

In-Home Job Satisfaction

External Job Satisfaction

Perceived injustices within the organization create a lot of stress for the person and reduce the job satisfaction of the employees. Many of the behaviors occur in the form of contact with negative emotions, such as the resentments or frustrations that a person encounters in the socio-psychological surroundings and within the organization. There are two kinds of attitudes in assigning the reason for behaviors contrary to productivity. First, to one's aggression and secondly, it focuses on the reactions of the person to unfair practices. Within these two approaches, the person takes negative emotion in the form of a reaction to the problems he has had around him and reacts in line with these feelings (Doğan & Kılıç, 2014: 103).

2.3. Business Performance

Performance is a concept that distinguishes qualitatively and quantitatively from those obtained as a result of planned and purpose-built activities. Concepts such as frugality, efficiency in service and production are related to performance. The concept of performance is of paramount importance in order for a business to maintain its presence and gain the upper hand in competition (Kubalı, 1999: 31). For enterprise sustainability performance, businesses need to take into account the

market's successful strategies, communications and transparency (Mitra et.al., 2018: 418).

Economic factors are also of great importance in terms of business performance. Determinants of economic development can be listed as socio-cultural factors, economic factors, legal and institutional factors, political and managerial factors. Although there are many determinants, the business performance factor among economic factors is of great importance. It has been stated that countries have recorded important stages in development processes due to the influence of economic factors, and other factors have developed in connection with economic factors. Economic factors include tax and income distribution, natural resources, economic growth, investment and capital accumulation, business performance, foreign trade, financial performance, foreign direct capital investments, infrastructure and technology that are examined in ten elements (Şaşmaz & Yayla, 2018: 252-253).

It has been stated that capital production develops in proportion to labor force productivity in an effort to improve business performance. Capital accumulation processes in Turkey have undergone significant structural changes in time from the years of the formation of production capital to the present day. With the weight gain of relatively plus values, the values created by the labor force are also raised through productivity increase. Economic growth occurs in capitalism in the form of capital accumulation. Capital accumulation also produces capital accumulation when it produces plus

values. In addition to the creation of values; productivity increases the accumulation of continuity (Açar, 2017: 82).

Business Performance Models

Business performance models are two main dimensions. The first of these is the structural dimension that defines and categorizes performance to fit all jobs. And the second one is, the dimension based on relationships between daily routine work and job performance history. Eight different models of business performance have been developed. The dimensions that make up these models are listed as (Motowildo vd., 1997: 72);

Professional qualifications,

Non-professional general qualifications,

Oral and written communication qualifications required to perform the tasks given,

To be able to take responsibility for the task and to make an effort,

Individual discipline,

Adapting to in-group studies and other employees,

Leadership components,

Management capability.

It is based on the ability to perform a job and the way employees behave according to the conditions set out in the business performance model. Employees' satisfaction with the results of their work, their work with high motivation and their satisfaction at work can improve their job performance (Landy & Conte, 2016: 58).

Contextual performance

Contextual performance, also called extra-role behaviors, is a behavior that does not

directly contribute to the actual task being performed but contributes to the improvement of the organizational, social and psychological environment necessary for this task to be done effectively. (Öcel, 2013: 37).

Task performance

Task performance is a concept that distinguishes a job from others and includes the fixed tasks and responsibilities required by that job. It also includes behaviors that support the technical foundations that make production possible. The implementation of technical processes, maintenance and service of technical needs are directly related to the technical capabilities of the organization. Task performance can be explained as described below (Jawahar & Dean 2007: 330);

Task performance behaviors contribute directly or indirectly to technical functions, vary between different jobs within the same workplace, roles required for reward are defined, and the main element in its change is human qualities such as knowledge, ability and skill that vary with task mastery.

Contextual performance behaviors support the organizational, social and psychological environment in which technical functions must be performed, are common to all jobs or many others, and roles are not defined.

3. Method

In this section, the data obtained by the survey method are prepared using the model, hypotheses, universe and sample, data collection tool and analysis of data that are included in the research.

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3.1. Model of Research

Figure 1 Statistical Model of Research for the Relationship between Employee Emotional Intelligence Levels and Job Satisfactions and Job Performance

Above Figure 1 there is a model that shows the relationship between employee emotional intelligence levels and job satisfactions and job performance.

3.2. Universe and Sample

Taking into account the degree of the size of the universe planned to be created within the scope of the research, these methods were used by developing methods based on formulas and tables in order to determine the universe. Sample numbers to be determined by the main mass size and reliability levels are shown in Table -1 (Yazıcıoğlu & Erdoğan, 2004: 50);

Universe Size	+- 0.03 sampling error range (d)			+-0.05 sampling error (d)			+-0.10 sampling error (d)		
	p=0.5 q=0.5	p=0.8 q= 0.2	p=0.3 q=0.7	p=0.5 q=0.5	p=0.8 q= 0.2	p=0.3 q=0.7	p=0.5 q=0.5	p=0.8 q= 0.2	p=0.3 q=0.7
5000	880	601	760	357	234	303	94	61	79
10000	964	639	823	370	240	313	95	61	80
25000	1023	665	865	378	244	319	96	61	80
50000	1045	674	881	381	245	321	96	61	81

Table 1 Number of Samples by Main Mass Size and Reliability Levels

Surveys used within the scope of research, OSB (organized Industrial Zones) Chamber of Industry in Ankara 1. OSB, Ostim OSB, Ankara Ivedik OSB, Capital OSB, Ankara Anadolu OSB, ASO 2nd and 3rd OSB electronic and optical sectors are among the enterprises operating; 165 companies were identified from industrial registry information system and OSB records, including small, medium and large enterprises (SMEs), and made in randomly selected companies among them.

1	Sector Name	Number of Employees
2	25- Metal Products	37.561
3	28- Machinery and Equipment	29.713
4	10- Food products	18.972
5	26- Electronics and optics	16.812
6	31- Furniture	12.133
7	27- Electrical equipment	11.311
8	30- Other means of transportation	11.096
9	23- Non-mechanical mineral products	10.905
10	29- Automotive, trailer	9.987
11	22- Rubber and Plastic	7.657
12	**Total**	**215.140**

Table 2 Universe Size

In Table 2, the total number of employees in industrial enterprises in Ankara province is 215,140 people, as shown in the table. 16,812 people are working in the electronics and optics sector. The total number of employees in the electronics and optics sector in Ankara OSBs, which constitute the universe of the study, is 6745. When checking the number of samples based on the main mass size and reliability levels, the sample size of up to 10,000 people in the universe was determined as 370 people with a margin of error of 0.05, and in this study it was found that 370 people were sufficient because the size of the universe was 6745 people. Therefore, with 0.5 errors, it was found that the sample of 370 people will be sufficient according to table 10. However, after the surveys were distributed and collected, 480 people decided that the survey would be sufficient to ensure its credibility, since not all of them could be considered valid. As a result of the survey application, 16 surveys were incomplete and the remaining 464 surveys were considered valid.

3.3. Research Hypotheses

The main hypothesis of the study is;

H0: Demographic variables; emotional intelligence affects job satisfaction and job performance statistically.

H1: Emotional intelligence statistically affects job satisfaction and job performance.

In this study; the hypothesis "H0.a: Emotional intelligence has no effect on job satisfaction" has been accepted. Taşlıyan, Hırlak and Çiftçi (2014: 66) in his work stated as; "H3: There is a positive significant relationship between empathic sensitivity and job satisfaction." In this study, it was determined that all dimensions of emotional intelligence significantly affected all dimensions of job satisfaction and burnout.

In this study it is hypothesized as "H1.b: Job satisfaction has an impact on emotional intelligence and job performance." Avunduk (2016: 175) found in the study as; "H0.2.1: It was denied that there was no significant and positive relationship between the emotional intelligence level of drivers and their work performance."

3.4. Data Collection Tool

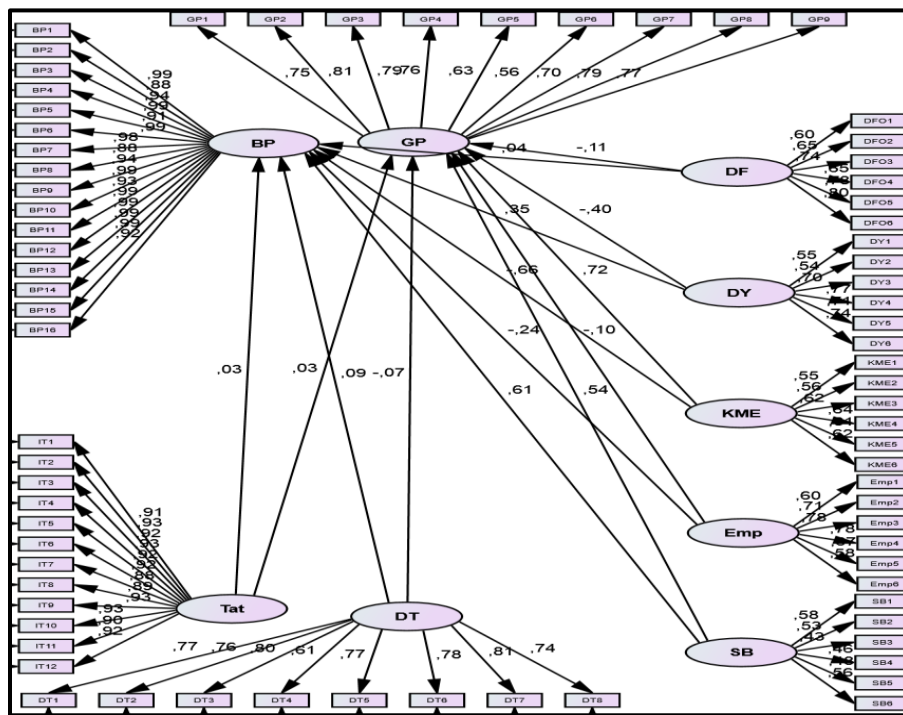In this study, research is designed for "The Relationship between Employee Emotional Intelligence Levels and Job Satisfactions and Job Performance: A Study in Ankara OSBs". "Emotional Intelligence Scale", "Job Satisfaction Scale" and "Business Performance Scale" will be used within the scope of the research to be carried out. Information about these scales is as follows;

1. Emotional Intelligence Assessment Scale (DZDÖ);

The scale that is "Emotional Intelligence Evaluation Scale" used in this study, was developed by Hall (1999) and adapted by Ergin (2000: 143) to Turkish and it was previously used in the work of Hocaoğlu (2018: 80). The scale in question consists of concepts as in awareness of emotions (article 1, 2, 4, 17, 19, 25), managing emotions (5, 6, 13, 14, 16, 22. article), social skills (article 12, 15, 24, 26, 27, 29), empathy (article 9, 11, 20, 21, 23, 28) and self-motivating (article 5, 6, 13, 14, 16, 22). The research scale is a 5-5 likert type scale with 1-totally disagree, 2-partly disagree, 3-unsure, 4-partly agree, and totally agree. Cronbach Alpha coefficients for scale dimensions in this context was 0.76 for awareness of emotions; 0.92 for managing emotions; 0.86 for social skills; 0.88 for empathy; self-motivating is calculated as 0.91.

2 Minnesota Job Satisfaction Scale;

"Minnesota Job Satisfaction Scale" was developed by Weiss et al. (1967: 86), Baycan (1985: 109) adapted it to Turkish and it was previously used in Terzi's (2013: 137-138) study. The scale in question consists of a total of 2 dimensions and 20 substances including internal satisfaction (1, 2, 3, 4, 7, 8, 9, 10, 11, 15, 16, 20). The research scale is a 5-5 likert type scale with 1-totally disagree, 2-partly disagree, 3-unsure, 4-partly agree, and totally agree. In this context, the cronbach alpha coefficient for scale dimensions was calculated as 0.77.

3. Business Performance Scale;

In this study, the "Business Performance Scale" that was developed by Goodman and Svyantek (1999) was used which was also used by Arslan (2018). The scale in question consists of a total of 2 dimensions and 25 questions: contextual performance (16 items) and task performance (9 items). The research scale is a 5-5 likert type scale with 1-totally disagree, 2-partly disagree, 3-unsure, 4-partly agree, and totally agree. In this scale, contextual performance was calculated as .867, task performance was 0.889 and the overall reliability coefficient of the scale was 0.915, according to cronbach alpha coefficients for scale dimensions.

3.5. Analysis of Data

In this article, a pilot survey was carried out in order to ensure the reliability levels of the surveys prepared to source the research data, and the survey study was revised by correcting the problems exposed as a result of the pilot survey application. As a result of the reliability analyses, the data required for research was obtained by directing all of the surveys with a level of reliability to individuals. The data obtained by applying all of the surveys were analyzed with the SPSS statistical analysis program. Within the scope of the research; reliability analysis, frequency analysis, data (ANOVA) analysis, Pearson correlation analysis and regression analyses and relationships between variables were

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examined. As a result of the analysis, the report of the study was completed using scientific and statistical methods.

4. Results

In this section, the data obtained by the survey method is used and reliability analysis, confirming factor analysis, demographic findings, ANOVA analysis, correlation analysis and regression analyses are included.

4.1. Reliability and Confirming Factor Analysis Results of Emotional Intelligence Scale

In this section, it is targeted to test the suitability of the original structure of the group that created the Emotional Intelligence Scale (30 items and 5 dimensions) with the help of verifying factor analysis (VFA) with the data set collected for research.
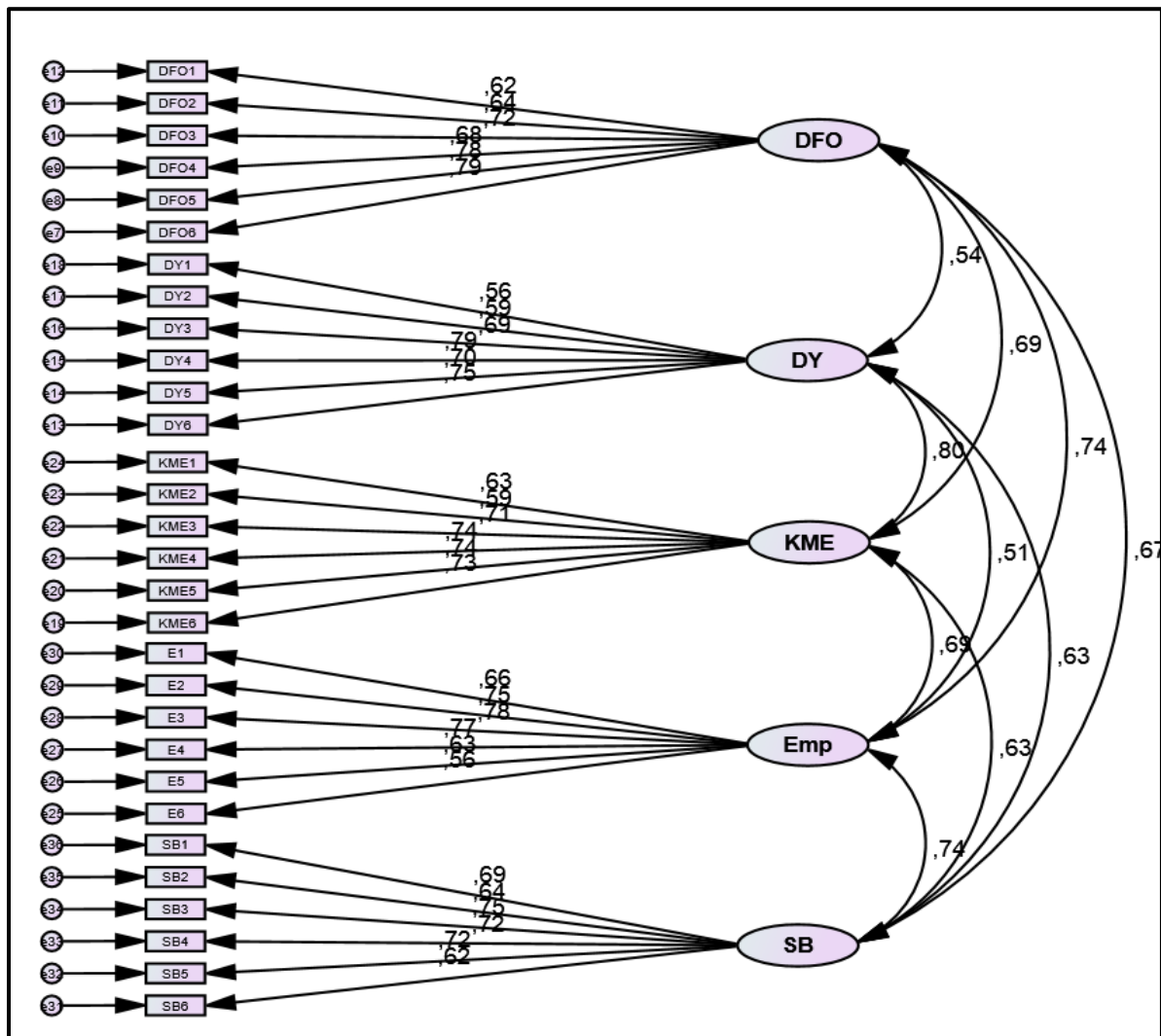
Figure 2 VFA Model for Emotional Intelligence Scale

In the VFA model, which tests the suitability of the Emotional Intelligence scale, the size of awareness of emotions is demonstrated by "DFO", managing emotions "DY", self-motivating "KME", empathy "Emp", and social skill with "SB". E1, e2, the structures are shown with e30 show the terms error. In the model, 6 items of the size of awareness of emotions, including DFO1, DFO2, DFO3, DFO4,

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DFO5 and DFO6; 6 substances including DY1, DY2, DY3, DY4, DY5 and DY6; It is targeted to explain the size of self-motivating with 6 substances including KME1, KME2, KME3, KME4, KME5 and KME6, empathy dimension 6 items including Emp1, Emp2, Emp3, Emp4, Emp5 and Emp6, and 6 items including SB1, SB2, SB3, SB4, SB5 and SB6.

	Good Value	Appropriate Value	Calculated Value
X²/sd	Smaller than 3	Smaller than 5	4,496
RMSEA	0.050 and Lower	0.080 and Lower	0,069
Gfi	0.90 and High	0.85 and High	0,876
Nfi	0.90 and High	0.85 and High	0,884
Cfi	0.95 and High	0.90 and High	0,933

Table 3 Model Adaptation Indexes of the Emotional Intelligence Scale

As shown in Table -3, the DFA results show that the values of X2/sd (4,496), RMSEA (0.069), GFI (0.876), NFI (0.884) and CFI (0.933) from the compliance indexes of the Emotional Intelligence Scale are in the appropriate value range.

Dimension	Item	Forecast Value	P value	α (0,942)
Being Aware of Emotions	1. I use both my positive and negative feelings, which are a product of my common sense, to guide my life.	0,622	***	0,857
	2. With my negative feelings, I reveal what changes I have to make in my life.	0,643	***	
	4. I can express my feelings in a way that suits me at any moment..	0,719	***	
	17. If the time is right, I will evaluate my negative feelings, my mistakes, and try to find out what the cause of the negativity is.	0,685	***	
	19. It is very important for my health to be aware of my true feelings.	0,685	***	
	25. People who are aware of their true feelings manage their own lives more easily.	0,564	***	
Directing Your Emotions	3. I'm calm under pressure.	0,593	***	0,830
	7. I know how I feel.	0,694	***	
	8. Some things don't work out (when they're turned upside down) so I can easily be cool again.	0,788	***	
	10. I don't allow negative emotions to affect me for long.	0,698	***	
	18. When things don't work out, I'm in control.	0,749	***	
	30. I can easily get away from my negative feelings.	0,786	***	

Self-Motivating	5. When I feel threatened and endangered, I can control myself and focus myself on what to do.	0,627	***	0,842
	6. When I feel threatened and endangered, I act largely with positive emotions (humor, fun, banter and combative, etc.)	0,587	***	
	13. I have the power to try again to succeed in the event of a failure.	0,708	***	
	14. I try to find a solution to the difficulties I face in life.	0,737	***	
	16. I can easily get into situations where it's going to take calm, attention and read readily.	0,74	***	
	22. When it comes to a mission, I can easily get away with my negative feelings.	0,734	***	
Empathy	9. I'm pretty good at listening to other people's problems.	0,656	***	0,845
	11- I'm sensitive to other people's emotional needs.	0,749	***	
	20. Even if it's not expressed directly, I can easily understand other people's feelings.	0,776	***	
	21. I'm good at understanding people's feelings from facial expression..	0,769	***	
	23. I can easily sense the unerlying needs of others.	0,633	***	
	28. I strongly warn others of their feelings.	0,56	***	
Social Skills	12. I have a calming effect on others.	0,686	***	0,844
	15. I react to other people's temperaments, needs and motives.	0,64	***	
	24. People think I affect other people's feelings.	0,751	***	
	26. I can often easily turn other people's pessimism into optimism.	0,718	***	
	27. I'm a good person for those who want advice on a relationship.	0,719	***	
	29. I help others achieve their own personal goals.	0,623	***	
*** = P<0,001				

Table 4 Predicting Values of the Emotional Intelligence Scale

The current structure of the Emotional Intelligence scale has been tested using the DFA method, and tests have calculated their meaningfulness in expressing sub-dimensions of substances on the Emotional Intelligence scale, their sub-dimensions description loads, and the reliability coefficient values of scale and dimensions.

As shown in Table - 4", the Cronbach Alpha value of the emotional Intelligence scale was found to be 0.942, and based on this result, the scale can be said to be reliable. Furthermore, cronbach alpha coefficients were found to be reliable in "awareness of emotions" (0.857), "emotions orientation"

(0.830), "self-motivating" (0.842), "empathy" (0.845) and "social skill" (0.844).

As a result, it was determined that the Emotional Intelligence scale had a reliable and valid structure as a result of the test of its original structure and explainability of 5 dimensions and 30 substances with the help of DFA.

4.2. Reliability and Venator Factor Analysis Results of the Business Performance Scale

In this section, it is targeted to test the suitability of the original structure of the group that created the Business Performance Scale (25 items and 2 dimensions) with the help of verifying factor analysis (VFA) with the data set collected for research.
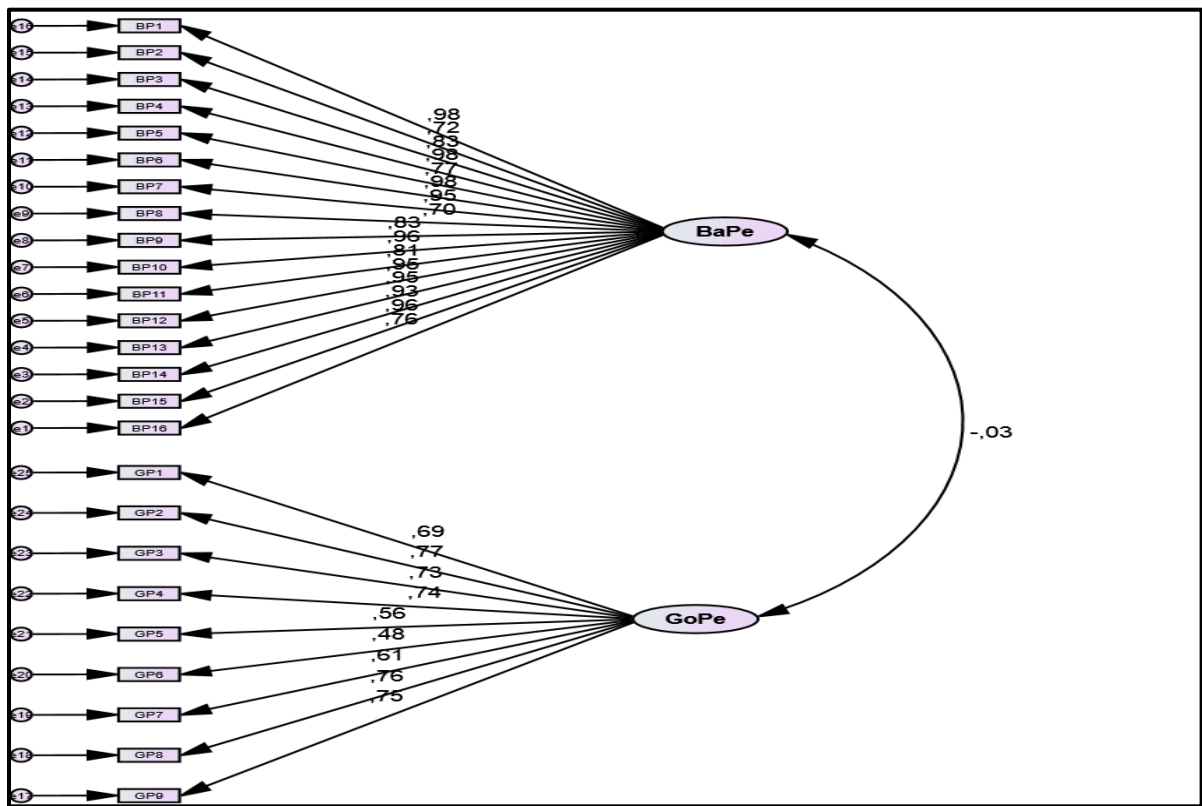
Figure 3 VFA Model for Business Performance Scale

As shown in Figure 3, the contextual performance dimension is shown in "BaPe" and the Task performance dimension is shown in "GöPe" in the DFA model, which tests the application of the Work Performance scale. e1, e2, ... The structures shown with e25 show the terms error. The

model is targeted to be explained by 9 items: contextual performance size BA1, BA2, BA3, BA4, BA5, BA6, BA7, BA8, BA9, BA10, BA11, BA12, BA13, BA14, BA15 and BA16, with 16 items and task performance size GP1, GP2, GP3, GP4, GP5, GP6, GP7, GP8, GP9.

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	Good Value	Appropriate Value	Calculated Value
X²/sd	Smaller than 3	Smaller than 5	4,787
RMSEA	0,050 and Lower	0.080 and Lower	0,079
GFI	0,90 and High	0.85 and High	0,852
NFI	0,90 and High	0,85 and High	0,890
CFI	0,95 and High	0,90 and High	0,904

Table 5 Model Compliance Indexes of the Business Performance Scale

As a result of the DFA, the compliance indexes of the Business Performance Scale are x2/sd (4,787), RMSEA (0.079), GFI (0.852), NFI (0.890) and CFI (0.904) in the appropriate value range.

Dimension	Item	Forecast Value	P value	α (0,946)
Contextual Performance	I help them get their work done while my friends are gone.	0,978	***	0,983
	I'll be back on time for work in the morning and afternoon.	0,716	***	
	I volunteer to do more than just the task given.	0,827	***	
	I take unnecessary breaks during business hours.	0,983	***	
	Even if it's not in my job description, I help beginners.	0,774	***	
	I tend to take less time off than I deserve, i don't take time off even if it's necessary.	0,976	***	
	When the workload of others is increased, I help them until they overcome difficulties.	0,948	***	
	I work with high performance until the end of the day.	0,698	***	
	If I don't make it to work, I'll give someone an advance if I don't make it beyond the legal obligation.	0,827	***	
	I spend a lot of time on personal phone calls.	0,955	***	
	I don't take unnecessary work breaks.	0,807	***	
	I help my colleague in my department with his work.	0,955	***	
	I offer innovative ideas to the responsible officer to improve the overall quality of my department	0,949	***	
	I'll be back on time from breaks, i won't tend to extend it.	0,929	***	
	I'd be willing to perform some tasks, even if it's not about the unit I work for.	0,959	***	
	I don't spend a lot of time talking free speeches.	0,759	***	
Task Performance	I'll have achieved all the goals of my work.	0,686	***	0,882
	I meet my performance criteria for the supervisor in charge of my department.	0,774	***	
	I work with the expertise required by my profession in all work-related tasks.	0,725	***	
	I perform all the tasks required by my work.	0,738	***	
	I can take more responsibility for the given task.	0,558	***	
	I seem fit for a better position.	0,483	***	
	I'm talented in all the areas covered by the job. I deal with all tasks with skill.	0,608	***	

	I perform well throughout the work by performing the given tasks as desired.	0,762	***
	I plan to achieve the objectives of my work and complete the given task in time.	0,750	***
*** = P<0,001			

Table 6 Estimate Values of the Business Performance Scale

The current structure of the Work Performance scale has been tested by the DFA method, and tests have calculated their meaningfulness in expressing subsizes of items on the Business Performance scale, their sub-dimensions description loads, and the scale and reliability coefficient values for dimensions.

The Cronbach Alpha value of the Business Performance scale has been found to be 0.946, and based on this result, the scale can be regarded as reliable. Furthermore, when checking the sub-dimensions of the scale, cronbach alpha coefficients were found to be reliable in "contextual performance" (0.983) and "task performance" (0.882).

As a result, it was determined that the Business Performance scale had a reliable and valid structure as a result of the original structure and explainability of 2 dimensions and 25 items tested with the help of DFA.

4.3. Results of Reliability and Confirming Factor Analysis of Minnesota Job Satisfaction Scale

In this section, it is targeted to test the suitability of the original structure of the group that created the Minnesota Job Satisfaction Scale (20 items and 2 dimensions) with the help of verificatory analysis (CFA) with the data set collected for research.
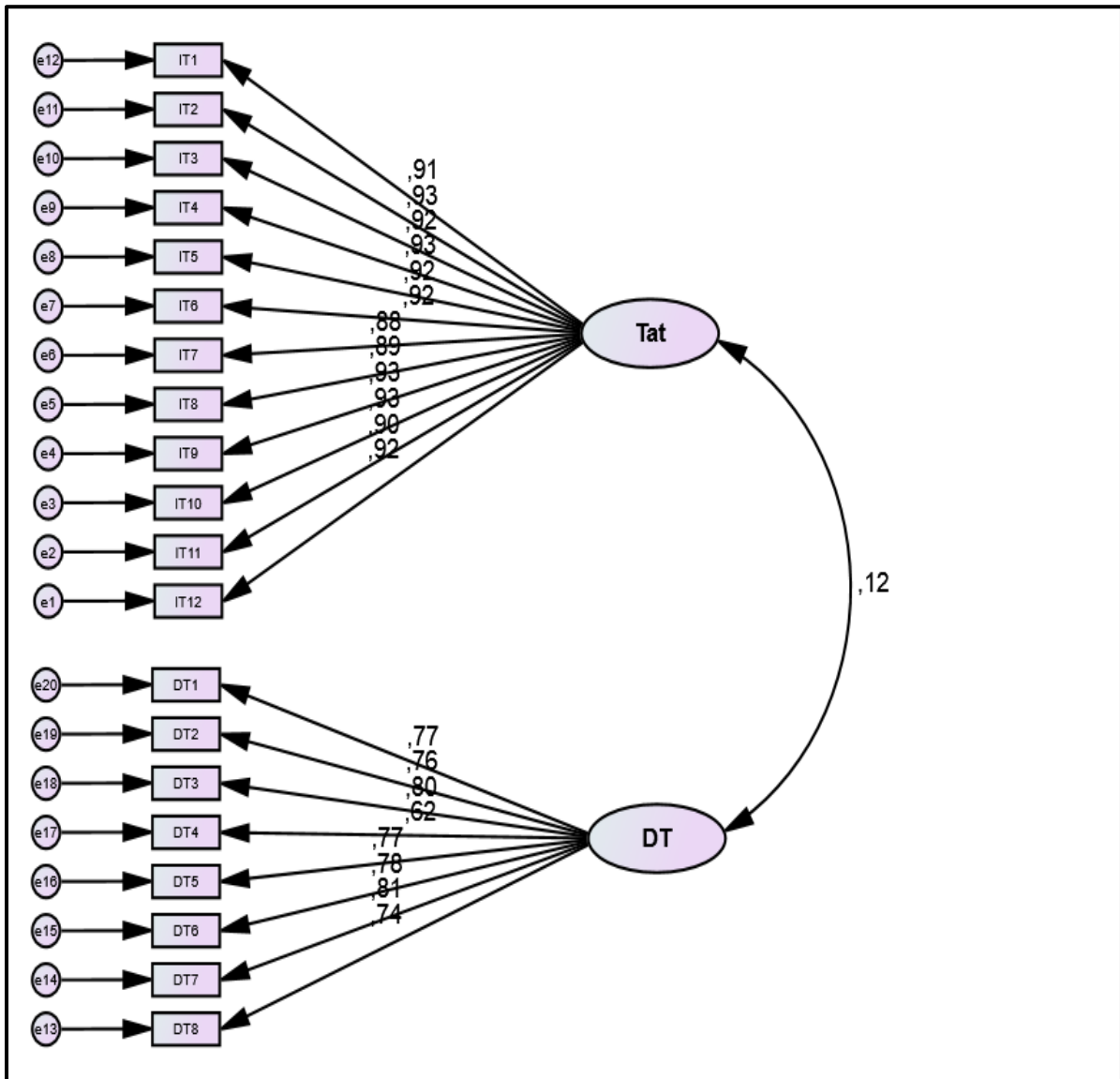
Figure 4 CFA Model for Minnesota Job Satisfaction Scale

The CFA model, which tests the application of the Minnesota Job Satisfaction Scale, has an intrinsic satisfaction dimension of "Taste" and an external satisfaction size of "DT". In the model, it is targeted to explain the size of internal satisfaction with 12 items including IT1, It2, It3, IT4, It5, IT6, IT7, IT8, IT9, IT10, IT11, IT12, and 8 items including DT1, DT2, DT3, DT4, DT5, DT6, DT7, DT8.

	Good Value	Appropriate Value	Calculated Value
X²/sd	Smaller than 3	Smaller than 5	4,858
RMSEA	0,050 and Lower	0,080 and Lower	0,072
GFI	0,90 and High	0,85 and High	0,873
NFI	0,90 and High	0,85 and High	0,912
CFI	0,95 and High	0,90 and High	0,926

Table 7 Model Compliance Indexes of the Minnesota Job Satisfaction Scale

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As a result of the DFA, the compliance indexes of the Minnesota Job Satisfaction scale are x2/sd (4,858), RMSEA (0.072), GFI (0.873), NFI (0.912) and CFI (0.926) in the appropriate value range.

Dimension	Item	Forecast Value	P value	α (0,963)
Inner Satisfaction	1. I'm happy with my profession to keep me busy all the time.	0,774	***	0,984
	2. I'm happy with my profession for the possibility of working independently.	0,762	***	
	3. I'm happy with my profession to have the opportunity to do different things from time to time.	0,8	***	
	4. I'm happy with my profession for giving me the chance to be respectable in society.	0,616	***	
	7. I'm happy with my profession for giving me the chance to carry a conscientious responsibility.	0,773	***	
	8. I'm happy with my profession to provide me with a guaranteed future.	0,776	***	
	9. I'm glad it makes me feel like I can do something for others.	0,805	***	
	10. I'm happy with my profession for giving me the opportunity to direct people.	0,738	***	
	11. I'm happy with my profession to allow me to do things that fit my own abilities.	0,905	***	
	15. I am pleased with my profession for giving me the opportunity to use my own opinions/opinions.	0,932	***	
	16. I'm happy with my profession, i'm happy with the working conditions.	0,918	***	
	20. I am pleased with my profession for giving me the opportunity to use my own methods while doing my job.	0,934	***	
External Satisfaction	5. I'm happy with my profession for managing the people at the manager's disposal well.	0,921	***	0,953
	6. I'm happy with my profession, the manager's ability to make decisions.	0,918	***	
	12. I am satisfied with my profession in terms of implementing the decisions I make about my work.	0,885	***	
	13. I'm happy with my profession, the wages I get for what I do.	0,887	***	
	14. I'm happy with my profession, the possibility of promotion.	0,931	***	
	17. I'm happy with my profession, my colleagues working well with each other.	0,929	***	
	18. I'm happy with my profession to be appreciated for what I do.	0,902	***	
	19. I'm happy with my profession, my sense of success in return for what I do.	0,918	***	
*** = P<0,001				

Table 8 Forecast Values of the Minnesota Job Satisfaction Scale

The current structure of the Minnesota Job Satisfaction scale has been tested by the CFA method, and tests have calculated their meaningfulness in expressing subsizes of items on the Minnesota Job Satisfaction scale, their sub-dimensions description loads, and the scale and reliability coefficient values for dimensions. The Cronbach Alpha value of the Minnesota Job Satisfaction scale was found to be .963, and based on this result, the scale can be said to be reliable. Furthermore, when looking at the sub-dimensions of the scale, cronbach alpha coefficients were found to be reliable within the dimensions of "intrinsic satisfaction" (0.984) and "external satisfaction" (0.953).

As a result, it was determined that the Minnesota Job Satisfaction scale had a reliable and valid structure as a result of the test of its original structure and explainability of 2 dimensions and 20 items with the help of CFA.

4.4. Analysis of Demographic Data

Frequency analysis is one of the analysis methods in which the data obtained in the studies are compiled and summarized. The main purpose of frequency analysis is to learn about the target audience. In this study, tables on gender, age, learning status, working time and position are summarized with the help of frequency analysis and summarized values are shown in Table-12.

	Levels	Frequency	Percent
Gender	Woman	106	22,8%
	Male	358	77,2%
Age	21-30 Age	148	31,9%
	31-40 Age	177	38,1%
	41-50 Age	123	26,5%
	50+	16	3,4%
Running Time	1-8 Years	230	49,6%
	9-18 Years	149	32,1%
	19-30 Years	73	15,7%
	31-40 Years	12	2,6%
Training	Primary	18	3,9%
	High School and Equivalent School	229	49,4%
	High School	87	18,8%
	License	95	20,5%
	M.Sc. or Ph.D.	35	7,5%
Position	Administrator	34	7,3%
	Office Worker	169	36,4%
	Field Worker	131	28,2%
	Security	75	16,2%
	Other	55	11,9%
Total		464	100,0

Table 9 Frequency Table of Demographic Variables

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A survey study was conducted with the voluntary participation of 464 participants in the data collection process of the survey. As a result of summarizing the data obtained by the survey study, it was observed that 106 (22.8%) of the participants were female and 358 (77.2%) were male. In addition, when the age distribution of these participants was examined, it was observed that 148 people were in the 21-30 age group (31.9%), 177 were in the 31-40 age group (38.1%), 123 were in the 41-50 age group (38.1%) and 16 were in the 50+ age group (3.4%). When looking at the working times of the participants, it was observed that 230 had 1-8 years (49.6%), 149 had 9-18 years (32.10%), 73 had 19-30 years (15.7%) and 12 had a working time of 31-40 years (2.6%). When the distribution was examined for educational status, it was observed that 18 people received primary education (3.9%), 229 people received high school and equivalent schools (49.4%), 87 people received college (18.8%), 95 people had undergraduate (20.5%) and 35 people received master's or doctorate (7.5%). 34 of the survey participants.

4.5. Correlation Analysis

Correlation is an analysis method used to examine the linear relationship between two random variables. The relationship between variables is interpreted with the help of correlation coefficient and can be interpreted in terms of strength (low, medium, high), statistical significance and Direction (positive, negative) when interpreting correlation coefficient. When the absolute value of the correlation coefficient is 1, the exact relationship, the values between 0.00-0.29 by absolute value indicate the low relationship, the values between 0.30-0.69 in absolute value indicate the middle-level relationship, and the absolute value of 0.70 and above shows a high level of relationship.

	Being Aware of Emotions	Managing Your Emotions	Self-Motivating	Empathy	Social Skills	Contextual Performance	Task Performance	Inner Satisfaction	Inner Satisfaction
Being Aware of Emotions	1								
Managing Your Emotions	,504**	1							
Self-Motivating	,589**	,719**	1						
Empathy	,630**	,467**	,577**	1					
Social Skills	,573**	,549**	,,551**	,644**	1				
Contextual Performance	,018	,107*	,,046	,059	,085	1			
Task Performance	,441**	,419**	,,570**	,494**	,540**	-,016	1		
Inner Satisfaction	,088	,204**	,280**	,276**	,264**	,075	,282**	1	
External Satisfaction	,141**	,227**	,,284**	,266**	,267**	,062	,390**	,416**	1

Table 10 Correlation Analysis

When correlation coefficient values were examined, it was determined that there were relationships between the binary variables. Among these correlation coefficients, the highest value is calculated for the relationship between Managing Emotions and Self-Motivating. There has been a high level of relationship between "Managing Your Emotions and Self-Motivating" (r= 0.719). Similarly, relations between "Empathy and Awareness of Emotions" (r=0.630), "Empathy with Social Skills" (r=0.644) and "Social Skills and Awareness of Emotions" (r=0.573) are also found to be quite good. However, when the coefficient values "Contextual Performance and Task Performance" (r=-0.016) and "External Satisfaction and Contextual Performance" (r=0.062) are examined, variables have little relation. Therefore, both to be able to examine the direction and size of the relationships between variables in more detail, as well as to examine the general interpretation of the relationships between variables, the logical.

4.6. Regression Analysis

Relationship Between Job Satisfaction and Emotional Intelligence and Business Performance

	Emotional Intelligence		Business Performance	
	β	P	β	P
Fixed	2,788	0,000	2,362	0,000
Job Satisfaction	,276	0,000	,235	0,028

Table 11 Multiple Regression Analysis Table for the Impact of Job Satisfaction on Emotional Intelligence and Job Performance

H0s: Job satisfaction has no effect on emotional intelligence and job performance.

H1s: Job satisfaction has an impact on emotional intelligence and job performance.

Multiple regression analysis showed that "Job Satisfaction" (p=0.000) had an effect on Emotional Intelligence. For this relationship, the regression equation should be established as below;

Emotional Intelligence = 2,788 + 0.276 Job Satisfaction

According to the multiple regression equation, Job Satisfaction has a positive effect on Emotional Intelligence. Emotional Intelligence will also increase by .276 units when Job Satisfaction increases by 1 unit. In other ways, Job Satisfaction positively affects Emotional Intelligence by 27.6%.

Another result obtained by multiple regression analysis is that "Job Satisfaction" (p=0.028) has an effect on Business Performance. For this relationship, the multiple regression equation should be established as below;

Job Performance = 2,181 + 0.235 Job Satisfaction

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According to the multiple regression equation, Job Satisfaction has a positive effect on Job Performance. Job Satisfaction will increase by 0.235 units when 1 unit increases. That is, Job Satisfaction positively affects Business Performance by 23.5%.

The Relationship Between Emotional Intelligence and Job Satisfaction and Business Performance

	Job Satisfaction		Business Performance	
	β	P	β	P
Fixed	2,176	0,000	1,762	**0,000**
Emotional Intelligence	,398	0,000	,385	**0,000**

Table 12 Multiple Regression Analysis Table for the Relationship between Emotional Intelligence and Job Satisfaction and Business Performance

H0t: Emotional intelligence has no effect on job satisfaction and job performance.

H1t: Emotional intelligence has an impact on job satisfaction and job performance.

Multiple regression analysis showed that "Emotional Intelligence" (p=0.000) had an effect on Job Satisfaction. For this relationship, the multiple regression equation should be established as below;

Job Satisfaction = 2,176 + 0.398 Emotional Intelligence

According to the multiple regression equation, Emotional Intelligence has a positive effect on Job Satisfaction. Job Satisfaction will also increase by .398 units when Emotional Intelligence increases by 1 unit. So Emotional Intelligence positively affects Job Satisfaction by 39.8%.

Another result obtained by multiple regression analysis is that "Emotional Intelligence" (p=0.000) has an effect on Business Performance. For this relationship, the multiple regression equation should be established as below;

Business Performance = 1,762 + .385 Emotional Intelligence

According to the multiple regression equation, Emotional Intelligence has a positive effect on Business Performance. Business Performance will also increase by .385 units when Emotional Intelligence increases by 1 unit. So Emotional Intelligence positively affects Business Performance by 38.5%.

5. Conclusion and Recommendations

In general, emotional intelligence has been found to have an impact on business performance, which is more than job satisfaction. The effect of emotional intelligence on job satisfaction is more than the effect of job satisfaction on emotional intelligence. In other ways, emotional intelligence positively affects both job satisfaction and job performance. These effects on job performance are based on task performance rather than contextual performance. Contextual performance was found to be associated only with the factor of managing the emotions of emotional

intelligence, no other job satisfaction and emotional intelligence factor.

As a result of the analysis; it can be evaluated that differences in educational status were found to be lower in the direction of Awareness of Emotions of people who were trained at the elementary school level than those who were trained at the Master's or Doctoral level. It was also found that the empathy aspect of people who were trained at the undergraduate level was lower than those who were trained at the high school and equivalent school and high school level. In addition to the situation, it was found that the empathy aspect of people who were trained at the high school level was higher than that of people who were trained at primary and high school and equivalent school level. In addition, the social skills of people who have been trained at the Master's or Doctoral level have been found to be higher than those who have been trained at the primary and undergraduate levels.

As a result of the analysis; gender-related differences were found to be lower intrinsic satisfaction and external satisfaction of women than men. This may be due to the fact that women have a more detailed structure by nature. It can be said that a perfectionist and detailed approach to a work done can reduce satisfaction.

In general, the emotional intelligence evaluation of people between the ages of 20 and 30 was found to be low. It can be claimed that this is due to a lack of experience.

Differences in Working Time were found to be more than those with a working period of 1-8 years than people with task performance between 31-40 years.

Differences depending on the position were found to be lower in the direction of awareness of emotions of people working in the executive position than security employees. It was also found that office workers have a lower ability to motivate themselves than those who work in other positions. In addition to the situation, the social skills of people working in other positions were found to be lower than managers, office workers, field workers and security.

On the other hand, the factor of emotional intelligence awareness of emotions was found to have a negative effect on work satisfaction, also on inner satisfaction and external satisfaction.

For the relationship between emotional intelligence and job satisfaction; it has been found that being aware of emotions from the components of emotional intelligence negatively affects business satisfaction in terms of internal and external satisfaction. The coefficient of the Emotional Intelligence scale was 0.942, and based on this result, it can be claimed that the scale is reliable. Furthermore, when looking at the sub-dimensions of the scale, Cronbach Alpha coefficients were found to be reliable in "awareness of emotions" (0.857), "expressing emotions" (0.830), "self-motivating" (0.842), "empathy" (0.845) and "social skill" (0.844).

As a result of correlation analyses; it has been found that there is a high level of relationship between managing emotions and self-motivating. In the same way, there has been an intense relationship between empathy and awareness of emotions, social skills and empathy and social skills and awareness of emotions.

According to the multiple regression equations made within the scope of this study; job satisfaction has a positive effect on emotional intelligence. When the job satisfaction level increases by 1 unit, the level of emotional intelligence increases by 0.276 units. Also, it has been found that the level of job satisfaction positively affects emotional intelligence by 27.6%.

According to the multiple regression equations made within the scope of this study; job satisfaction has a positive effect on business performance. When the job satisfaction level increases by 1 unit, the job performance level increases by 0.235 units. In another perspective, it has been found that the level of job satisfaction positively affects business performance by 23.5%.

According to the multiple regression equations made within the scope of this study; the level of emotional intelligence has a positive effect on job satisfaction. When the level of emotional intelligence increases by 1 unit, the level of job satisfaction increases by 0.398 units. In other results, it has been found that the level of emotional intelligence positively affects job satisfaction by 39.8%.

According to the multiple regression equations made within the scope of this study; the level of emotional intelligence has a positive effect on business performance. When the level of emotional intelligence increases by 1 unit, the level of work performance increases by 0.385 units. In other results, emotional intelligence level was found to positively affect business performance by 38.5%.

It is thought-provoking that being aware of emotions from these results has a negative effect. Taking into account the definition of this issue, it remains to be seen that expectations are the main factor determining job satisfaction. From there, it is concluded that the expectations of employees in general are not being exceeded in the institutions involved in the research universe. It leads to job dissatisfaction when the emotional awareness of employees whose expectations are not met is high. If the survey universe could be created from workplaces where employee expectations are generally meet, it can be predicted that the Awareness of Emotions component will have a positive impact on job satisfaction.

It has been found that businesses need to create professional staff units that will take the contribution of demographic characteristics to the top of the business by providing appropriate staff selection in recruitment. In this case, thanks to professional personnel units, the Staff Turnover Rate can be kept low, resulting in the improvement of demographic factors over time. Because it will not be possible to change the age, work experience, training of the staff who are already working instantly except for recruitment and staff removal.

As for suggestions; these results revealed that managers who want to improve task performance should be able to work on improving both the entire dimensions of job satisfaction and the social skills, empathy and self-motivating dimensions of emotional intelligence. When the relationship of emotional intelligence with business performance is examined; it has been revealed that managing emotions only affects contextual performance (20%), which is one of the components of emotional intelligence. The following

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recommendations can be made to improve contextual performance;

Providing psychological training for employees on emotion control,

Increasing the opportunities for physical activity in the business environment in an aim to help manage the feelings of employees. (Table tennis, etc.)

Providing the necessary religious worship facilities for employees (Masjid, yoga, etc.)

Preference of individuals who have a high level of managing emotions when hiring staff.

Task performance was found to be influenced by the components Of Social Skills (34%), Empathy (9%) and Self-Motivating (26%). The following suggestions can be made on this topic:

Preference of individuals who are at a high level in these subjects when hiring staff

Organization of social organizations of the business to increase social skills.

Providing training on these topics.

6. Recommendations for Future Researches

Similar research in this field, business performance and emotional intelligence to be done on employees and managers in different research phases and business areas can be easy to compare the results.

The relationship between emotional intelligence in working environments and many variables such as job satisfaction and job performance may also be among the topics that may be the subject of research in studies in this field.

The effects of the relationship between emotional intelligence, job satisfaction and

work performance can be examined in many different institutions belonging to private and human fields.

A broader range of activities can be done by reaching out to employees throughout Turkey who are continuing their activities.

Apart from job satisfaction and job performance, similar studies can be done with many different arguments that are related to emotional intelligence. In this way, variables associated with emotional intelligence can also be evaluated from a whole perspective.

When the relationship of job satisfaction with job performance was examined, there was no significant relation of job satisfaction to contextual performance, but both intrinsic satisfaction and external satisfaction were found to positively affect task performance. Therefore, in addition to wages, health insurance, organizational justice, which will provide internal and external satisfaction of enterprises, it would be in place for employees to take measures to improve their work environments. Besides the scales used in this research for employees in Ankara OSBs, new studies can be carried out by using scales.

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Testing Explosive Bubble for Eurozone Exchange Rate in the COVID-19 Outbreak: Evidence from Recursive Right-Tailed Tests

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Abstract

This paper investigates the presence of explosive bubbles in financial markets using daily data (5-day weeks) of the closing rate of EUR/USD exchange in the COVID-19 outbreak, covering the period from December 2, 2019 to December 4, 2020. The bubble behavior in the closing rate of EUR/USD exchange is measured by two distinct right-tailed testing procedures. In this vein, the Supremum Augmented Dickey-Fuller (SADF) test developed by Phillips et al. (2011) and the Generalized Supremum Augmented Dickey-Fuller (GSADF) test developed by Phillips et al. (2015) are used to identify multiple bubble periods. The empirical findings imply that positive bubbles are a common feature of the closing rate of EUR/USD exchange in the COVID-19 outbreak. As a critical year, 2020 is identified to point out the importance of explosive bubble behavior, after which estimated statistics by two types of unit-root test procedures provide evidence of ongoing financial instability.

Keywords: Exchange Rate, Bubble Behavior, Financial Instability, COVID-19, Right-Tailed Test

JEL Classification: C22, C51, G01

1. Introduction

The world economy faced a severe financial crisis in 2007, which had been led by the collapse of Lehman Brothers in the US. However, this is neither the first nor the last in which the financial markets have been confronted with several bubbles throughout time across different countries and regions. In that vein, the possibility of occurrence of the financial bubbles has led several countries to make provision for alleviating their impacts of potential harms on the economic system. However, the problems that the financial markets have to deal with are essentially very far away from being solved due to the fact that financial assets still attract different kinds of investors even though the bubbles may negatively affect individuals' financial profits. Therefore, the demand-led financial motives for several assets in financial markets lead the prices of those assets to skyrocket in a very short time; and thus, cause the emergence of financial bubbles. However, the divergence from the equilibrium point between demand and supply in the asset market due to excess demand for financial instruments eventually results in the burst of a financial

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bubble. The collapse of the financial system to a large extent caused by the bursting of the bubble has been contagious among the countries and has led to a considerable amount of recovery attempts by governments together with several global organizations to avoid the contamination (Ahmed et al., 2016). As the final shock in financial markets, which affects all the economies, particularly pointed out the importance of financial instabilities from being protected to the collapse of the real sector (Afşar et al., 2019).

The dramatic changes in the value of the currencies during the unexpected moments allow for unprecedented movements of asset sales back in just a short time. In particular, the markets that have very fragile foundations may not have a chance to recover their ongoing problems where several economies from the developing region encounter outflowing of a huge amount of foreign assets abroad. Since the capital outflows are considered as undesirable for host countries, leaving money from an economy at an extremely high rate plays an important role about foreign imbalances and financial crises that may originate from increasing speculative motives devoted to an excess demand towards foreign assets. In that sense, the foreign exchange markets can be considered as the focal point in which the financial problems can easily be identified by way of analyzing the current movements of foreign capital subject to the socio-economic structure. In addition, the foreign exchange markets are important for the reason that the financial fluctuations resulting from the capital movements are reflected in domestic prices. Hence the bubbles become a threat for the financial markets if the domestic price level exceeds a certain benchmark level in which several economic indicators depend on price movements. This may be thus explained as one of the major reasons why the real economic indicators get worse following the burst of asset bubbles. Given the financial market bubbles of crucial importance in exchange rate movements, a bulk of studies have conjectured that the exchange rates were driven by speculative motives at the beginning of its outbreak.

Even though the speculative motives substantially lead investors to invest in risky assets for getting more financial profits, the determination of exchange rate bubbles is still puzzling economists as well as the financial market participants. Besides the existence of speculative bubbles in financial markets have been a longstanding problem under the debate of many scholars, the assumptions behind the orientation towards capturing more profits in those markets are far away from being agreed in the theoretical context. An undeniably high mass of economists still advocates the theoretical and empirical validity of rational expectations together with the rational behavior of economic agents which is based on the knowledge that the pricing of an asset is determined as regards to "market fundamentals" of given assets (Wu, 1995: 27). So, deviations of an asset's price from its optimum level determined by its market fundamentals are important for detecting the emergence of bubbles in financial markets, which is exacerbated by irrationality. On the other hand, the second pillar of studies implies that self-fulfilling rumors of investors in financial markets can affect the pricing dynamics of assets as well. In that vein, they are often assumed as the reasons that lead to the occurrence of asset bubbles.

However, the historical investigation on the assumption of irrationality shows that the discrepancies between an asset's price and its actual value does not necessarily be understood from the standpoint of rational expectations. On the contrary, the structural ingredients of occurrence of asset bubbles should also be undertaken by way of looking at different phenomena; and thereby, reflecting mixed results (Shiller, 1978; Blanchard, 1979; Obstfeld and Rogoff, 1983; Diba and Grossman, 1988a; Gilles and LeRoy, 1992).

In this paper, considering the presence of asset bubbles in financial markets, the detection of its possible occurrence in the COVID-19 outbreak will be examined by way of using closing EUR/USD exchange rate for the Eurozone countries for the period from December 2, 2019 to December 4, 2020. The remainder of the paper is organized into five sections. Section 2 points to the importance of a bubble in financial markets by looking at the causal linkages among several determinants. Section 3 presents the details of some theoretical approaches on exchange rate bubbles along with the literature review. Section 4 explains the data set and the empirical methodology. Section 5 reports the empirical findings. Section 6 summarizes the core results and concludes.

2. Speculative Bubbles and Financial Markets: The Causal Linkage

The major way to express the importance of bubbles that may occur in financial markets is to understand the ongoing formation of the real sector. In other words, the interdependency of different sectors in a globalized world requires to ascertain complex features of a causal relationship between financial markets and the real

economy. However, the gap between the real economy and the financial markets is rarely assumed as clear as possible that some people thought. In essence, the presence of the negative effects of volatility and the sharp increases in asset prices lead many economists and analysts to consider the magnitude of bubbles in financial markets, which of those recognize the potential of their impacts on the real economy. In that vein, the bubbles are typically associated with sharp increases in prices of financial instruments resulting in panics and crashes (Kindleberger and Aliber, 2005). The common vision on the way that leads to the emergence of bubbles and thereby financial crises depends on an increasing gap between the actual and current prices of financial instruments. Indeed, the speculative motives of investors encourage them to demand more towards the ownership of several kinds of assets in which they become conditioned to sell those assets at higher prices. The breaking point is that the bubbles emerge in financial markets when manias for the case of reliance towards an absolute increase in prices of different financial instruments are supposed to discern that it comes to an end. Indeed, this is the fact that a substantial amount of investment on financial assets swiftly reduce in parallel to a decrease in demand for those assets and thereby their prices.

The causal linkage between financial markets and the real economy emerges at this point. Since the asset bubbles emerge in terms of their prices along with bankruptcies and credit defaults, the real investment may confront with serious disadvantages resulting in a decrease of employment, and investment opportunities. As a reflection of this,

market participations, as well as policymakers, act to prevent the collapse of financial markets (Grover and Grover, 2014). The major reason that the economic actors have a part in counteracting against the occurrence of financial crises is that the financial instability may tend to cause serious socio-economic and political problems in world economies.

The literature on the history of financial crises and the burst of financial bubbles specifies that concern by arguing that the asset price deflation following the resolution of speculative mania cause the economic structure to be seriously affected throughout a particular period of time (Malkiel, 2010). Therefore, the investigation of the relationship between speculation and resilience in resource-based communities (i.e., boomtowns) susceptible to economic swings (boom/bust) becomes more charming in the relevant literature (Deacon et al, 2018). In that sense, the mechanisms behind the financial bubbles can be intuitively categorized into two parts. As Sornette and Cauwels (2014: 5) state that "during bubbles, prices move away from their so-called fundamental value; where, during positive bubbles, there is excessive demand and, during negative bubbles, there is disproportionate selling". Therefore, when the bubbles burst, prices suddenly decrease in parallel to the case in which the rate of defaults and foreclosures skyrocketed in the real economy. During the fast price appreciation of a bubble phase where the speculative motive exceeds the precautionary motive for "…the object of securing profit from knowing better than the market what the future will bring forth…" (Keynes, 1936: 170), the oscillations are subjected to an ever-

increasing frequency, implying that the inertia of investors when reevaluating their expectation decreases (Sornette and Cauwels, 2014: 17). However, together with a decrease in price expectations to rise endlessly and thereby the reduction of demand towards such assets lead investors to get rid of those assets by trying to sell them in financial markets. Since the price deflation in financial markets becomes clear, it leads to an increase in transactions in over-the-counter markets, which also exacerbates the potential problems in an economic environment. Therefore, the burst of bubbles in financial markets primarily affects the growth rate of an economy and future projections of current investment. If the financial markets in countries where a certain level of financial development is not provided, the effects of bubble bursts become more severe in terms of economic growth.

Moreover, this research implies that the financial markets are inherently unstable as Minsky (1992) developed to show that speculative and Ponzi-type finance became the driving force for asset demand behavior of individuals in unregulated or loosely regulated financial markets. Although they are assumed as playing an important role in economic functioning such as pricing, providing an efficient allocation of capital, and enabling risk diversification, the unfettered degree of financial globalization and the "financialization of daily life" (Martin, 2002) exacerbate the financial cycles characterized by the rapid escalation of asset prices and thus induce dramatic fluctuations in financial asset prices and business cycles along with the occurrence of more severe bursting of the bubbles in financial markets. Hence, each problem augments the ways that lead to the

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emergence of several crises in different platforms such as the banking sector and foreign exchange markets. The next part will be based on the investigation of theoretical approaches for the occurrence of exchange rate bubbles and of the relevant literature.

3. Theoretical Approaches and Literature Review

To categorize the trajectory of exchange rate movements, one should formulate the theoretical framework to account for the occurrence of large deviations, as well as for some mean-reversal behavior (Maldonado et al., 2012: 1034). Moreover, the asset nature of exchange rate stocks, forward exchange contracts, and foreign exchange deposits should be well-designed in terms of analyzing the risk-based effects of assets which are prone to speculative motives. In addition, it necessitates the deductibility of its role in pricing tradeable goods relative to non-tradable ones (Maldonado et al., 2012: 1034).

The theoretical models on the determination of exchange rate bubbles are several in the literature. However, the distinctive features of each model are based on their data selection process, which lead them to grasp the heterogeneous dynamics of exchange rate bubbles. One group of studies focalizes the structural system of equations to detect the exchange rate movements as part of two distinct components: (i) the *fundamental value* and (ii) the *bubble*. For instance, Tirole (1985) and Blanchard and Fisher (1989) develop macroeconomic models to define the reasons behind the occurrence of bubbles. In addition, the other group of research considers the stochastic specification of the bubble. In that vein, the major research

topics in which they investigate the differences in terms of specific factors: (i) the ways that lead to the disappearance of bubbles (Obstfeld and Rogoff, 1983; Engsted, 1993), (ii) the collapsing process of bubbles in case of exogenous probability (Blanchard, 1979; Blanchard and Watson, 1982), and (iii) the inception and survival of bubbles (Diba and Grossman, 1988a).

Considering these theoretical classifications to detect the bubble formation over time, some historical investigations can be summarized to understand the bubbles in practice. For instance, Evans (1986) benefits from a non-parametric strategy that deems the possibility of several bubble bursts for the sterling-dollar exchange rate and finds evidence of a negative bubble in excess return to holding sterling rather than dollar assets during 1981 – 1984. Meese (1986) provides mixed evidence of asset market bubbles or extraneous factors in exchange markets, using a monthly monetary model of exchange rates, and rejects the tests of the no-bubbles hypothesis regards to dollar/deutsche mark and the dollar/pound exchange rates over the period 1973 – 1982. West (1987) follows a parametric method and rejects the joint hypothesis that no bubbles occur in the Standard & Poor's 500 index and the Dow Jones index over the period 1871–1980 and 1928–1978, respectively. Diba and Grossman (1988b) analyze the existence of bubbles based on unit-root testing procedures and cointegration analysis for the stock price and the dividends. The empirical findings indicate that the existence of an explosive rational bubble in prices is not robust in a statistical framework. In addition to these early phase analyses to test the presence of bubbles in

financial markets, a bulk of studies were also investigated the same topic from different perspectives. Some of them can be ranged as follows: Shiller, 1981; Hart and Kreps, 1986; Rappoport and White, 1994; Hall et al., 1999; Nasseh and Strauss, 2004; Maldonado et al., 2012; Geuder et al., 2019.

However, many of these estimates intrinsically assume that the potential occurrence of bubbles has an upward tendency until the structural dynamics exogenously change in time. Indeed, this restrictive assumption can be relaxed by employing a regime-switching model for the bubble. Therefore, two alternative dynamics of the bubble size should be designed by economic agents and the possibility of regime change should be incorporated into their expectations (Maldonado et al., 2012: 1034). Following this background, the bubbles have two characteristics. On the one hand, it will be collapsing with decreasing expected size. On the other hand, it will be survived with increasing expected size. Each formulation leads to the context of literature to change from a different perspective. For example, Evans (1991) states that bubbles collapse in regular periods, depending on their size. Besides the estimates of Evans (1991), which show that the bubble regime is observable, Van Norden and Schaller (1993) suppose that it is not, where the bubble regime is determined by a non-observable stochastic binary variable together with the assumption that the bubble size affects the probability of occurrence. Van Norden (1996) also extends this formulation by looking at the speculative bubble mechanisms in the exchange rate between the US dollar and three other major currencies and concludes that there is mixed evidence for the occurrence of regime-switching bubbles. The other studies based on the regime-switching formulation in bubbles find similar results as Van Norden (1996) reveals (e.g., Funke et al., 1994; Driffill and Sola, 1998; Roche, 2001; Brooks and Katsaris, 2005). Finally, a related body of literature assesses whether the Markov-Switching models are more reliable based on the estimation of speculative bubbles in financial markets (Hamilton, 1994; Hall et al., 1999; Liu et al., 2012; Lucey and O'Connor, 2013; Shi, 2010, 2013; Das, 2017; Balcombe and Fraser, 2017).

4. Data and Empirical Priors

4.1 Data

The data of this paper covers the daily data (5-day weeks) of the closing rate of EUR/USD exchange, $E_{€/\$}$, during the period from December 2, 2019 until December 4, 2020 as obtained from Yahoo Finance. As the exchange rates are available five days a week for certain hours, the data is collected for all available days and corresponds to a total of $T = 265$ days. The empirical method is tested with the statistical software EViews version 10. The exchange rates are estimated in natural forms. Table 1 reports the key summary statistics for closing rate of EUR/USD exchange. The minimum $E_{€/\$}$ is 1.0657, whereas the maximum $E_{€/\$}$ of 1.2146 shows 18.66% depreciation of the euro against the dollar. This fluctuation of the euro/dollar exchange rate in the sample introduces the possibility of a bubble burst in the Eurozone. The closing rate of EUR/USD exchange is positively skewed. In addition, the kurtosis value of closing rate of EUR/USD exchange is lower than 2, indicating that it is platykurtic. Therefore, the distribution produces fewer extreme

outliers such as uniform distribution than does normal distribution. As expected, the Jarque-Bera test rejects the null hypothesis for the Gaussian distribution at a significance level of 1%. Finally, Figure 1 shows the historical movements of EUR/USD exchange rate over the sample period. The closing rate of EUR/USD exchange series is not stationary, as confirmed by Figure 1. Also, as anticipated, the null hypothesis of nonstationary is rejected for the augmented Dickey-Fuller (ADF) test, meaning that the series have order one I (1) process.

Table 1. Descriptive Statistics

	Minimum	Maximum	Mean	Median	Skewness	Kurtosis	Jarque-Bera
Close	1.0657	1.2146	1.1338	1.1226	0.2276	1.5837	24.4348

Figure 1. Historical Movements of EUR/USD Exchange rate
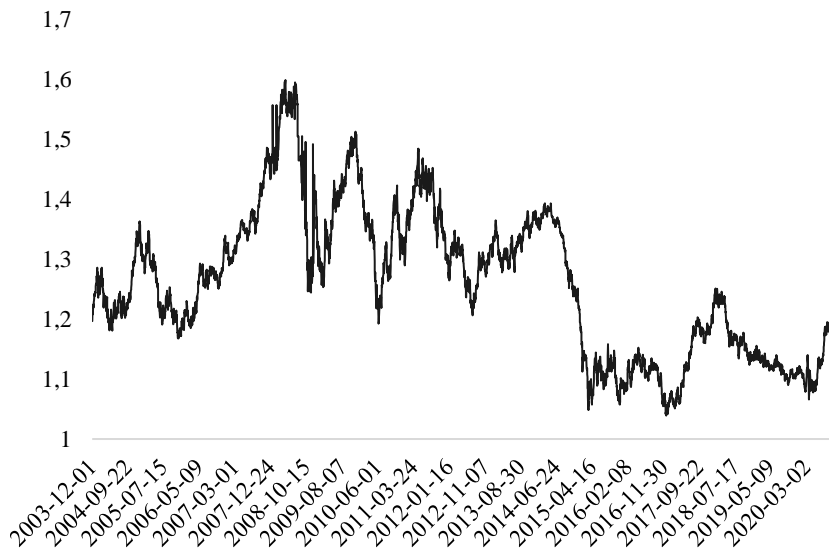
Source: Yahoo Finance

4.2 Empirical Methodology

The core method that the paper uses in the empirical analysis is based on a test procedure developed by Phillips et al. (2011; PWY hereafter), which is right-tailed versions of the traditional Augmented Dickey-Fuller (ADF) test with parameter δ.

The statistics test the unit-roots of an explosive root:

H_0: δ = 1

H_1: δ ≠ 1

which means that the rejection of null hypothesis (H_0) against its alternative (H_1) refers to an explosive root in series. In that sense, the rejection of H_0 points to the case

that the bubbles are statistically prevailing. The PWY procedure includes two types of statistics: (i) a recursive supremum ADF (SADF) and (ii) a generalized supremum ADF (GSADF). The methodological representation can be shown in Equations (1) and (2) as follows:

$$SADF\ (r_0) = sup_{r_2 \epsilon [r_0,1]}\{ADF_0^{r_2}\} \tag{1}$$

$$GSADF\ (r_0) = sup_{r_2 \epsilon [r_0,1];\ r_1 \epsilon [0,r_2-r_1]}\{ADF_{r_1}^{r_2}\} \tag{2}$$

where $r_1, r_2 \epsilon [0,1]$ are a series of subsamples. Relative to the SADF statistic, the GSADF statistic is more efficient and provides robust results since its flexibility in window widths is much higher and includes more fractions of the overall sample.

The detection of an explosive root also extends to the presence of one or multiple bubble periods. The above strategy further developed by Phillips et al. (2015; PSY hereafter), which is based on a backward supremum ADF (BSADF) test, represents a double recursive method:

$$BSADF_{(r_2)}(r_0) = sup_{r_1 \epsilon [0,r_2-r_0]}\{ADF_{r_1}^{r_2}\} \tag{3}$$

Indeed, the BSADF testing procedure benefits from the SADF and GSADF statistics, respectively. This newly updated procedure developed by Phillips et al.

(2015) divides the current series into two periods in which the bubbles start in $\hat{r}_{i,b}$ and end in $\hat{r}_{i,e}$, given in Equations (4) and (5), respectively:

$$\hat{r}_{i,b} = inf_{r_2 \epsilon [r_0,1]}\ \{r_2: BSADF_{r_2}(r_0) > scv_{r_2}^{\alpha_T}\} \tag{4}$$

$$\hat{r}_{i,e} = inf_{r_2 \epsilon \left[\hat{r}_{i,b}+\frac{\gamma log(T)}{T},1\right]}\ \{r_2: BSADF_{r_2}(r_0) < scv_{r_2}^{\alpha_T}\} \tag{5}$$

The recursive rolling window of Phillips et al. (2015) was also extended by Phillips and Shi (2018, 2020) for detecting the multiple bubbles. Each observation from the sample ranges in an interval between r_0 and 1 for the PSY testing procedure, where $r_0 = 0.01 + 1.8/\sqrt{T}$.

Under the null hypothesis of $\rho = 0$, the regression analysis is based on the estimates representing in Equation (6):

$$\Delta y_t = \mu + \delta y_{t-1} + \sum_{i=1}^{p} \emptyset_i \Delta y_{t-i} + \varepsilon_t \tag{6}$$

By using Equation (6), the multiple bubbles for the period determination can be evaluated into two dates matching as the *exuberance date* and the *collapse date*. On the one hand, the exuberance date implies that

the PSY test statistic is initially higher than its critical value in which the first episode ends. On the other hand, the collapse date indicates that the supremum test statistic drops below its essential value in which the second episode is completed. Let the episode is unitary for the sample arising from r_e and r_f. Following the Phillips and Shi (2018; 2020) procedure, Equations (7) and (8) can be conducted for the determination of estimated periods and termination dates:

$$\hat{r}_e = inf_{r\epsilon[r_0,1]} \{r: PSY_r(r_0) > cv_r(\beta_T)\} \tag{7}$$

$$\hat{r}_f = inf_{r\epsilon[\hat{r}_e,1]} \{r: PSY_r(r_0) < cv_r(\beta_T)\} \tag{8}$$

where $cv_r(\beta_T)$ represents the quantile of the distribution of the $PSY_r(r_0)$ of Equation (3).

5. Empirical Findings

Table 2 reports the results of SADF and GSADF test statistics for the closing euro/dollar exchange rate with 95% critical values obtained by the Monte Carlo simulation using the EViews 10 package. Following Phillips et al. (2015), initial window width is measured as $r_0 = 0.01 + 1.8/\sqrt{265} \approx 0.121$, which yields 0.121*265 ≈

32. So, the initial window width includes 32 observations. The right-tailed unit-root test statistics show that the null hypothesis is rejected at the 5% significance level for the SADF test and the 1% significance level for the GSADF test in favor of the alternative hypothesis, representing that there is at least one explosive unit in the series. In other words, bubble behavior in at least one subperiod of the EUR/USD exchange rate series can be assumed for the COVID-19 outbreak. This leads us to ask, for which subperiods this assumption holds.

Table 2. Closing Rate of EUR/USD Exchange SADF and GSADF Statistics

	Test Statistic	Critical Values		
Confidence Level		90%	95%	99%
SADF	0.72	0.21	0.43	1.14
GSADF	2.43	0.99	1.21	1.74

Note: The critical values are measured by Monte Carlo simulation using EViews software version 10. The test statistic for SADF exceeds the critical values at the 95% confidence level and the test statistic for GSADF exceeds the critical values at the 99% confidence level. The sample period is from December 2, 2019 to December 4, 2020.

To assess the background of this question, the empirical strategy tends to analyze the backward SADF sequence and their corresponding critical values for a 95% confidence level as represented in Figures 2 and 3 for SADF and GSADF testing procedures, respectively. On the one hand, the graphical output in Figure 2 for the SADF test shows that three subperiods containing bubble behavior. All of these bubble periods are dated in 2020. The initial one starts at the end of February and ends in the second week of March. The following

period ranges between the middle of July and at the end of July. The third period starts at the beginning of August and ends in the middle of August. On the other hand, the graphical representation in Figure 3 for the GSADF test indicates that four subperiods containing bubble behavior. In 2020, the bubble period ranges from February to March, a short period in time from the middle of March to the end of March, the third period from May to June, and a fourth period range from July to

August. These findings mostly correspond with the literature assuming that the positive bubbles are likely to occur over time. The distinctive feature of this paper is to extend this explosive bubble behavior in exchange rate by looking at Eurozone and to assess its statistical significance in the COVID-19 outbreak for the period between December 2, 2019 and December 4, 2020 in terms of 265 observations and 32 initial window width.
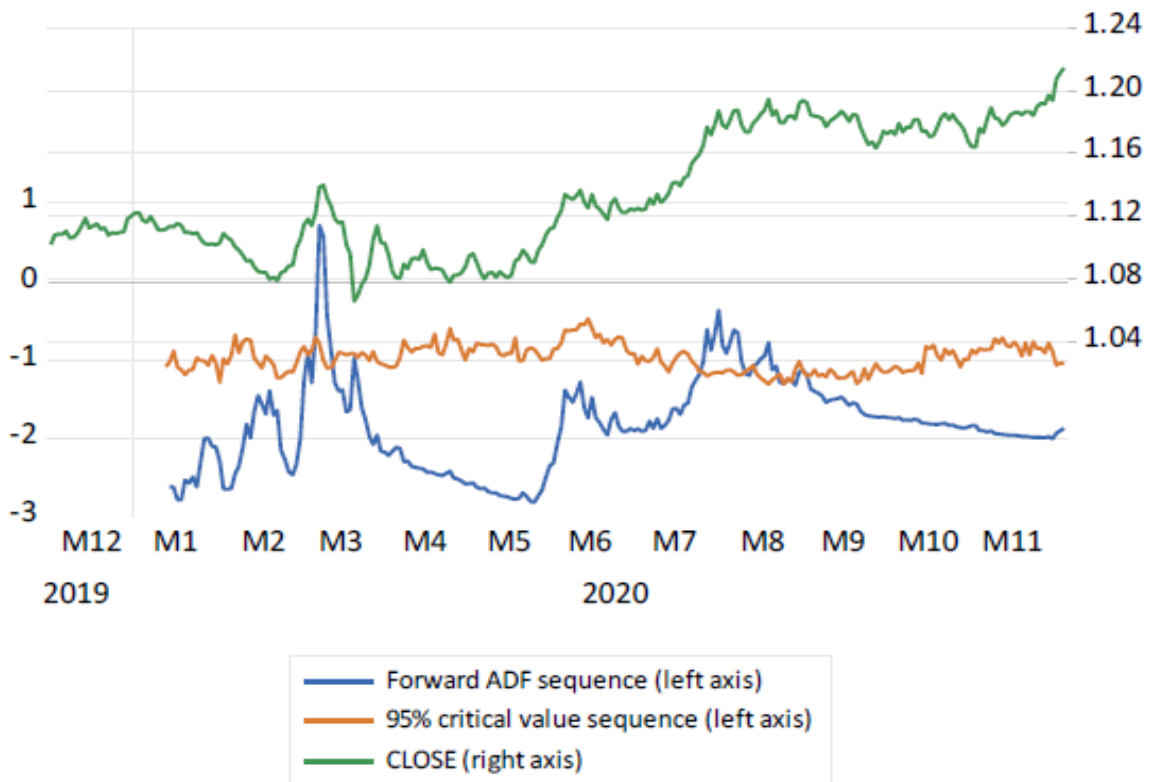
Figure 2. The SADF Test Results

Figure 3. The GSADF Test Results
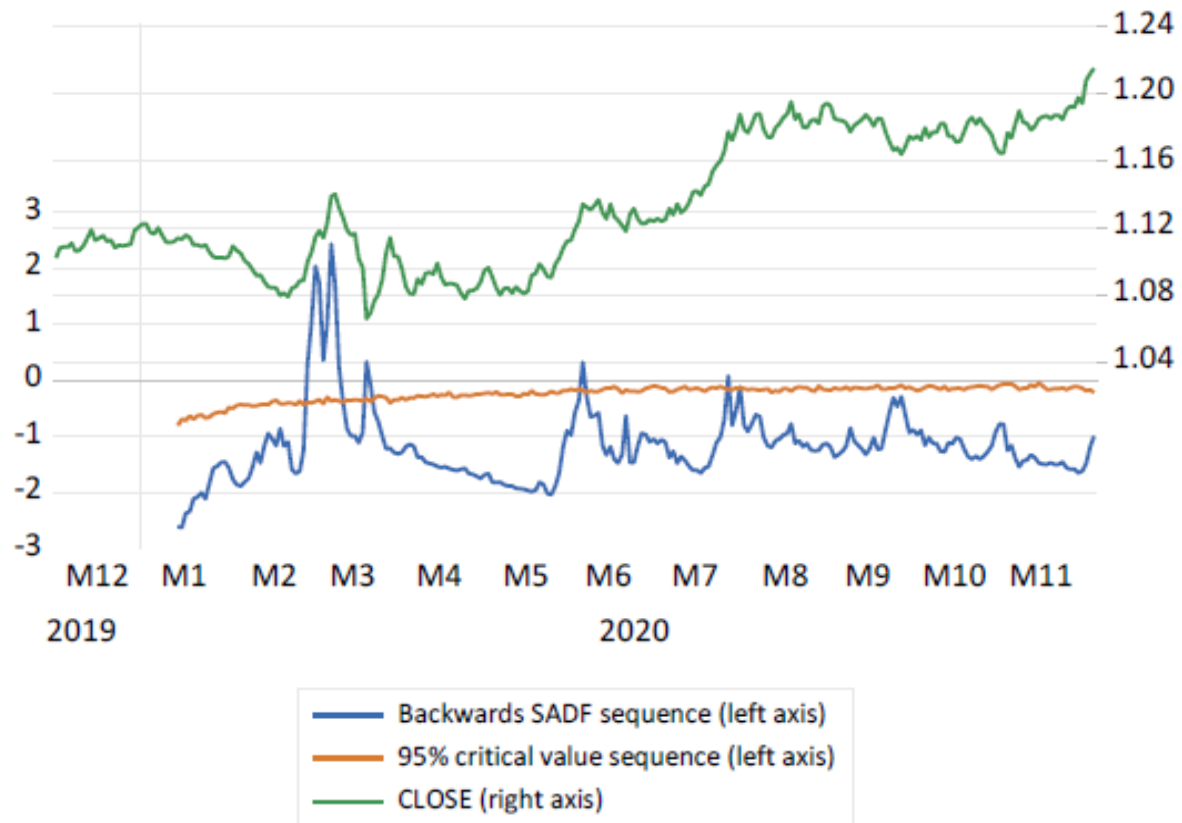
6. Concluding Remarks

In this study, the Monte Carlo simulation of Phillips et al. (2011, 2015) is used to identify the explosive bubble behavior in the closing rate of EUR/USD exchange from December 2, 2019 to December 4, 2020. The major aim is to assess whether the explosive bubbles in EUR/USD exchange rate are likely to occur in the COVID-19 outbreak. The empirical findings based on right-tailed unit-root testing procedures, covering SADF and GSADF, confirm the existence of frequent bubble periods in the closing rate of EUR/USD exchange. A natural question that arises from those results depends on which factors caused these episodes of bubble behavior. In other words, the results have also some practical implications. Given the flatting the spread of COVID-19 using lockdowns, a surging unemployment level, skyrocketing level of youth unemployment, a lower level of industrial production, a decrease in investment spending, and increasing demand for speculative motives along with an increasing degree of Ponzi-type finance may have significantly affected the closing rate of EUR/USD exchange across the Eurozone over the COVID-19 outbreak. Those issues are also instructive for governments, economic agents, and policymakers who have to make decisions on financial instability measures. Future studies will be based on the analysis to test whether the above findings are significant over the long-run historical period across the Eurozone.

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Liquidity Timing Ability of Fund Managers under Changing Market Dynamics[*]

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Abstract

We examine the liquidity timing ability of Turkish variable fund managers during 2011-2018, and how this ability is affected by the environmental factors such as the technological advancement level, the presence of derivatives market, the growth in the overall economy, the level of market openness, and the performance of portfolios for bond, gold, real estate, foreign exchange, emerging markets. We use interaction variables within a panel data framework. We find strong evidence of the liquidity timing ability of mutual fund managers even after controlling for environmental factors. The nature of the interactions for most of the control factors with liquidity timing ability is strongly significant and differs based on the factor.

1. Introduction

'Timing' is a tactical asset allocation strategy that sets a fund for certain assets while analyzing the market conditions in the near future. Liquidity timing strategy involves fund managers' allocating away from bonds to stocks during the periods of high stock market liquidity, and from stocks to bonds during the periods of low stock market liquidity. This study searches for evidence for fund managers' liquidity timing ability and factors that interact with this ability. Our sample includes monthly data on the Turkish variable mutual funds from 2011 - 2018. We examine the effects of technological advancement level, market openness, economic growth, currency, commodity, real estate, bond, and emerging market performance on the fund

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manager's liquidity timing ability for Turkish variable funds.

Prior research on timing mainly focuses on market timing, that is, the ability of fund managers to time market return (e.g., Treynor and Mazuy, 1966; Henriksson and Merton, 1981; Jagannathan and Korajczyk, 1986; Jiang, 2003), market volatility (e.g., Busse, 1999) or style returns (e.g., Swinkels and Tjong-A-Tjoe, 2007; Chen, Adams and Taffler, 2013). The number of studies on the liquidity timing ability of mutual fund managers is much less compared to the market timing literature. While some studies show that there is weak or no evidence of liquidity timing (e.g., Wang, 2008 p.67; Foran & O'Sullivan, 2017 p: 20) other studies show strong evidence for the fund managers' liquidity timing (e.g., Pukki, 2012; Cao, Simin & Wang, 2013; Cao, Chen, Liang & Lo, 2013; Bazgour, Bodson & Sougne, 2017; Wattanatorn, Padungsaksawasdi, Chunhachinda, & Nathaphan, 2020).

Our results indicate very strong evidence for the Turkish variable fund managers' liquidity timing capability, which increases with growing derivative market size relative to spot markets, increasing economic growth, as well as bond and gold portfolio returns and decreases with real estate and emerging market returns. We also show that the technological advancement level and the market openness affect the mutual fund performance, but it does not interact with the liquidity timing ability of fund managers during our sample period. Our results indicate that liquidity timing is the performance-enhancing strategy for the fund managers and certain environmental factors may increase or decrease the extent

to which this strategy improves the performance. We have not seen any other liquidity timing research studying similar issues using the same set of factors and interaction terms within a panel data set, especially for Turkish mutual funds. Our study adds to the literature on the importance of liquidity in investment performance, the evidence for fund managers' liquidity timing ability, and its interacting factors. Liquidity is an important dimension for the markets (e.g., Amihud, 2002; Pastor & Stambaugh, 2002; Acharya & Pedersen, 2005; Yeşildag, 2008) and it will be important to understand how its relation to investment performance changes under changing market conditions.

The remainder of the paper is organized as follows: Section 2 describes the sample data and the methodology. Section 3 reports the results while Section 4 concludes.

2. Data and Methodology

Using a sample of 96 Turkish Variable mutual funds during 2011 – 2018, we search for evidence of liquidity timing-ability for the fund managers.

Greene (2003) defines the panel data analysis as a method that attempts to predict the relationships between the variables using the cross-sectional data with time dimension where it is not adequate to study only with time-series data or cross-sectional data separately.

In order to evaluate fund managers liquidity-timing ability, the following liquidity timing model is adopted from prior literature (for instance, see Pukki, 2012; Cao, Chen, Liang and Lo, 2013; Foran and O'Sullivan, 2017; Bazgour, Bodson and Sougne,2017; Wattanatorn,

Padungsaksawasdi, Chunhachinda and Nathaphan, 2020):

$$\left(R_{p,t} - R_{f,t}\right) = \alpha_p + b_{1,p}\left(R_{m,t} - R_{f,t}\right) + c_{1,p}\left(L_{m,t} - \bar{L}_{m,T}\right)\left(R_{m,t} - R_{f,t}\right) + e_{p,t}$$

[1]

where

$R_{f,t}$=Month t rate of return on the risk-free asset (proxied by the one-year Treasury bill),

$R_{p,t}$=Month t rate of return of Turkish Variable Fund P,

$$L_{m,t} = |R_{m,t}| / VOLM_t$$

$VOLM_t$ = Natural logarithm of the Market (proxied by the BIST-30 Index) TL transaction volume in Month t,

$\bar{L}_{m,T}$ = Average Amihud (2002) illiquidity measure for the Market (proxied by the

$$\bar{L}_{m,T} = \frac{1}{M_T} \sum_{t=1}^{M_T} L_{m,t}$$

and

M_T = number of months with available data in Year T f our sample period, 2011-2018.

In order to estimate the Market Illiquidity measure, $L_{mt,}$ we follow the Amihud (2002) procedure: First, we determine the firms listed in the BIST 30 Index every period during our sample period, then, for every month, we estimate the daily illiquidity measure of each BIST 30 Index firm using the L_{mt} formula above. After that, we estimate the monthly illiquidity measure for each index firm by taking the average of that firm's daily illiquidity values during that month. Monthly market illiquidity, $L_{mt,}$ is the average of monthly illiquidity measures of all firms listed in the market index that month.

$R_{m,t}$=Month t rate of return of the market portfolio (proxied by the BIST-30 Index),

$L_{m,t}$ = Amihud (2002) illiquidity measure for the market in Month t:

BIST-30 Index) in year T, estimated as a moving average of the last 12 months' monthly illiquidity measure:

The coefficient $c_{1.p}$ in Equation 1 measures the liquidity timing ability of a mutual fund manager. A significant, positive liquidity-timing coefficient $c_{1,p}$ implies that a fund has higher (lower) market exposure when aggregate market liquidity is higher (lower). In other words, the mutual fund manager is able to increase (reduce) exposure prior to increases (decreases) in liquidity. We expect the sign of the coefficient to be negative since the Amihud illiquidity measure should be inversely related to the fund's premium in the presence of liquidity timing (Amihud & Mendelson, 1986; Amihud, 2002; Cao e al., 2013).

We also examine how changes in certain market conditions affect the fund managers' ability to time the liquidity using:

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$$\left(R_{p,t} - R_{f,t}\right) = \alpha_p + b_{1,p}\left(R_{m,t} - R_{f,t}\right) + c_{1,p}\left(L_{m,t} - \bar{L}_{m.T}\right)\left(R_{m,t} - R_{f,t}\right) + c_{2,p}\, F_t$$
$$+ c_{3,p}\left[F_t\left(R_{m,t} - R_{f,t}\right)\left(L_{m,t} - \bar{L}_{m.T}\right)\right] + e_{p,t}$$

[2]

where F_t is one of DGDP, DT, DOOR, DDMS, DCB, DGLDTR, DFBIST, DXGMYO or DMSCI, each of which represents the percentage monthly change in a controlling factor. We examine the interactions of these control factors with the mutual fund performance and liquidity timing ability of fund managers. These factors are

- Gross Domestic Product (GDP). The monthly Gross Domestic Product values are extrapolated from the quarterly values obtained from the Turkish Statistical Institute database. The economic growth level of the country is represented by the monthly change in the Gross Domestic Product. DGDP denotes the monthly percentage change in GDP.

- Technological Advancement Level (T) is measured by the number of active customers of digital, internet, and mobile banks in the country. The data is obtained by the Banks Association of Turkey. DT denotes the monthly percentage change in T.

- Outward Openness Ratio (OOR) is the ratio of the total of imports and exports to the Gros Domestic Product of the country. The data is obtained from the Turkish Statistical Institute database. DOOR denotes the monthly percentage change in OOR.

- Derivative Market Size (DMS) is the monthly TL transaction volume of the Turkish Derivatives Exchange as a percentage of the monthly TL

transaction volume of Borsa Istanbul obtained from Borsa Istanbul. DDMS denotes the monthly percentage change in DMS.

- Currency Basket (CB) monthly closing value. Currency Basket is an equally weighted portfolio of EURO/TL and US Dollar/TL exchange rates. The monthly closing values are obtained from the Foreks FX plus financial platform. DCB denotes the monthly percentage change in CB.

- Istanbul Gold Exchange Traded Fund monthly closing value (GLDTR) obtained from investing.com. DGLDTR denotes the monthly percentage change in GLDTR.

- Finansbank FTSE Istanbul Bond Exchange Traded Fund monthly closing value (FBIST). FBIST is a portfolio of Turkish Government Debt Securities. The data is obtained from investing.com. DFBIST denotes the monthly percentage change in FBIST.

- Borsa Istanbul Real Estate Investment Trust monthly closing value (XGMYO). It is composed of National Market listed companies in the real estate industry. The monthly data is obtained from investing.com. DXGMYO denotes the monthly percentage change in XGMYO.

- MSCI Emerging Markets Index monthly closing value (MSCI). The Morgan Stanley Capital International Emerging Markets Index covers 24 developing and 23 emerging markets

in the world. The data is obtained from investing.com. DMSCI denotes the monthly percentage change in MSCI.

Table 1 presents the descriptive statistics for the variables used in the study. The

Capital Markets Board reports 131 variable mutual funds during our sample period. However, we could determine only 96 Turkish variable funds with complete and continuous monthly data for our sample period, 2011-2018.

	Mean	Median	Maximum	Minimum	Standard Deviation
R_P	-0.0126	-0.0024	0.5043	-1.0154	0.107
R_M	-0.0022	-0.0032	0.1433	-0.1396	0.0653
DGDP	0.0124	0.0252	0.0523	-0.05	0.0333
DT	0.019	0.0173	0.1166	-0.0038	0.0164
DOOR	0.0063	-0.0083	0.4543	-0.284	0.1139
DDMS	0.0386	0.025	0.7431	-0.3743	0.2364
DGLDTR	0.0111	0.0021	0.3143	-0.1051	0.0574
DCB	0.0117	0.0092	0.3278	-0.0881	0.0408
DFBIST	0.0052	0.0054	0.1125	-0.0984	0.0237
DXGMYO	0.0014	0.0015	0.2192	-0.1676	0.0676
DMSCI	-0.001	-0.0006	0.1303	-0.1478	0.049
L_M	0.115	0.1056	0.3517	0.0244	0.0653
$\bar{L}_m$	0.1247	0.1191	0.2229	0.0316	0.0544

Notes: This table presents the mean, median, maximum, minimum, standard deviation and number of observations for the variables RP, RM, DGDP, DT, DOOR, DDMS, DGLDTR, DCB, DFBIST, DXGMYO, DMSCI, LM, $\bar{L}_m$ during our sample period, January 2011 - December 2018. Number of observations is 96. RP is the monthly return on the variable type of Turkish Securities Mutual Funds. RM is the monthly market Index returns. The market index is proxied by Borsa Istanbul 30 Index. DGDP is the monthly percentage change in the Gross Domestic Product. DT is the monthly percentage change in the Technological Advancement Level measured by the number of Digital, Internet, and Mobil Banks Users in the country. DOOR is the monthly percentage change in the market outward openness, which is calculated as the sum of import and export value changes as a percentage of GDP. DDMS is the monthly percentage change in the Turkish Derivatives market's monthly TL transaction volume relative to Borsa Istanbul monthly TL transaction volume. DCB is the monthly percentage change in the Currency Basket closing value. The currency basket is an equally weighted portfolio of EURO/TL and US Dollar/TL exchange rates. DGLDTR is the monthly percentage change in the Istanbul Gold Exchange Traded Fund closing value. DFBIST is the monthly percentage change in FTSE Istanbul Bond Exchange Traded Fund closing value. DXGMYO is the monthly percentage change in the Borsa Istanbul Real Estate Investment Trust closing value. DMSCI is the monthly percentage change in the Morgan Stanley Capital International Emerging Markets Index monthly closing value. Lm is the monthly Amihud (2002) market illiquidity measure while $\bar{L}_m$ is the annual Amihud (2002) market illiquidity measure, which is the moving average of the last 12 months' monthly illiquidity measures. In order to estimate the monthly Amihud (2002) market Illiquididty measure, Lm, we first estimate the daily illiquidity measure of each BIST 30 Index firm using the Amihud (2002) illiquidity ratio. After that, we estimate the monthly illiquidity measure for each index firm by taking the average of that firm's daily illiquidity values for each month in our sample period. Lm is the average of monthly illiquidity measures of all firms listed in the market index that month. The data for mutual funds is from the historical statistics section of the Turkish Capital Markets Board website. The data for DGDP and DOOR are from the Turkish Statistical Institute website. The data for DIT is from the Banking Regulation and Supervision Agency website. The data for RM and DDMS are provided by Borsa Istanbul. The data for DGLDTR, DFBIST, DXGMYO, and DMSCI are from the investing.com website while the data for DCB is from the Foreks financial trading platform.

Table 1. Descriptive Statistics, Turkish Variable Mutual Funds, 01/2011 – 12/2018

Table 2 present the cross-correlations for the variables of the study. As Table 2 shows, all correlations among independent variables are small and not economically meaningful, with the exception of the negative correlation of (-0.4932) between

economic growth and internet usage. A decrease in economic growth may increase the intensity and duration of financial management and search for funds by individuals as well as institutions, which, in turn, may lead to the increased use of internet banking.

	R$_P$	R$_M$	DGDP	DT	DOOR	DDMS	DDCB	DGLDTR	DFBIST	DXGMYO	DMSCI
R$_P$	1.0000										
R$_M$	0.0856	1.0000									
DGDP	-0.0095	-0.1368	1.0000								
DT	0.0360	0.07488	-0.4932	1.0000							
DOOR	0.0781	0.1739	-0.385	0.1816	1.0000						
DDMS	-0.0253	-0.1840	-0.0005	0.0480	0.0109	1.0000					
DCB	-0.0208	-0.3618	0.2057	-0.07545	-0.2379	0.09575	1.0000				
DGLDTR	-0.0651	-0.2372	0.1401	-0.06486	-0.3007	0.02633	0.6027	1.0000			
DFBIST	0.0112	0.4833	-0.1069	0.01255	0.1576	-0.07674	**-0.7253**	-0.3168	1.0000		
DXGMYO	0.0758	0.7076	-0.2124	0.1381	0.06252	-0.01081	-0.2745	-0.2046	0.3779	1.0000	
DMSCI	0.0481	0.4660	-0.2035	0.1217	0.1384	-0.0003238	-0.3289	-0.06873	0.2632	0.4401	1.0000

Notes: Cross-correlations for the variables of the study are reported. The sample period is January 2011 to December 2018. The variable definitions are provided in Table 1.

Table 2. Correlation Matrix

We use Variance Inflation Factor (VIF) (Belsley et al., 1980) to verify lack of multicollinearity for the independent variables in our models, and test for stationarity of our variables using the Augmented Dickey-Fuller-Fisher (ADF) (Dickey & Fuller, 1979 and Fisher, 1932) unit root tests. Our unit root test results, omitted here for space sake, show all variables used in regressions to be stationary.

To ascertain the use of panel data analysis and decide on random effects vs fixed effects approach, we conduct the Breusch-Pagan tests and Hausman tests, which compare Swamy-Arora random-effects

estimates of coefficients with the related fixed effects estimators (Baltagi, 2008). The fixed effect and random effect model result was shaped and determined using the Hausman Test structure, which was previously made.

As Table 3 shows the Breusch-Pagan Lagrange Multiplier p-values are smaller than zero for all regressions, which support the validity of panel estimation, and the redundant fixed effect tests produce insignificant statistics. The Hausman tests fail to reject the choice of random effects model over the fixed effects model for all equations except the one that uses the Currency Basket (CB) as a control factor.

	Cross-section F Statistics	Cross-section χ^2 Statistics	Hausman Test (χ^2 Statistics)		Breusch-Pagan Test Langrage Multiplier p-value
R_P	0.5716	54.8229	1.2870	*	< 0.000
DGDP	0.5721	54.8876	4.5665	*	< 0.000
DT	0.5805	55.6931	6.2855	*	< 0.000
DOOR	0.5746	55.1243	5.7790	*	< 0.000
DDMS	0.5741	55.0766	6.4981	*	< 0.000
DCB	0.5706	54.7492	9.9329	***	< 0.000
DGLDTR	0.5713	54.8151	3.4016	*	< 0.000
DFBIST	0.5749	55.1584	3.2156	*	< 0.000
DXGMYO	0.5689	54.5862	1.7130	*	< 0.000
DMSCI	0.5719	54.6555	2.6059	*	< 0.000

Notes: The results from the redundant fixed effects, Hausman and Breusch-Pagan tests are reported. This table shows cross-section F and Chi-square (χ^2) statistics for redundant fixed effects, Chi-square statistics for Hausman tests, and the Lagrange Multiplier (LM) probability (p) values for Breusch-Pagan tests. The sample includes 96 mutual funds. The sample period is from January 2011 to December 2018. Models studied:

$$\left(R_{p,t} - R_{f,t}\right) = \alpha_p + b_{1,p}\left(R_{m,t} - R_{f,t}\right) + c_{1,p}\left(L_{m,t} - \bar{L}_{m,T}\right)\left(R_{m,t} - R_{f,t}\right) + e_{p,t} \; [1]$$

$$\left(R_{p,t} - R_{f,t}\right) = \alpha_p + b_{1,p}\left(R_{m,t} - R_{f,t}\right) + c_{1,p}\left(L_{m,t} - \bar{L}_{m,T}\right)\left(R_{m,t} - R_{f,t}\right) + c_{2,p}\,F_t + c_{3,p}\,F_t\left(R_{m,t} - R_{f,t}\right)\left(L_{m,t} - \bar{L}_{m,T}\right) + e_{p,t} \; [2]$$

*where (Rm-Rf) is the monthly rate of return on the market portfolio (proxied by the BIST 30 Index return) in excess of the monthly rate of return on the risk-free asset (proxied by the one-year Treasury Bill). F_t is the monthly percentage change in one of the control factors, which are DGDP, DIT, DOOR, DDMS, DCB, DGLDTR, DFBIST, DXGMYO, or DMSCI. These variables are as described in Table 1. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.*

Table 3. Redundant Fixed Effects, Hausman and Breusch-Pagan Tests

All analyses use panel corrected standard error covariance estimators, which correct for heteroscedasticity and serial correlation problems in panel data (White & Domowitz, 1984; Beck & Katz,1995; Liang & Zeger, 1986; Hansen, 2007b).

3. Empirical Results

In a panel data analysis, a statistically significant coefficient on an independent variable from a regression generally indicates how that independent variable impacts the dependent variable, when the value of the independent variable changes across time and between different funds by one unit. Tables 4 and 5 present the results of our panel data analyses to determine the liquidity timing ability of fund managers using Turkish variable mutual funds and the impact of selected control factors on this ability during January 2011 and December 2018.

Dependent Variable: $\left(R_{p,t} - R_{f,t}\right)$	
Independent Variables	Coefficients
α_p	-0.0139 ***
$\left(R_{BIST30,t} - R_{f,t}\right)$	0.1466 ***
$\left(R_{BIST30,t} - R_{f,t}\right) * \left(L_{m,t} - \bar{L}_{m,T}\right)$	-1.3767 ***
R-squared	0.0090
Adjusted R-squared	0.0087
F-statistics	33.4550 ***
Number of Mutual Funds	96
No. of Months per Fund	96
Notes: This table reports the empirical results from the panel data analyses of Model 1: $\left(R_{p,t} - R_{f,t}\right) = \alpha_p + b_{1,p}\left(R_{m,t} - R_{f,t}\right) + c_{1,p}\left(L_{m,t} - \bar{L}_{m,T}\right)\left(R_{m,t} - R_{f,t}\right) + e_{p,t}$ [1] R_P is the monthly return of each of the 96 Turkish Variable Mutual Funds. (Rm-Rf) is the monthly rate of return on the market portfolio (proxied by the BIST 30 Index return) in excess of the monthly rate of return on the risk-free asset (proxied by the one-year Treasury Bill). All other variables are as described in Table 1. The period of estimation is January 2011 to December 2018. All analyses use panel corrected standard errors (PCSE) covariance estimators, which correct for heteroscedasticity or serial correlation. R-squared, adjusted R-squared, and F statistics are reported. ***, **, and * denote significance at 1%, 5% and 10%, respectively.	

Table 4. Empirical Results: Liquidity Timing Ability of Fund Managers, Turkish Variable Funds, 2011-2018

We use the Amihud (2002) illiquidity measure, which is expected to be positive and larger when the market is more illiquid. A negative coefficient for the Amihud (2002) measure implies that fund managers effectively use liquidity timing when they make investment decisions for their funds; Since we use the ILLIQ proxy, we will be interpreting the sign of ($c_{1,p}$) in reverse.

Table 4 shows that the illiquidity timing coefficient is negative and significant at 1% significance level (-1.3767 ***) indicating that the fund managers' effectiveness in liquidity timing decisions. The Amihud illiquidity measure is significantly and negatively correlated with market returns which means that high (low) level of market liquidity is associated with high (low) market returns.

We also examined how environmental factors interact with the liquidity timing ability of fund managers. Environmental factors; we examined include Economic Growth (DGDP), and changes in the Outward Openness Ratio (DOOR), Technological Advancement level (DT) the Derivative Market Size (DDMS), Currency Basket (DCB); Istanbul Gold Exchange Traded Fund (DGLDTR), Finansbank FTSE Istanbul Treasury Securities Exchange Traded Fund (DFBIST), Borsa Istanbul Real Estate Investment Trust (DXGMYO) and MSCI Emerging Market Index (DMSCI).

Table 5 presents the results from these analyses.

Dependent Variable: $(R_{p,t} - R_{f,t})$					
Panel A	**Control Factor: DGDP**	**Control Factor: DT**	**Control Factor: DOOR**	**Control Factor: DDMS**	**Control Factor: DCB**
α_p	- 0.0134 ***	-0.0175 ***	-0.0145 ***	-0.0128 ***	-0.0140 ***
$(R_{BIST30,t} - R_{f,t})$	0.1569 ***	0.1419 ***	0.1278 ***	0.1556 ***	0.1576 ***
$(R_{BIST30,t} - R_{f,t}) * (L_{m,t} - \bar{L}_{m,T})$	-0.7659 ***	-0.7647	- 1.5207 ***	-0.6285 *	- 1.0321 ***
F_t	-0.0239	0.1928 ***	0.0621 ***	- 0.0077 *	0.0225
$F_t * (R_{BIST30,t} - R_{f,t}) * (L_{m,t} - \bar{L}_{m,T})$	- 29.7595 ***	-34.4850	- 1.6361	- 4.5250 ***	-13.4044 *
R-squared	0.0095	0.0100	0.0134	0.0102	0.0164
Adjusted R-squared	0.0090	0.0095	0.0129	0.0097	0.0031
F-statistics	0.1066	0.1065	0.1064	0.1065	1.2359 *
Number of Mutual Funds	96	96	96	96	96
No. of Monthly Observations per Fund	96	96	96	96	96
Panel B	**Control Factor: DGLDTR**	**Control Factor: DFBIST**	**Control Factor: DXGMYO**	**Control Factor: DMSCI**	
α_p	-0.0128 ***	-0.0127 ***	-0.0145 ***	-0.0134 ***	
$(R_{BIST30,t} - R_{f,t})$	0.1283 ***	0.1757 ***	0.1148 ***	0.1538 ***	
$(R_{BIST30,t} - R_{f,t}) * (L_{m,t} - \bar{L}_{m,T})$	-1.2477 ***	-1.1959 ***	-1.2452 ***	-0.8478 ***	
F_t	-0.1298 ***	-0.2246 ***	0.0797 ***	0.0372 ***	
$F_t * (R_{BIST30,t} - R_{f,t}) * (L_{m,t} - \bar{L}_{m,T}$	-13.7474 ***	-46. 3252 ***	10.8926 ***	18.6238 ***	
R-squared	0.0126	0.0110	0.0111	0.0100	
Adjusted R-squared	0.0120	0.0104	0.0106	0.0094	
F-statistics	23.5762 ***	20.5594 ***	20.7907 ***	18.6871 ***	
Number of Mutual Funds	96	96	96	96	
No. of Monthly Observations per Fund	96	96	96	96	

Notes: This table reports the empirical results from the panel data analyses of Model 2:

$$(R_{p,t} - R_{f,t}) = \alpha_p + b_{1,p}(R_{m,t} - R_{f,t}) + c_{1,p}(L_{m,t} - \bar{L}_{m,T})(R_{m,t} - R_{f,t}) + c_{2,p} F_t + c_{3,p} F_t (R_{m,t} - R_{f,t})(L_{m,t} - \bar{L}_{m,T}) + e_{p,t} \quad [2]$$

Where R_P is the monthly return on the variable type of Turkish Securities Mutual Fund; $(R_m - R_f)$ is the monthly rate of return on the market portfolio (proxied by the BIST 30 Index return) in excess of the monthly rate of return on the risk-free asset (proxied by the one year Treasury Bill); F_t is the monthly percentage change in one of the control factors, which are DGDP, DT, DOOR, DDMS, DCB, DGLDTR, DFBIST, DXGMYO, or DMSCI. L_m is the monthly Amihud (2002) market illiquidity measure while $\bar{L}_m$ is the annual Amihud (2002) market illiquidity measure. These variables are as described in Table 1. The period of estimation is January 2011 to December 2018. All analyses use panel corrected standard errors (PCSE) covariance estimators, which correct for heteroscedasticity or serial correlation. R-squared, adjusted R-squared, and F statistics are reported. ***, **, and * denote significance at 1%, 5% and 10%, respectively.

Table 5. Empirical Results: Liquidity Timing Ability of Fund Managers in the Presence of Macro Control Factors, Turkish Variable Mutual Funds, 2011-2018

Table 5 presents that controlling for macroeconomic factors such as economic growth, technology advancement level, market openness, or alternative investments such as gold market, real estate market, similar emerging markets do not change the results obtained in Table 4: There is strong evidence of liquidity timing ability for Turkish variable fund managers during our sample period 2011-2018.

As seen in Table 5, increases in the technology advancement level, market openness, real estate, and emerging markets' returns have significant positive effects while increasing returns in the gold and bond portfolios have significant negative effects on Turkish variable fund returns in our sample during 2011-2018.

For a factor, if the coefficient $(c_{3,p})$ for the interaction term $(F_t * (R_{BIST30,t} - R_{f,t}) * (L_{m,t} - \bar{L}_{m,T})$ is negative and statistically significant, it shows that a raise in any of these control factors enhances the market liquidity timing ability.

The coefficients of the interaction terms for DGDP, DDMS, DGLDTR, and DFBIST are negative and significant at 1%. Increases in economic growth, derivatives market size

growth relative to spot market size, gold market returns, and bond portfolio returns increases the liquidity timing ability.

Similarly, the coefficients of the interaction terms for real estate investment trust (DXGMYO) and similar emerging market returns (DMSCI) are positive and significant at 1%. This implies that decreases in the real estate market and similar international market returns increase the liquidity timing ability of fund managers in the domestic market.

Interestingly, the coefficients of the interaction terms for the changes in the technology advancement level (DT), market openness (DOOR) for the country and average foreign exchange rate represented by the currency basket (DCB) are not statistically different from zero implying theses variables does not increase or decrease the liquidity timing ability.

4. Conclusions

We examine the liquidity timing ability of Turkish variable fund managers during 2011-2018 using panel data analyses and state-of-the-art timing methodologies. Our results show strong evidence of liquidity

timing ability for Turkish fund managers during our sample period.

We also examine how environmental factors such as economic growth, changes in the technological advancement level, market openness of the country, foreign exchange rate, and the relative size of the derivatives market, and the returns on bond, gold, real estate portfolios and emerging markets interact with liquidity timing ability of mutual fund managers.

Turkish variable fund managers still exhibit significant liquidity timing ability even after controlling for these market factors. We find that liquidity timing ability of fund managers gets stronger when we observe increases in economic growth, derivatives market size relative to the spot market, gold, and bond market returns. Our findings also show that liquidity timing ability increases when there is a decrease in the real estate market and similar international market returns. Even though the mutual fund returns are positively related to the technology advancement and market openness levels of the country, our results do not show any evidence of interaction between liquidity timing ability and changes in the technological advancement level, the market openness, and the foreign exchange rate during our sample period. Our findings imply that liquidity timing is the performance-enhancing strategy for the fund managers and certain environmental factors may increase or decrease the extent to which this strategy improves the performance. Our results add to the literature on the importance of liquidity in investment performance; To our knowledge, there is no other study that examines the interaction of our

environmental factors with the liquidity timing ability of fund managers using panel data analyses and interaction terms.

In the economy and finance literature and over time; as economies developed, as the financial quantities increased, as technology and business volumes progressed, the liquidity timing increased and the values giving positive signals were observed in more academic studies and the empirical results show significant evidence for the application of liquidity timing strategies by mutual fund managers in Turkey and so, our results show that investment fund managers do fulfill the predictions of the liquidity introduction for the future.

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Reserve Options Mechanism and Exchange Rate Volatility: An Implementation for Turkey

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Abstract

Due to the flexible monetary policies implemented during the crisis, low-interest rates obtained funds has moved towards countries with emerging economies and that caused speculative attacks (the volatility in exchange rates, capital market etc. to make short-term trades.) on countries such as Turkey. Therefore, Turkey has developed a set of measures to ensure price stability along with financial stability. One of these measures is the Reserve Option Mechanism, which enables TL required reserves to be held in foreign currency. Foreign currencies entering the country through the Reserve Options Mechanism will not enter the economy directly, and some of this money will be kept by the CBRT as required reserves by banks. Thanks to this mechanism, it is aimed to reduce the volatility in exchange rates. In this study, the effect of Reserve Options Mechanism on exchange rate volatility has been examined. In this framework, the effect of the GARCH approach used in modelling volatility in the 2011-2016 period and the Reserve Option Mechanism on exchange rate volatility was researched. As a result of the study, it is concluded that the Reserve Option Mechanism (ROM) variable decreases the volatility.

Keywords: *Reserve Options Mechanism, Reserve Options Coefficient, Volatility, GARCH, Global Crisis*

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1. Introduction

The Reserve Options Mechanism (ROM) is an application that allows a portion of Turkish Lira required reserves to be held in foreign currency and gold (Koray et al., 2012). Although the main objective of The Central Bank of Turkey (CBRT) is price stability, after the 2008 global crisis they brought forward financial stability as well as price stability. To achieve the financial stability target, the CBRT introduced a new instrument called the Reserve Options Mechanism (ROM), which allows holding required reserves in foreign currency and gold alongside traditional instruments such as required reserves and interest rate corridor. With the ROM, it was aimed to strengthen foreign exchange reserves, to provide banks with more flexibility in their liquidity management, and to reduce the volatility that may arise in exchange rates due to short-term capital movements (Basci, Aktaran Ergin and Aydin: 2017). Thanks to the ROM, banks gain flexibility in establishing Turkish lira required reserves, and can optionally accumulate

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foreign exchange reserves with the central bank (Eroglu and Kara, 2017). In this application, the coefficient indicating the amount of foreign currency or gold is called reserve option coefficient (ROC). The extent to which it will benefit from ROM can be adjusted by increasing or decreasing the ROC. While ROM is used more when ROC is increased, ROM is used less when ROC is decreased. CBRT can change this coefficient depending on the foreign currency inflow into the country.

ROM has an automatic balancing feature, which is different from direct foreign currency purchase and sale interventions, ie banks can decide for themselves how much they will benefit from ROM based on the relative costs of TL and FX resources. Another advantage of ROM is that the foreign exchange reserves that banks hold in the CBRT will grow in proportion to the passive growth rate of the banking sector. This in turn means that banks' reserves have the potential to be bigger than the rate at which the CBRT increases its total reserves (Alper, Kara and Yorukoglu 2012).

It has been a recent discussion in the literature whether the ROM and interest corridor are substitutes for each other. While the interest rate corridor and the ROM are both used to hedge capital flows volatility, the interest rate corridor affects exchange rate volatility through direct portfolio behavior; changing the use of the capital entering the country. For this reason, ROM has reduced the need for the interest rate corridor in order to reduce the volatility of the domestic capital flows on the domestic market. However, the use of ROM does not completely remove the need for the interest rate corridor. ROM can be sterilized with the help of the foreign

exchange interest corridor which cannot be withdrawn from the market, which indicates that the ROM and the interest rate corridor can be used as complementary qualities (Kantar 2017).

Volatility refers to the price of a financial asset and the fluctuation of the overall market during a certain period of time. Statistically, it is a measure of the distribution and spread of the development of a financial asset around a certain average. According to definitions in the literature, volatility, as a measure of risk, indicates the systematic and unavoidable risk of an asset as a measure of the change of the price of the asset relative to the market index, refers to the variance or standard deviation of the asset (Ertugrul 2012).

Since 1973, the concept of volatility has begun to be effective from the years when advanced industrial countries' currencies transitioned from an adjustable fixed exchange rate system to a free floating exchange rate exchange rate system. Volatility has indicated its impact on different areas between countries. These are in the form of volatility related to inflation in emerging markets experiencing exchange rate, interest, stocks and inflation problems (Kantar 2017).

There are two proposals in the literature for the prevention of exchange rate volatility. These are:

I.   Restructuring of the international exchange system by returning to the gold standard or fixed exchange rate system as the exchange rate system,

II. The fluctuations in the foreign exchange rates are interfered with

the monetary policies implemented by the central banks and the intensive capital inflows and outflows are controlled. (Ertugrul 2012)

This high level of volatility in stocks and exchange rates has laid the foundation for many empirical studies and economic modeling in economic summer. The most important studies on the determination of volatility are the studies of Engle (1982) and Bolerslev (1986) (Sarikovanlik, Koy, Akkaya, Yildirim ve Kantar, 2019). After the global financial crisis began in 2008, primarily due to the lowering of interest rates in especially the United States and Europe, low-cost funds obtained from the United States and European countries tended to move towards developing countries with higher interest rates such as Turkey. Since foreign currencies entering the country in a short-term and uncontrolled manner will cause volatility in the exchange rates of countries, the central banks of developing countries have taken various measures to ensure that these currencies enter the market under a certain control. Some of these measures are methods such as required reserves and interest corridor. Central Bank of the Republic of Turkey (CBRT) has put ROM into practice to prevent volatility in exchange rates and avoid allowing the separation of foreign currency and gold reserve to ensure financial stability. Although short-term empirical studies have been carried out with the effect of the ROM on the exchange rate volatility, the lack of any empirical work on whether the ROM is effective in the long term has been the motivation for this study.

2. Literature Review

Work on exchange rate volatility has become even more important since the Bretton-Woods system collapsed in 1973, leaving the money of the industrialized countries to fluctuate. In 1987, Bollerslev estimated the daily exchange rates and the volatility of stock prices using the GARCH (1,1) -t model in the 1980-1985 period.

Hseih (1989), used daily data from 1974-1983 to examine the volatility between the US dollar, Canada, Switzerland, Germany, England and Japan with the help of ARCH and GARCH models and found that the EGARCH (1,1) model of the GARCH models gave better results.

Engel and Hamilton (1990), examined the volatility between the US dollar and the German, French and British currencies in the period 1973-1988 with the Markov transformation model, which was better predicted than the random walk model.

Heynen and Kat (1994), estimated the volatility between the US dollar and the 5 currencies in the 1980-1992 period with GARCH (1,1), EGARCH (1,1), and Stochastic volatility models and found the best ending GARCH (1,1) model.

Engel (1994), succeeded in studying volatility with Markov transformation model and random walk model with 18 different exchange rates in the period of 1973-1986 and using the Markov transformation model to predict the direction of exchange rate changes.

West and Cho (1995), discussed the volatility of five weekly bidirectional nominal exchange rates against the US dollar in the period 1973-1989 with the univariate constant variance model

(ARIMA), GARCH (1,1) and IGARCH (1,1) they have reached the conclusion that it is not possible to find the best prediction model.

Fong (1998), explored the volatility between the Mark / Paund exchange rate and the SWARCH model in 1987-1994, and the ERM crisis in 1992 was well captured as the model considers the structural break.

Beine, Laurent and Lecourt (2003), attempted to estimate the volatility between the Dollar / German Mark and the Dollar / Japanese Yen currencies using the SWARCH model taking into account GARCH and structural breakdown in two different periods, 1985-1995 and 1991-1995. According to the results of the study, the SWARCH model considering the structural break was found to be more successful than the GARCH model.

Fidrmuc and Horvath (2008), examined foreign exchange volatility of countries such as the Czech Republic, Hungary, Poland, Slovakia and Romania from the new EU member states in the period 1999-2006 by using the TARCH model which takes into account GARCH and asymmetry. Because of the asymmetry observed in the currencies of these countries, the TARCH model, which takes asymmetry into consideration, proved to be better.

Caglayan and Dayioglu (2009), examined the volatility of OECD countries in exchange rates during the 1993-2006 period with ARCH, GARCH, EGARCH and TGARCH models. They found that for most countries asymmetric ARCH models (TGARCH) were better than symmetric models in the study.

Ermisoglu, Oduncu and Akcelik (2013), formed a currency basket composed of 0,5 * Euro / TL and 0,5 * Dollar / TL between the dates of 2010-2012 and examined the effect of ROM on exchange rate volatility by using the GARCH (1,1) model and that ROM has reduced exchange rate volatility.

Demirhan (2013), in his study examining the financial stability instruments of the CBRT, stated that the required reserve application was used to adjust the credit volume and reduce the volatility in short-term interest rates, while the interest rate corridor and the ROM application were used to reduce the negative effects of foreign capital inflows on the economy.

Aysan et al. (2014), examined the effectiveness of the asymmetric interest rate corridor and the ROM used by the CBRT to ensure financial stability. According to the findings of the study, they stated that the asymmetric interest corridor is used to eliminate the negative effects of short-term capital movements, and the ROM is used to prevent volatility in exchange rates.

Ersoy and Isil (2016), examined the monetary policy instruments implemented after the global crisis and stated that, according to the study findings, required reserves and ROM implementation limited credit expansion.

Icellioglu (2017), examined the monetary policy tools implemented by the CBRT to achieve the price and financial stability targets in 2010 and after. According to the findings of the study, it was concluded that the wide interest rate corridor gave flexibility to the applied interest policies, strengthened the balance sheets of banks with the required reserve application and

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reduced the volatility caused by capital movements in exchange rates with the ROM application.

Oner (2018), examined the monetary policies implemented by the CBRT after the 2008 global crisis. According to the findings of the study, he emphasized that after the global crisis, price stability has become important as well as financial stability and that non-traditional monetary policy tools such as required reserves, interest rate corridor, ROM and communication policy are used to ensure financial stability.

Kurum and Oktar (2019), tested the effectiveness of the ROM application implemented by the CBRT to ensure financial stability. According to the findings of the study using Engle-Granger Cointegration and Toda-Yamamoto Causality analyzes using monthly data from 2011-9: 2018-12, they concluded that the ROM application has significant effects on the exchange rate.

When the studies on the ROM implementation are examined, the studies on the effect of the ROM application on financial stability are related to whether it reduces the exchange rate volatility. In this study, both the effect of ROM application on financial stability will be examined and it is aimed to contribute to the literature by testing the effect of ROM on negative shocks in exchange rates.

3. Data and Methodology

In the literature, ARCH models are used because of the fact that the errors observed in the time series in the models related to the exchange rate are not normally distributed and they are not linear. In this study, the GARCH, TGARCH and EGARCH models which take into account the asymmetry and conditional variance of ARCH models that are developed later, will be used as a comparative measure and to determine whether ROM is more effective against negative shocks in order to contribute to the model economy literature, will be added.

An exchange basket of 0.5 (Euro / TL) and 0.5 (Dollar / TL) was formed by taking the daily exchange rate from the electronic data distribution system (EVDS) of the central bank as the exchange rate in this study which examines the effect of ROM on exchange rate volatility. The dataset includes dates between 16/09 / 2011-16 / 09/2016; since the data in the dataset has been publicly disclosed on different dates, the date of 16/09/2016 was taken as the last date of data interval in terms of harmonization of dates. Again, another reason why these dates are taken as a basis is the CBRT abolished the interest rate on required reserves within this date range. In case of payment of interest on required reserves, the effectiveness of the ROM implementation decreases. The aim of the study is that the period in which no interest payments for required reserves are paid since the ROM implementation has an effect on financial stability is the period of the study.

(Rt), foreign exchange amounts (DMSt) that the central bank sold through direct interventions, additional monetary tightening by the central bank as a control variable (days when monetary tightening was done1 , other days 0 DEPS), the change

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in the VIX[1] index (ΔVIX), which well reflects the fluctuations in global capital flows, was also included in the model as a further explanatory variable, reflecting the amount of foreign currency held for Turkish Lira required reserves under the ROM in order to measure the effect of ROM.[2]

Model:

$$R_t = \beta_0 + \beta_1 R_{t-1} + \beta_2 R_{t-3}{}^3 + \beta_3 \Delta VIX_t + \beta_4 DMS_t + \beta_5 D_{EPS} + \beta_6\ ROM_t + \varepsilon_t \tag{1}$$

$$\varepsilon_t \sim N(0, h_t) \tag{2}$$

$$h_t = a_0 + a_1 \varepsilon_{t-1}^2 + a_2\ h_{t-1} + a_3 \Delta VIX_t + a_4 DMS_t + a_5\ D_{EPS} + a_6\ ROM_t + u_t \tag{3}$$

$$h_t = a_0 + a_1 \varepsilon_{t-1}^2 + a_2\ h_{t-1} + a_3 \Delta VIX_t + a_4 DMS_t + a_5\ D_{EPS} + a_6\ ROM_t + a_7\ D_{ROMt}{}^4 + u_t \tag{4}$$

The explanations of the variables used in the model are as follows:

$R_t = ln\ (P_t/P_{t-1})*100$ P_t: Value of exchange basket

$\Delta VIX_t = ln(VIX_t/VIX_{t-1})*100$ VIX_t: VIX Value:

$DMS_t = $ Exchange rate amount sold by CBRT through intervention or tendering

$\overline{\text{Gross exchange rate reserve of CBRT}}$

$D_{EPS} = $ 0, other days

        1, days when the additional monetary consolidation is implemented

$ROM_t = $ Exchange rate amount retained for Turkish Lira reserve requirements within the scope of ROM

$\overline{\text{Gross exchange rate reserve of CBRT}}$

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[1] VIX is an index measuring the implied volatility for the S & P 500 index. This index is expressed as a percentage and is considered as a sign of global risk desire. This decline in the index is expressed as an increase in risk desire, while the increase is expressed as a decrease in risk desireç

[2] DMSt and ROMt variables in the model are normalized by dividing to gross reserves. Again, the series are made stable by taking the natural logarithm of the variables Rt and ΔVIXt.

[3] The first five delays of Rt variables are included to the model, however only first and third delays are considered as meaningful.

[4] In order to test the effect of ROM on negative shocks to the DROMt variable variance equation 1 if Rt <0; otherwise it is added as a control variable of 0; will be compared with the variance equation before addition.
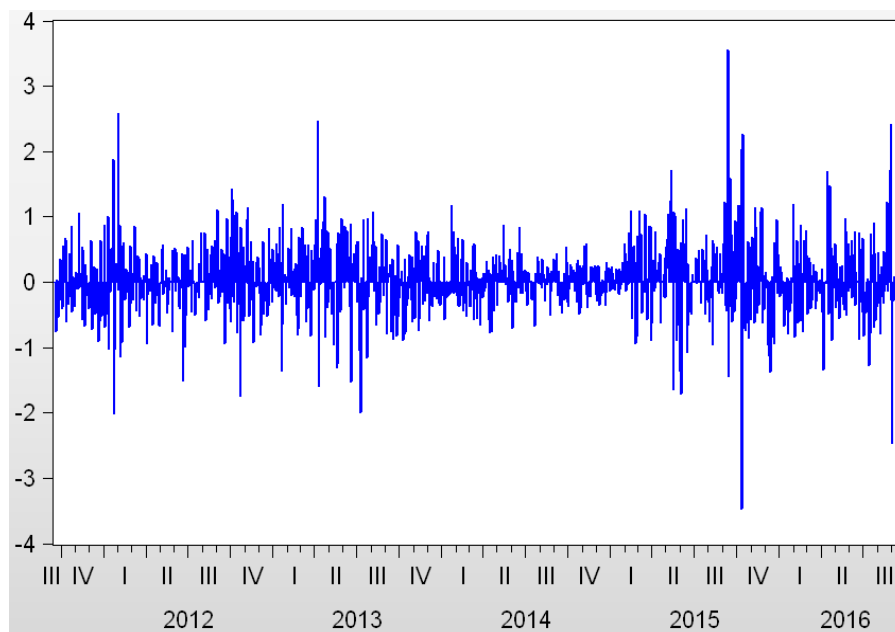
Figure 1: Daily return of the exchange rate basket

As seen in Figure 1, the use of ROM is highly preferred from the beginning of 2011 to the middle of 2014, and with the increase in the cost of foreign exchange, it is observed that the banks have begun to act a little abstention about ROM use (Ermisoglu et al., 2013).

3.1. Stability Analyzes

In order to create models in the time series, the variables in the model must be stationary, ie they should not have unit roots. If the variables included in the model are not stable, the results obtained will be biased and the results will be misinterpreted (Brooks 2008).

Table 1: Stability of the variables used in the model

Variables	ADF t-statistics	P- value
R_t	-31.56483	0,0000
ΔVIX_t	-44,99015	0,0001
DMS_t	-17,50721	0,0000
ROM_t	-3,366976	0,0123
ΔROM_t	-42,73098	0,0000

As indicated in Table 1, when the unit root tests of the variables in the model are applied, all the variables except for the ROMt variable are significant at the 1%
significance level and do not contain the unit root. All variables are stable at the 1% significance level when the ROMt variable is first subtracted and the ΔROMt variable is reordered.[5]

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[5] Since DEPS is a control variable, it is not necessary to display it on the table.

3.2. Estimation and Results of Models

In order to test the effect of ROM on exchange rate volatility, the lowest AIC, SIC values to be applied with GARCH (1,1), GJR or TGARCH (1,1) and EGARCH (1,1) it

will be considered as a good model. Since the effect of ROM on volatility is measured in the model, the results are interpreted through the variance equation.

Table 2: GARCH (1,1) Variance Equation

Variables	Coefficients	P Value
c	0,147084	0,0000
ε^2_{t-1}	0,127005	0,0000
h_{t-1}	0,509321	0,0000
ΔVIX_t	-,003997	0,0000
DMS_t	-6,548730	0,0000
D_{EPS}	-0,042819	0,0000
ROM_t	-0,173839	0,0018

As indicated in Table 2, the GARCH (1,1) model was considered to be an effect of reducing the volatility of the variable ROMt in the variance equation. But here the volatility does not give an idea of

whether positive shocks or negative shocks are there. For this reason, by re-testing the model by adding a control variable to the GARCH (1,1) model that can give an idea of the response of ROM to negative shocks to the variance equation;

Table 3: GARCH (1,1) Model Modified Variance Equation

Variables	Coefficients	P Value
c	0,164116	0,0000
ε^2_{t-1}	0,123536	0,0000
h_{t-1}	0,539482	0,0000
ΔVIX_t	-0,003868	0,0001
DMS_t	-4,099848	0,1402
D_{EPS}	-0,027864	0,0144
$\underline{ROM_t}$	<u>-0,110093</u>	<u>0,1466</u>
D_{ROMt}	-0,269960	0,0000

When we look at Table 3, we clearly observe that ROM is more effective in negative shocks when we add the D_{ROMt}

control variable to the variance equation. For this reason, it seems to be a more useful model than the previous variance equation.

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Table 4: GJR / TGARCH (1,1) Model Variance Equation

Variables	Coefficients	P Value
c	0,165249	0,0000
ε_{t-1}^2	0,129459	0,0000
$\varepsilon_{t-1}^2 * I_{t-1}$	-0,072647	0,0299
h_{t-1}	0,542539	0,0000
ΔVIX_t	-0,004588	0,0000
DMS_t	-4,031068	0,3967
D_{EPS}	-0,027901	0,0232
$\underline{ROM_t}$	-0,105995	0,1686
D_{ROMt}	-0,257562	0,0000

When we examine Table 4, we see that positive shocks in the model are more likely to affect the exchange rate volatility, because the coefficient of the $\varepsilon_{t-1}^2 It-1$ variable is negative, but the asymmetry is not taken care of since the main subject of the thesis is the effect of ROM on volatility.

Table 5: EGARCH (1,1) Model Variance Equation

Variables	Coefficients	P Value
ω	-0,089681	0,6021
$\left\|\dfrac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}\right\|$	0,113444	0,0000
$\varepsilon_{t-1}/\sqrt{h_{t-1}}$	0,052502	0,0000
$logh_{t-1}$	0,977748	0,0000
ΔVIX_t	-0,013406	0,0000
DMS_t	-13,13530	0,0008
D_{EPS}	0,047476	0,0039
$\underline{ROM_t}$	-0,040183	0,2892
D_{ROMt}	-0,139106	0,1300

When examining Table 5, although the model has advantageous aspects compared to other models and ROM correctly determines the effect on volatility, statistically the results are not significant.

Table 6: GARCH Models for Turkey Foreign Exchange Rate Series

			GARCH(1,1)	TGARCH(1,1)	EGARCH(1,1)
Variance Model	α_0	Coefficient	0,164116	0,165300	-0,089367
		p Value	0,0000	0,0000	0,0000
	α_1	Coefficient	0,123536	0,129334	
		p Value	0,00000	0,0000	
	β_1	Coefficient	0,539474	0,543263	0,977849
		p Value	0,0000	0,0000	0,00000
	γ	Coefficient		-0,072855	
		p Value		0,0291	
	δ_1	Coefficient			0,113051
		p Value			0,0000
	δ_2	Coefficient			0,052550
		p Value			0,0000
Criteria	**AIC Criteria**			1,173915	1,177468	0,998226
	SIC Criteria			1,219197	1,225769	1,046527
	Logprobility			-1056,197	-1058,440	-894,8816

When Table 6 is examined, the model with the lowest AIC and SIC criterion and the highest Logability value is chosen as the best model according to the model results. According to this, although the EGARCH (1,1) model is the best model, the GARCH (1,1) model has been chosen as a more suitable model because some variables in the variance equation are meaningless.

In order to be able to decide the compatibility of the generated model, the standardized mistakes and mistakes squares are examined, it is reached that the errors are meaningless at 1% level in all delayed periods and error squares in the first two delay periods, that is, the model is valid.

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Table 7: Correlogram of Standardized Errors and Error Squares

Standardized Errors			Stnadardized Error Squares		
Term	**Q Statistics**	**p Value**	**Term**	**Q Statistics**	**p Value**
1	1,2965	0,255	1	3,7749	0,052
2	4,5582	0,102	2	7,4418	0,024
3	4,8361	0,184			
4	4,8388	0,304			
5	4,9596	0,421			

When we test whether the ARCH effect is present in the result of GARCH (1,1) model;

H_0: Errors have no ARCH impact

H_1: Errors have ARCH impact

As indicated in Table 7; Here, H_0 hypothesis was accepted at the 5% level of significance of the model errors (p value 0.0523), so that the ARCH impact was not found in the errors.

When it is examined whether the errors in the model indicate a normal distribution, it is determined that the value of the error is 8,266,613, that is, the thick tail. This result is accepted as being a frequent situation in volatility models and non-linear models. According to the findings and results obtained, the appropriate conditional variance equation for the series;

$$h_t = 0.164116 + 0,123536\varepsilon_{t-1}^2 + 0,539474\, h_{t-1} - 0,003868\Delta VIX_t - 4,099838 DMS_t$$

$$-0,027863\, D_{EPS} - 0110093\, ROM_t - 0,269959\, D_{ROMt}$$

Conclusion

In this study, the effect of ROM on exchange rate volatility has been tested with GARCH models. The return (Rt) of the 50% USD and 50% Euro currency basket representing the exchange rate is accepted as the dependent variable. Volatility Index (VIX), the amount of foreign currency sold through linear interventions (DMS), Additional monetary tightening (DEPS), with the first (Rt-1) and third lag values (Rt-3) of the exchange rate return, Turkish A regression model was created with ROM variables representing the ratio of the exchange rates held for the lira required reserves to the central bank's exchange rate reserves. In the study, a variance model was created that takes into account the volatility in the exchange rate and the DROM dummy variable was included in the model to measure the effect of negative shocks on exchange rate returns. In all the variance equations, which were made separately according to the GARCH (1,1), TGARCH (1,1) and EGARCH (1,1) models used to measure volatility, the ROM variable was found to be statistically significant and the sign was negative as expected. In other words, it is concluded that the ROM variable reduces the exchange rate volatility. As the effect of negative shocks was examined in the study, the DROM variable was found to be significant according to the GARCH (1,1) and TGARCH (1,1) models, but not statistically significant compared to the EGARCH (1,1) model. Among GARCH (1,1), TGARCH (1,1) and EGARCH (1,1) models according to the decision criteria (the model with the lowest AIC and SIC criterion and the highest Log Likelihood value), it was concluded that GARCH (1,1) model is the most suitable one. According to the GARCH (1,1) model, both the ROM variable and the DROM variable were found to be statistically significant and negative. As can be seen from these results, it is found that the ROM implementation reduces the volatility of exchange rate returns and is more effective against negative shocks.

Developing countries are usually exposed to short-term capital flows because of high interest rates, which in turn affects the exchange rate volatility in the country and thus negatively affects financial stability. For this reason, this study suggests that the use of ROM, an engineering work of the CBRT, in countries with similar conditions

is extremely important in terms of ensuring financial stability.

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Renewable Energy Use and Energy Productivity: A Panel Data Analysis

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Abstract

This study emphasizes renewable energy source use's effects on productivity, competitiveness, and growth. The hypothesis of the study was tested with panel data analysis on European and Central Asian countries. Panel data analysis covered 15 Eurasian countries with data from 1990-2014. In our hypothesis, renewable energy use increases income by increasing efficiency in production. The model established reveals the difference between various energy types and renewable energy. Analysis outputs support the study hypothesis. According to the results, the increase in the share of renewable energy use in total energy use affects per capita income positively. On the other hand, an increase in the share of fossil fuels decreases per capita income. Our study suggests that countries aiming for better economic growth should increase their use of renewable energy.

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1. Introduction

Energy is a power that we need and use in every field of life, from lighting to warming, from growing industry to technology. The rapid increase in the world population has increased the need for energy and caused our natural resources to be depleted rapidly. Although the world meets 80% of its energy requirement from fossil fuels, it is known that oil and fossil fuels such as oil and coal reserves are limited. Climate change and global warming reduction of fossil fuel reserves increased environmental pollution, and the destruction of nature brought up the issue of alternative energy sources. With the use of renewable energy sources, it is possible to reduce carbon emissions. Renewable resource usage is necessary for a sustainable economy and life. For a life that will maintain ecological balance, resources should also be renewable. Renewable energy sources are briefly as follows; solar, wind, hydroelectric, geothermal, wave, biomass energy, etc.

In recent years, the reality of climate change has brought up the question of how to use energy resources more efficiently.

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Accordingly, discussions on alternative energy sources have increased. Some alternative approaches that respect sustainable understanding are sustainable environment and development, green energy, green economy, natural resources economy, and circular economy. By using energy efficiently at every stage of our lives, we can contribute to the family budget, the country's economy, and the environment's protection without limiting our needs. Countries have several efforts towards the energy transition: changing primary energy consumption, improving energy efficiency and technologies. As a result of all these effects, energy efficiency is an important determinant of global sustainable competitiveness.

This study examines the contribution of renewable energy use to energy productivity, which is one of the main determinants of sustainable competitiveness. And the comparison of the use of renewable energy with other energy types in the context of its impact on energy productivity was tested by panel data analysis. The study reveals the effects of renewable energy usage that are not included in the literature.

2. Literature Review

The rapid increase in energy prices and climate change are vital for energy efficiency. And this has led to the energy productivity concept being brought to the agenda. (Ma et al. 2018). Therefore, Countries that attach importance to global warming and climate change issues prefer clean technologies that are cost-cutting and environmentally friendly (Horbach, 2008). Among the most important areas of global warming, issues are the increase in carbon emission and their relationship with energy consumption and economic growth (Waheed et al.2019). Reducing CO_2 emissions to zero levels can prevent global warming increases in the long run horizons (Masson-Delmotte et al. 2018).

European Union's 2020 target of reducing emissions by 20 % by 2020 and this target is one of their strategies for smart, sustainable, and inclusive growth (European Commission, 2010) and countries need to reduce energy costs for global competition at the same time. In this literature review, the reasons and effects of the implementation of renewable energy policies were investigated. Most researchers have evaluated the effects of renewable energy on growth. Chein and Hu (2007), increased renewable energy has a positive relationship with economic efficiency, and the increased consumption of traditional energy sources reduces economic efficiency. Similarly, Paramati, Sinha, and Dogan (2017) analyzed the relationship between economic growth and renewable energy for the developing from 1991 to 2012. The result of renewable energy has a positive and important relationship with economic growth.

Ozturk and Bilgili (2015), economic growth is positively affected by biomass consumption in African countries. Applying dynamic panel analyses for 51 Sub-Sahara African countries for the 1980–2009 period. The governments of Thailand, Mexico, and South Africa have successfully implemented renewable energy programs, reducing their economy's dependence on fossil fuels. South Africa and Thailand are some of the renewable energy sources, about 5% of the total electricity supply. Mexico adds 13.6% of its renewable energy

sources to the electricity mix (Rennkamp et al. 2017). Ay (2021) also revealed that environmental pollution has a significant impact on economic efficiency.

The type of energy used as input is an important determinant of productivity and productivity is the most important determinant of global competitiveness (Dasdemır, 2018). Therefore, the environmental approach, productivity, and competitiveness are like a chain that is interconnected. Considering the studies as a global competitive advantage; China has developed rapidly in the field of wind power equipment manufacturing. The total market share of the world's top ten wind turbine manufacturers in 2018 was 29.32% (Huang, 2020).

Countries have also started to take important steps within the scope of returning to renewable energy. Especially some developed countries show their intention to lead this transformation. The German government has announced that it will eliminate nuclear power generation and replace it with renewable energy within 10 years, reduce greenhouse gas emissions by 40% and 80% by 2020, and renewable energies would contribute 80% of German energy by 2050 (Park et al. 2016).

Studies are comparing renewable energy and other energy types in the literature. In the period 1960-2007, the causal

relationship between renewable and nuclear energy consumption, CO_2 emissions, and real GDP for the USA was investigated. According to the results of the study, there is a one-way causality that extends from nuclear energy consumption to CO_2 emissions (Menyah and Rufael, 2010).

Fossil energy technologies negatively affect the environment more than renewable energy technologies. And provide energy security by reducing energy dependence. Activities that use technological infrastructure together with the Information Age create a global value chain (Cetin and Yilmaz, 2017). This reveals the importance of technological investment. Saidi and Omri (2020) show that investment in nuclear energy and renewable energy reduced CO_2 emissions in the USA, Sweden, Canada, UK, Belgium, Finland, Czech Republic, France, Germany, Japan, Switzerland, and renewable and nuclear energy consumption CO_2 emissions for the panel estimations.

3. Model and Analysis

The hypothesis proposed within the scope of the study was tested with panel data analysis. 15 Eurasia countries producing nuclear energy between 1990 and 2014 selected for analysis. The data used in the analysis are taken from the World Bank (WB) database. The definitions of the variables are given in Table 1.

Table 1 Variable Name and Definition

Variable Name	Definition
GE	GDP per unit of energy use (constant 2017 PPP $ per kg of oil equivalent)
REC	Renewable energy consumption (% of total final energy consumption)
EPC	Electricity production from coal sources (% of total)
EPH	Electricity production from hydroelectric sources (% of total)
EPO	Electricity production from oil sources (% of total)
EPG	Electricity production from natural gas sources (% of total)
EPAN	Alternative and nuclear energy (% of total energy use)
EPN	Electricity production from nuclear sources (% of total)
GCF	Gross capital formation (% of GDP)

The model and its economic form calculated in the study are as in given equations 1 and 2 at below.

$$lGE = f(lREC, lEPC, lEPH, lEPO, lEPG, lEPAN, lEPN, lGCF) \qquad (1)$$

$$lGE_{it} = \beta_0 + \beta_1 lREC_{it} + \beta_2 lEPC_{it} + \beta_3 lEPH_{it} + \beta_4 lEPO_{it} + \beta_5 lEPG_{it} + \beta_6 lEPAN_{it} + \beta_7 lEPN_{it} + \beta_8 lGCF_{it} + \varepsilon_{it} \qquad (2)$$

The analysis reveals the impact of renewable energy and various other energy types on energy productivity. The share of gross capital formation in GDP is used as the control variable and is expected to be positive with the GE variable. In the model, "i" refers to the unit and "t" refers to the time dimension. "ε_{it}" is the error term "β_0" is the constant-coefficient and the symbols before the variables are the coefficient of that variable.

For all tests for the validity of the predictions and predictions Stata 16 Package Program used. The letter "l" in front of the variables indicates that the logarithm of the variable is taken. The logarithm of the variables taken with the Stata 16 Package Program.

In panel data analysis, the model needs to be tested for the existence of unit and/or time effects. The econometric model changes according to the existence of the unit and/or time effect. The results of F, LM and LR tests regarding the existence of unit and time effects are given in Table 2.

Table 2 Unit and Time Effects Tests

Effect	Test	P Value	Result
Unite	F Test	0.000	Null Hypothesis Reject: Unit Effect Exist
Unite	LM Test	0.000	
Unite	LR Test	0.000	
Time	F Test	0.0245	Null Hypothesis Reject: Time Effect Exist
Time	LM Test	0.9200	Null Hypothesis Can't Reject: Time Effect Doesn't Exist
Time	LR Test	1.000	

As can be seen from the table, there are unit effects according to F, Lagrangian Multiplier (LM) and Likelihood Ratio (LR) tests. However, time effects are found with a 5% margin of error according to F test, but not according to LM and LR tests. According to results obtained from the LM and LR tests it is decided that there are unit effects in the model but not time effects. The model with unit effects is shown in the form at equation 3.

$$lGE_{it} = \beta_0 + \beta_1 lREC_{it} + \beta_2 lEPC_{it} + \beta_3 lEPH_{it} + \beta_4 lEPO_{it} + \beta_5 lEPG_{it} + \beta_6 lEPAN_{it} + \beta_7 lEPN_{it} + \beta_8 lGCF_{it} + \varepsilon_{it} \qquad (3)$$

Unit effects refer to the presence of separate coefficients for each unit. This situation is shown economically in equation 3. The model expressing unit effects can also be shown in the figure in equation 4.

$$lGE_{it} = \beta_0 + \beta_1 lREC_{it} + \beta_2 lEPC_{it} + \beta_3 lEPH_{it} + \beta_4 lEPO_{it} + \beta_5 lEPG_{it} + \beta_6 lEPAN_{it} + \beta_7 lEPN_{it} + \beta_8 lGCF_{it} + \mu_i + \varepsilon_{it} \qquad (4)$$

"μ_i" in Equation 4 refers to the unit effects arising from the characteristic feature for each "i" unit. One of the method of fixed or random effects should be chosen based on whether the explanatory variables are associated with the value of "μ_i" expressing the unit effect. In case the unit effect correlates with explanatory variables, fixed effects (FE) methods can be used. If there is no correlation relation, one of the random effects (RE) methods should be chosen. Although there is no correlation relationship, selecting fixed effects may exclude important information coming from unit effects from the model.

Hausman (1978) Test performed for the determination of the FE or RE methods to choose. For this purpose, Hausman and Robust Hausman tests were carried out. The null hypothesis in two Hausman tests is RE methods are not efficient. P-value for the Hausman test is 0.9994 and 1.0000 for the Robust Hausman test. Both test results show that the RE method is valid and effective. Therefore, estimates made with RE models are safer.

Accordingly, RE models were used to explain the relationship between variables.

The assumption deviation tests for the RE method are given in Table 3.

Table 3 Assumption Deviation Tests for RE Method

Test		P Value (Stat)	Result
Normality	Skewness and Kurtosis (Unit Effect)	0.4296	Null Hypothesis Can't Reject: Error Terms and Unit Effect are Normal
	Skewness and Kurtosis (Error Term)	0.9072	
Heteroscedasticity	Levene	0.000	Null Hypothesis Rejected: Error Terms are Heteroscedastic
	Brown	0.000	
	Forsythe	0.000	
Autocorrelation	Durbin-Watson	(0.392)	Null Hypothesis Rejected: Autocorrelation Does Exists
	Baltagi-Wu LBI	(0.263)	
Intertemporal Correlation	Pesaran	0.158	Null Hypothesis Can't Reject: Intertemporal Correlation Doesn't Exists
	Friedman	0.002	Null Hypothesis Rejected: Intertemporal Correlation Does Exists
	Frees	(2.258)	
Multicollinearity (Mean Variance Inflation Factor)		7.81	No Multicollinearity

Skewness and Kurtosis test was performed to test the normal distribution. Levene (1960), Brown and Forsythe (1974) tests performed to detect the heteroscedasticity problem. Durbin-Watson (1971) and Baltagi-Wu, (1999) LBI tests were performed to detect the autocorrelation problem. And Pesaran (2004), Friedman (1937), and Frees (2004) tests were performed to detect the intertemporal correlation problem. According to variance inflation factor (VIF) value is less than 10 there is no multicollinearity problem.

The results given in the table show that the predicted model has heteroscedasticity, autocorrelation and intertemporal correlation problems. Therefore, the Driscoll-Kraay (1998) Standard Errors (DKSE) method is suitable for predicting the model. Predicted models and significance levels are given in Table 4.

Table 4: Predicted Outputs: Dependent Variable GE

Regression Method		LREC	LEPC	LEPH	LEPO	LEPG	LEPAN	LEPN	LGCF	Constant	R-Squared
Pooled OLS		0.073**	0.067*	-0.199*	0.027***	0.012	1.007*	-0.837*	-0.001	2.020*	0.449*
Robust Pooled OLS		0.073*	0.066*	-0.199*	0.027**	0.012	1.00*	-0.837*	-0.001	2.020*	0.461*
Between Regression		0.073**	0.066*	-0.199*	0.027***	0.012	1.007*	-0.837*	-0.001	2.020*	0.461*
Robust Between Regression		0.073*	0.066*	-0.199*	0.027***	0.012	1.007*	-0.837*	-0.001	2.020*	0.461*
First Difference^		0.058*	-0.121*	-0.120*	-0.118*	-0.111*	0.070*	-0.141*	.017*	…	0.280*
Fixed Effect	Least Squares Shadowing sensitivity	0.145*	-0.044***	-0.034	-0.081*	-0.009	0.247*	-0.139**	0.006*	1.754*	0.941*
	Robust Least Squares Shadowing sensitivity	0.145*	-0.044***	-0.034	-0.081*	-0.009	0.247*	-0.139**	0.006*	1.754*	0.941*
	Within Regression	0.145*	-0.044**	-0.034	-0.081*	-0.009	0.247*	-0.139**	0.006*	1.614*	0.704*
	Robust Within Regression	0.145**	-0.044	-0.034	-0.081*	-0.009	0.247	-0.139	0.006*	1.614*	0.704*
Random Effect	Within Regression	0.148*	-0.035	-0.064**	-0.084*	-0.009	0.235*	-0.142**	0.006*	1.684*	0.138*
	Robust Within Regression	0.148*	-0.035	-0.064	-0.084*	-0.009	0.235	-0.142	0.006*	1.684*	0.138*
	Generalized Least Squares	0.073*	0.067*	-0.199*	0.027***	0.012	1.008*	-0.837*	-0.001	2.021*	…*
	Maximum Likelihood Estimator	0.147*	-0.037	-0.058**	-0.083*	-0.009	0.237*	-0.142**	0.006*	1.668*	…*
	Population-Averaged	0.147*	-0.037	-0.058**	-0.083*	-0.009	0.237*	-0.142**	0.006*	1.668*	…*
	Robust Population-Averaged	0.147**	-0.037	-0.058	-0.083*	-0.009	0.237	-0.142	0.006*	1.668*	…*
DKSE	Pooled OLS	0.073**	0.067*	-0.199*	0.027***	0.012	1.007*	-0.837*	-0.001	2.020*	0.461*
	Fixed Effect	0.145*	-.044***	-.0342	-.081*	-.009	.247*	-.139**	.006**	1.615*	0.705*
	Random Effect	0.148*	-0.035*	-0.064	-0.084*	-0.009	0.235*	-0.142*	0.005**	1.683*	0.138*

*: p<%1, **: p<%5, ***: p<%10

^: variable not logarithmic

According to the results of the Hausman test and assumption deviation tests, the Driscoll-Kraay random effects model is more suitable to be interpreted instead of other estimates given in Table 4. According to the estimation results, 1% increase in the share of renewable energy consumption in total energy consumption, GDP per unit energy consumption increases by

approximately 0.15%. 1% increase in the share of electricity production from coal sources in total electricity production, GDP per unit energy consumption decreases by approximately 0.04%. 1% increase in the share of electricity production from hydroelectric sources in total electricity production, GDP per unit energy consumption decreases by approximately 0.06%, but not significant. 1% increase in the share of electricity production from oil sources in total electricity production, GDP per unit energy consumption decreases by approximately 0.08%. 1% increase in the share of electricity production from natural gas sources in total electricity production, GDP per unit energy consumption decreases by approximately 0.01%, but not significant. 1% increase in the share of alternative and nuclear energy in total energy use, GDP per unit energy consumption increases by approximately 0.24%. 1% increase in the share of electricity production from nuclear sources in total electricity production, GDP per unit energy consumption decreases by approximately 0.14%. 1% increase in the share of gross capital formation in GDP, GDP per unit energy consumption increases by approximately 0.01%.

4. Concluding Remark and Policy Suggestions

Orientation towards alternative energy sources comes to the fore as a necessity rather than a choice. The negative outcomes arising from climate change and global warming have shown us the necessity of reconsidering resource efficiency. Destroying nature and reducing fossil fuel reserves brought new alternative approaches. Green economy, circular economy, natural resources economy, green energy are some of these alternative approaches. Among the most important areas of global warming, issues are the increase in carbon emission and their relationship with energy consumption and economic growth. The main purpose of our study is how to use natural resources and resources efficiently. We see the importance of renewable energy and other energies that are handled within the framework of sustainable development and sustainable competitiveness in the economic field.

Particularly, countries that stand out with their competitive attitudes in global markets have positive attitudes towards alternative energies. Efficiency is one of the key factors for countries to achieve better sustainable competitiveness. In this context, the efficiency of energy, which is the most important input of production, has become a tool for countries aiming to increase their sustainable competitiveness.

The study argues that renewable energy will provide a more efficient form of production, thus increasing the competitiveness of the country. The study hypothesis was tested by panel data analysis. Panel data analysis gave similar results to the studies in the literature. As a result of the test, a positive relationship has been found between renewable energy consumption and energy productivity. The increase in energy types other than renewable and nuclear energy negatively affects energy productivity.

This study revealed that countries should increase their renewable energy use to increase their sustainable competitiveness. Countries should invest in renewable energy; It should shape their physical and human capital accordingly. Policymakers

need to see the use of renewable energy not only from an environmental perspective but also as an economically beneficial tool.

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BOOK REVIEW-1

Ceren DEMİR[*]
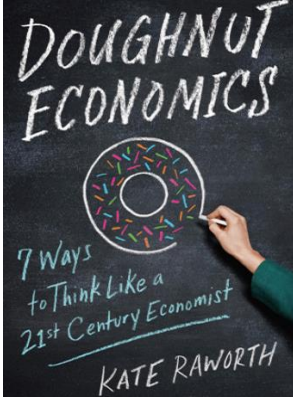
Doughnut Economics:

Seven Ways to Think Like a 21st Century Economist

Author: Kate RAWORTH

ISBN: 9781603587969

This book, which we will examine, challenges the understanding of economic growth and the functions of the economy in the 21st century. The world continues to change, but economic theories are persistently pushing us to accept the same things. This book responds in the name of countless people who find it difficult to reject this pressure. The book's explanation of what it deals with, its criticisms and observations with a creative metaphor makes it easier to read and understand.

Seven ways to think like a 21st century economist are explained in the book. Before that, the introduction is done with the question "Who Wants to Be an Economist?". This headline addresses the disappointment of Yuan Yang who was student at Oxford University in 2008. As a sensitive person with a global citizen perspective, Yang was beginning to drown in mainstream economic theories, because mainstream theories were far from focusing on real problems. On the other hand, Yang had started his education just as the global financial system was in free fall (the year of collapse in 2008) and it was actually a kind of "Wake Up" call. However, the authority in the classes was also far from addressing this. Addition to these, Yang was disappointed in a short time that the lessons, theories and the mathematics used to prove them were also based on narrow-minded assumptions. As Yang's dissatisfaction was increasing day by day, his teachers assured that he would get rid of all this unrest and troubles in the

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next stage of his education. However, the density of abstract theories began to increase in his master and the equations began to proliferate, let alone succeed in problems. Yang found out: **"Instead of questioning everything, you should master the materials in front of you."**

Recognizing the situation, the students either cooled off from the economy or accepted the system and mastered it and built lucrative careers with the skills they had by almost absorbing all of the theories. He soon realized that there were countless bored young people like himself who were overwhelmed by this dogmatic attitude. The student group, which gathered from more than 30 countries, saying that the world economy is in crisis, rebelled in 2014 exclaiming:

"The teaching of economics is in crisis too, and this crisis has consequences far beyond the university walls. What is taught shapes the minds of the next generation of policymakers, and therefore shapes the societies we live in ... We are dissatisfied with the dramatic narrowing of the curriculum that has taken place over the last couple of decades ... It limits our ability to contend with the multidimensional challenges of the 21st century – from financial stability, to food security and climate change."

This has shown us that the revolution in economics has begun. There are two ways this can be successful:

1) Tearing down old ideas,

2) The introduction of new ideas.

This is where the book offers its readers seven ways to think like the economists of the 21st century.

What are These Seven Roads?

1) Change the Goal from GDP to the Doughnut: How economics lost sight of its goal? Although the economists of the 20th century wanted to define economics as a science that studies human behavior, the shallow definition they summarized with "rational person" created only an irony. Students of the traditional economy, which claimed to be purified from values, but did not get rid of being a value-laden structure in essence that under the pressure.

A twenty-first-century compass: Here, the author explains the visual design that gives the book its name by putting on the table the approach that enables people to develop putting the GDP growth aside, while doing so, predicating on a more realistic and protective border for our world. What does this design? Let's discuss the figure below and the author's explanation of it.
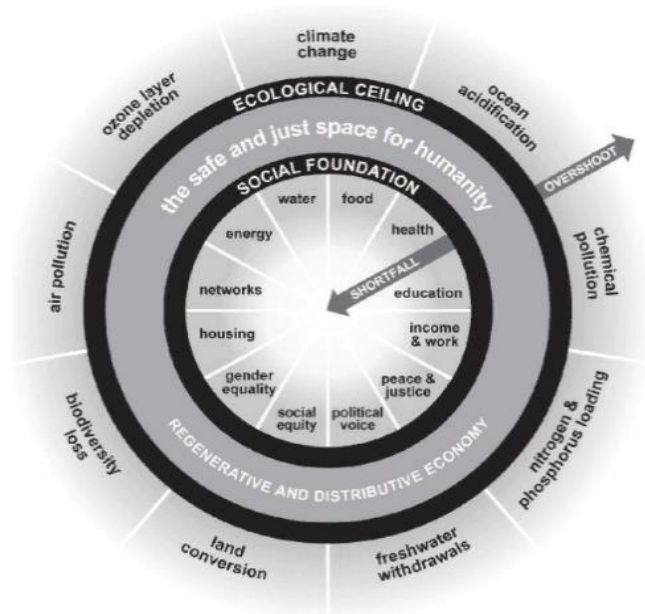
Image 1: The Doughnut: a twenty-first-century compass. Between its social foundation of human well-being and ecological ceiling of planetary pressure lies the safe and just space for humanity.

Kate Raworth explained to this creative idea in book with all details: Doughnut can provide all person's needs while safeguarding the living World. The Doughnut's social foundation lie shortfalls in human well-being, faced by those who lack life's essentials such as food, education and housing. The ecological ceiling lies an overshoot of pressure on Earth's life-giving systems, such as through climate change, ocean acidification and chemical pollution. But between these two sets of boundaries lies a sweet spot – shaped unmistakably like a doughnut – that is both an ecologically safe and socially just space for humanity. **The twenty-first-century task is an unprecedented one:** to bring all of humanity into that safe and just space.

Twelve basics include in inner ring: sufficient food; clean water and decent sanitation; access to energy and clean cooking facilities; access to education and to healthcare; decent housing; a minimum income and decent work; and access to networks of information and to networks of social support. Furthermore, it calls for achieving these with gender equality, social equity, political voice, and peace and justice. Can we move from Unlimited Growth to Balanced Development? Can We Live in Doughnut?

2) See the Big Picture, from self-contained market to embedded economy

3) Nurture Human Nature, from rational economic man to social adaptable humans

4) Get Savy with Systems, from mechanical equilibrium to dynamic complexity

5) Design to Distribute, from 'growth will even it up again' to distributive by design

6) Create to Regenerate, from 'growth will clean it up again' to regenerative by design

7) Be Agnostic about Growth, from growth addicted to growth agnostic

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Remember this when you read the seventh way: Agnosticism is a belief in philosophy which is related with determinism implicitly. Determinism is a philosophical view that recognizes that every event is the necessary consequence of a number of causes. According to this; everything that happens in the universe is predetermined, but is formed by some laws that require them to be. This mechanism, based on causality, is considered the order of the universe. There is no place for free will in this order, because everything in the universe, including the human mind, functions just like a perfect machine. In other words; Human behaviors, actions, feelings and thoughts are predetermined in accordance with the causality principle. In this case, it becomes impossible to talk about a freedom of will. When it comes to agnosticism again, it is mostly used about God's existence but it claims in itself that nothing or any idea can be known. In this case, we'll modify it with the GDP actually. The author questions the situation for GDP and its exponential growth dreams by economists. She wonders that why nobody ask this: It will grow but until when? What will be happen next? She says in the book the trouble for economists who produce graphic below is the obvious question that is left hanging in the air with it: what happens next? **There are essentially two options**. Either the line keeps rising indefinitely, rapidly shooting up off the top of the page, or it must start to flatten out and eventually come to a level. For the mainstream economists, the first option is awkward, the second unconscionable.

To sum up, Kate Raworth queried extraordinarily oppressive understanding of economics with her book. She wants us to do it too. Or our planet which has been patient with humanity for centuries, will soon answer us in our style. But as Kate Raworth said, we still have luck.

BOOK REVIEW-2

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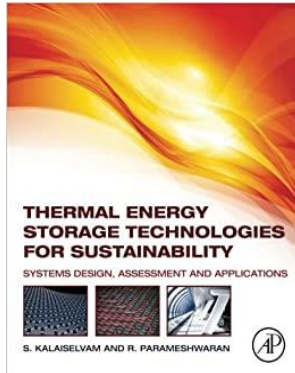
Thermal Energy Storage Technologies for Sustainability: Systems Design, Assessment and Applications

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Energy has always been a major challenge for human life. As emphasized in Brutland Report in 1987 "sustainability" is a concept that all countries must consider in order to have a role in the future. Nowadays energy consumption is a worldwide problem. In order to overcome this problem and save energy for the next generations, energy storage materials have gained much attention. Thermal Energy Storage (TES) technology is particularly requisite since it delivers sustainable energy solutions for potential future energy problems. This book, Thermal Energy Storage Technologies for Sustainability; Systems Design, Assessment, and Application, presents the phenomenon of thermal energy storage and explains various methods for saving thermal energy, and provides strategic plans to combine TES technologies with real-world problems.

The book starts with the definition of energy and energy consumption. The first two chapters, which are "*Energy and Energy Management*" and "*Energy Storage*", provide an overview of energy in terms of global energy demand and consumption. The categorization according to energy demand/consumption was done under the fossil, transition, and post-fossil eras, and brief explanations were given related to these eras. Attention is also drawn to the importance of nuclear energy including

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fission and fusion energy. The major energy challenges necessitating the implementation of energy efficiency measures were listed in the first chapter. Chapter 2 is mostly related to energy storage and starts with the well-known law of conservation of energy, which claims energy can neither be created nor destroyed but can be transformed from one form to another. After mentioning the significance of energy storage, the types of energy storage in means of mechanical, chemical, magnetic, hydrogen, and biological media are mentioned. The thermal energy storage is divided into low-temperature thermal storage and medium and high-temperature thermal storage. The basic principles of operation of these storage systems are defined. The most remarkable part of this chapter is where various energy storage systems are technically evaluated and then compared.

Authors define possible energy problems and solutions to overcome them with the help of different TES technologies which are favorable for a sustainable future. In Chapter 3, which is named "*Thermal Energy Storage Technologies*" TES technologies are discussed and sub-categories of TES, which are "*Sensible Thermal Energy Storage*", "*Latent Thermal Energy Storage*" and "*Thermo-Chemical Energy Storage*", are explained in detail through Chapter 4-5-6, respectively. Chapter 7 is all about "*Seasonal Thermal Energy* Storage" which differs from the other three sub-categories as the resource of the thermal energy is natural, whereas the others are not. As an alternative energy storage "nanotechnology" is also elaborated in Chapter 8. As we all know, nanotechnology

is a hot and trendy topic since it can evaluate almost every property of a material in a positive way.

In Chapter 8, Nanotechnology in Thermal Energy Storage, authors pay special attention to nanotechnology since every property of a material could be changed and improved profoundly in a nano-scale in comparison to the same material on a macro-scale. The phenomenon of nanomaterials is discussed in detail in terms of both synthesis and characterization methods in order to understand the effect of size and shape of the nanomaterials which added into latent heat storage materials (likewise PCM) to enhance their thermal storage performance. In Chapter 8, it is also emphasized that despite having some challenges in the production and usage of nanomaterials, they are all preferred because through nanomaterials energy consumption can be reduced and materials like PCM can show remarkable effects in terms of thermophysical and thermochemical properties when they are manufactured using nanomaterials as a doping material.

In Chapter 9, "*Sustainable Thermal Energy Storage*" thermal energy storage systems are observed from a sustainability perspective. The topic is well examined with various and widely used implementation instances around the globe. Besides the thermal energy storage systems, to increase the overall efficiency of the system, renewable energy system integrations such as solar, wind, geothermal and combined heat and power system are also recommended to use. Chapter 10, "*Thermal Energy Storage Systems*

Design" and 11, "Review on the Modeling and Simulation of Thermal Energy Storage Systems" are all about modeling and designing thermal energy storage systems. Designs are supported with calculations and simulations. Chapter 12, "*Assessment of Thermal Energy Storage Systems*" focuses on the assessment of thermal energy storage systems considering energy supply, and demand, contribution to reduced greenhouse gas (GHG) emissions into the environment. Based on these perspectives, energy, and exergy concepts are mainly viewed and definitions of these terms, the distinction between them, their role in performance or assessment of systems, merits, and limitations of these systems are explained. Chapter 13, "*Control and Optimization of Thermal Energy Storage Systems*" is mainly based on controlling and optimizing the thermal energy storage systems. It mentions the control systems and methodologies and their types such as PI, PD, PID, fuzzy logic, artificial neural network or hybrid systems. Also, this chapter focuses on shifting the peak load periods through the incorporation of thermal energy storage systems by using different control strategies and explains improving these systems by analysis taking into consideration real-time parametric disturbances.

The future of TES technologies and the expectations are elaborated in Chapter 14, "Economic and Societal Prospects of Thermal Energy Storage Technologies". Cost analysis and economic feasibility of TES systems are evaluated using latent and seasonal TES systems. Societal implications of TES systems can be mainly summarized as; reduction in the usage of fossil fuel-based energy sources, reduced greenhouse emissions, reduced electricity and energy costs, economic feasibility. In addition to those, there are limitations such as; issues related to the storage and keeping the temperature constant, space requirements, operation and maintenance issues. As a final of the book, Chapter 15, "*Application of Thermal Energy Storage Systems*" focuses on the applications of TES systems considering active and passive systems, carbon-free thermal storage systems, low energy building design, and future developments. The efficient active or passive TES system can be performed depending on the location, environmental conditions, and thermal load demand of the buildings. The carbon-free thermal storage systems are explained with solar energy, which has to be stored suitably in order to be reused when demand rises and two important factors for solar TES systems are given as requirement of a larger area for collection of heat energy and size of a heat storage facility. The integration of Latent Thermal Energy storage (LTES) systems in buildings are also mentioned with their application potential which can be classified as space heating, space cooling, and air conditioning.