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EDITORIAL PREFACE

Dear readers of the International Journal of Insurance and Finance It gives us great pleasure to welcome you in the ninth issue of our new journal in the field of insurance and finance. As indicated in the earlier issues, the journal was aimed to contribute the fields of insurance and finance. This journal presents papers intended to advance scientific knowledge of the insurance industry and finance sector as well as to stimulate dialogue between scientists and practitioners in both two sectors.

Using a double blind reviewing process, IJIF will continue to publish original scientific papers. Scientists and practitioners in the field of insurance and finance are encouraged to submit their papers to our new journal online via the link <https://www.ijif.net>

IJIF has started its publication life since 2021 as peer-reviewed journal to publish articles written in English with this concept, and still continues to maintain this feature for now. We strongly believe that all actors of these fields, such as researchers, professionals, students and politicians, will continue to benefit from IJIF articles published.

Starting from the second issues, IJIF are still being indexed or abstracted by Crossref, IZOR, ISI, DOAJ, Euro Pub, ASOS, Ideal Online and IP Indexing databases.

We would like to thank the leading companies of the finance and insurance sector operating in the national and international arena, for their trust in IJIF, after the first issue of our journal was published. In addition, we are pleased to have valuable number of submitting articles by scientists and practitioners to our journal as the recognition of our journal becomes more widespread.

Finally, we would like to thank to our authors, the advisory and referee boards who contributed to the sixth issue; Türk Reasürans, AXA Insurance Company as well as Ziraat Bank, TARSİM, Insurance Thought Center and Sivas Soft for their support to publication of this issue.

As the journal editors we will be honored to welcome to all national and international valuable scientists and practitioners who will submit and publish the articles of in the tenth issue.

Kind Regards,

Ahmet Şengönül
Ahmet Genç
Fuat Çamlıbel

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ORIGINAL ARTICLE

AN EVALUATION ON THE PREMIUM/LOSS RELATIONSHIP OF AIRCRAFT INSURANCE IN TURKEY FOR 2019-2023

Hakan ÖZCAN

Abstract

The insurance system cannot prevent loss-causing events, but it protects the insured against these damages by paying for their financial loss. The same is true for aircraft. The study aims to determine whether there is causality between aviation insurance premium production and claims, total insurance premium production and claims for the period 2019-2023 in Türkiye. For this purpose, 5 insurance companies with high aviation insurance premium production were selected. In order to analyze the variables in the study, unit root tests were applied first. ADF and PP tests were applied for unit root tests. VAR analysis was performed to determine the appropriate lag and Granger Causality Test analysis was used to evaluate the short-run relationship. According to the results obtained, it is concluded that aircraft outstanding claims are the cause of total paid claims, aircraft insurance premium is the cause of total outstanding claims, and aircraft outstanding claims are the cause of total outstanding claims and a short-run relationship between the variables has been identified.

Keywords

Insurance, Air Vehicles, Premium, Claim

JEL Classification

G22, E64, L93, E42.

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1. INTRODUCTION

Social life involves significant dangers in people's daily activities (Kırkbeşoğlu, 2015: 4). People have needed an insurance system in order to reduce the financial impact of the damages caused by these hazards. This system cannot prevent the events that cause damage, but it protects the policyholder against these damages by paying the financial loss of the policyholder. The same is true for aircraft. Aircraft owners have to take out insurance against these uncertain risks. Aircraft insurance differs from other insurance branches in terms of legislation and utilization (El-Kasabi et al., 2003: 299).

Insurance branches are divided into three groups: property, life and liability in Türkiye. Aircraft insurances are also in the property group. There are many studies on the aviation sector. However, there are few studies on aviation insurance. When the literature is examined, it is seen that studies on aircraft, unmanned aerial vehicles (UAVs), risks in aviation companies, policy pricing and aviation insurance premium production are generally conducted. There is no study on the relationship between aircraft insurance premium and loss in Turkey. In this respect, it is thought that the study may make valuable contributions to the aviation and insurance sectors.

The study aims to determine whether there is causality between aviation insurance premium production and claims, total insurance premium production and claims for the period 2019-2023 in Türkiye. For this purpose, five insurance companies with aircraft insurance premium production were selected.

In the second part of the study, previous studies are presented. In the third section, the concept of insurance and risk in Türkiye, and in the fourth section, insurance and insurance premium, claims and outstanding data in Türkiye are presented. In the fifth section, aircraft coverage structures, insurance premiums, claims and outstanding data are shared.

The research section includes the purpose, hypotheses, sample, data and analysis. For the analysis of the variables that are the subject of the research, unit root tests were applied first. ADF and PP unit root tests were applied in the analysis. VAR analysis was performed to determine the appropriate lag and Granger Causality Test analysis was used to evaluate the short-run relationship. There is no study on the relationship between aircraft insurance premium and claims in Türkiye. In this respect, the study is expected to make valuable contributions to the aviation and insurance sectors.

2. LITERATURE REVIEW

The acceleration of developments in the insurance sector has increased the number of scientific studies in this field. The rapid growth in the aviation sector has brought the need for insurance to the agenda. When the literature is examined, it is found that there are few academic studies on aviation insurance.

Wells and Chadbourne (1992) studied the basic principles of insurance and risk as applied to the aviation industry. They discuss aviation insurance in the United States and investigate underwriting and pricing, risk management, premises liability and workers' compensation coverage.

Lee (2006), Safety risk management in aviation is important. The study developed a quantitative model to assess aviation safety risk factors as a way to improve the effectiveness of the safety risk management system. The model was developed by evaluating all relevant prediction factors according to their importance, how dangerous they are, detectability, probability, criticality and frequency.

Wallis (2013), The study investigated the role of international organizations in enhancing civil aviation safety. It provides a brief description of their different roles and shows how they connect to provide a worldwide security structure for the benefit of air travelers. It addresses their strengths and weaknesses and discusses their different approaches to aviation security implementation.

Yardımcı (2019) investigated the impact of technological change and developments in the aviation sector on air vehicles. In recent years, the need for unmanned aerial vehicles has come to the agenda and the importance of insurance responsibility against the risks that may be encountered during use

has been emphasized.

Kahveci and Can (2017) Unmanned Aerial Vehicle (UAV) are an automatic and remote-controlled aircraft type that does not have a passenger or pilot, only carries appropriate equipment. The civil, military and scientific uses of UAV are rapidly spreading. The use of UAV for civil purposes in very wide areas and the need for insurance accordingly have been emphasized.

Ünan (2019) analyzed aviation insurance on the basis of insurance law. The study is deepened with judicial decisions and case studies.

In the study conducted by Macit and Göçer (2020), the financial performances of two aviation companies operating in Borsa İstanbul were compared with the data obtained from their financial statements. According to the findings of the study; Pegasus exhibits a higher financial performance than THY. It was observed that THY's profitability performance was better than Pegasus.

Aslan (2024) In the Civil Aviation Law, the carrier is obliged to have financial liability insurance. It is essential that the liability insurance to be taken out by the carrier is equal to the insurance amount determined in the legislation. The carrier's liability is limited to the death of the passenger; damages to the cargo and baggage are not covered. In the study, the content of the airline carrier liability insurance coverage in the event of bodily harm and death of the passenger was examined.

Despite the general trend towards a decrease in the accident rates involving commercial passenger aircraft due to their safer status, the aviation insurance market is far from stable. The study provides an overview of the importance of aviation insurance and its need in recent years. The distribution and pricing of risk among insurance companies has been examined.

Herdemir (2021) aviation insurance covers the liability of institutions operating in the aviation sector for problems that may arise due to the fault of their employees during flights or for unexpected accidental damages. Aviation insurance provides coverage for the economic part of the damage that may occur in parallel with the policy content. Aviation insurance is divided into 3 groups: body, liability and personal accident. In the study, aviation insurance data between the years 2012-2021 were used to comprehensively examine the changes in aviation premium productions in TL and USD, the number of policies, average premium changes per policy, and company-based aviation premium production analyses.

Khotsianovska (2023), The purpose of the study is to conduct a comprehensive study of the legal essence of certain types of contracts entered into by carriers with other participants of transportation services. It is concluded that the attention of legal science and practice is mostly focused on air transportation contracts, many contracts concluded between participants in aviation relations are not sufficiently detailed, and some aspects of air transportation contracts need further scientific research.

There are many studies on the aviation sector. However, there are few studies on aviation insurance. When the literature is examined, it is seen that studies on aircraft, unmanned aerial vehicles (UAVs), risks in aviation companies, law, policy pricing, passenger safety and aviation insurance premium production have been conducted. There is no study on the relationship between aircraft insurance premium and claims in Turkey. In this respect, it is thought that the study may make valuable contributions to the aviation and insurance sectors.

3. INSURANCE SECTOR

Insurance is defined as a bilateral contract made by paying a premium by foreseeing and preparing a policy in advance in order to eliminate the material damage that may be encountered for all living or non-living assets. The insurance policy is taken out with the aim of securing the insured financially (Uralcan, 2011: 21).

Throughout our lives, our values are faced with risks arising from various hazards. If precautions are not taken against the damages that may occur as a result of these hazards; it may become impossible to cover the damages financially. People have needed the insurance system in order to reduce the financial impact of these damages. The insurance contract cannot prevent the events that cause

damage, but it protects the policyholder against these damages by paying the financial loss (Çelik, 2024: 1002).

When an insurance company receives a policy proposal for evaluation, the process can be finalized in 4 ways. The first of these is direct acceptance, especially in compulsory policies. The other is that the offer can be rejected or accepted and managed with some conditions. Finally, the insurance company can accept and transfer the offer.

4. INSURANCE IN TÜRKİYE

The interest in insurance in Türkiye began in 1870 as a result of the great fire in Istanbul. After the great fire, foreign insurance agencies started their activities in our country. Within ten years, the number of agencies working in this manner reached fifteen. These agencies were directed by their own countries and issued the policies they used with their own licenses. The most important issue for agencies was that in case of a dispute, their authority was decided by the courts in their own countries. In the following years, the number of foreign companies increased and in 1883, with the help of the Ottoman Bank, they established an insurance agency called 'Osmanlı' (Ottoman) (Ererdi, 2018: 45). In 1925, our first national company Anadolu Sigorta T.A.Ş. was established. As of 2024, there are 50 non-life, 19 life and individual pension and 5 reinsurance companies in Türkiye.

4.1. Insurance Branches in Türkiye

Insurance branches in Türkiye are divided into three groups as property, life and liability. Property insurance is made against the consequences of risks that threaten the property of an institution or person. The purpose of making this insurance policy is to compensate the damage that may occur to the insured. Property insurance is also referred to as compensation insurance (Dursun, 2016: 2). It is in the property insurance branch of motor insurance, traffic, green card, fire, engineering, transportation, agriculture, sea and air vehicles. Life Insurances are insurances that cover risks to human life (Kayıhan, 2016: 252). Personal accident, life and private health insurances are life insurances. Liability Insurances refer to insurances that are activated in the regulation of damages caused by individuals and institutions within their responsibilities. Third party, occupation, product and employer liability insurance policies are in this group. With this guarantee, the insured person or institution transfers the payment debts requested from them to the insurance company through recourse (Ölmez, 2016: 2131).

4.2. Insurance Premium Production

Insurance premium production in Türkiye has been steadily increasing every year. The sector is growing in real terms (inflation-adjusted) every year.

Table 1

Annual Total Insurance Premium Production for 2014-2023

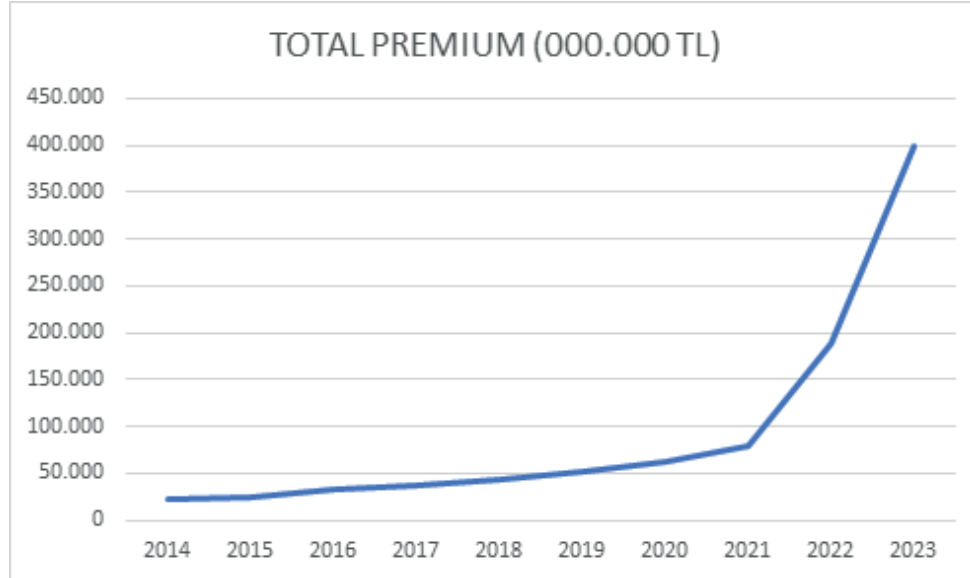
Year	Total Premium (000.000 TL)	Year	Total Premium (000.000 TL)
2014	22.056	2019	52.388
2015	24.495	2020	61.254
2016	33.442	2021	79.019
2017	37.111	2022	187.704
2018	43.470	2023	400.079

Reference: TSB Official Statistics (Premium Production)

Non-life insurance premium production in Türkiye grew approximately 20 times between 2014 and 2023. The share of insurance in national income increased from 1.3% to 2% in the last 10 years.

Graphic 1

Annual Total Insurance Premium Production for 2014-2023



5. AVIATION INSURANCE IN TÜRKİYE

Institutions and individuals operating in Türkiye are obliged to have their interests in Türkiye insured by insurance companies in Türkiye. However, when air and sea vehicles are purchased with foreign loans, insurance policies can be taken out abroad until the loan debt is paid.

5.1. Aviation Insurance Coverage Structures

Most aviation insurance contracts are indemnity contracts. The uncertainty here is whether the damage will occur or not. The aim of an indemnity policy is to restore the person/company to the financial position it was in before the damage. Insurances such as loss of license and personal accident insurance are not based on indemnity. The uncertainty here is when the damage will occur. In both cases, in order to be entitled to compensation, it is sufficient for the insured to prove that he or she had an interest and benefit in the subject matter at the time of the damage.

The contractual process begins when the insured fills out a proposal form containing the elements of risk and submits it to the insurer. Insurance companies or their intermediaries try to provide the most appropriate coverage according to the needs and requirements of the insured. Aviation insurance includes coverage for the airframe, third parties and passengers.

5.2. Aircraft Insurance Policy

The policy, which is accepted as AVN 1C and is used for both hull risks and passenger and third-party liability in the field of general aviation, although it was also created to determine the coverage of small airlines, has found wide use. This policy has 3 sections; damage to the airframe, third party liability and passenger liability.

Damage to the Airframe: Insurers may repair, pay for or replace damaged parts due to accidental damage or loss arising from risks arising from the aircraft in motion and while parked (in-flight, taxiing and ground parked).

5.3. Aircraft Insurance Premium Production

Aircraft insurance premium production in Türkiye has been steadily increasing every year.

Table 2

Annual Total Insurance Premium Production for Aircrafts for the 2014-2023

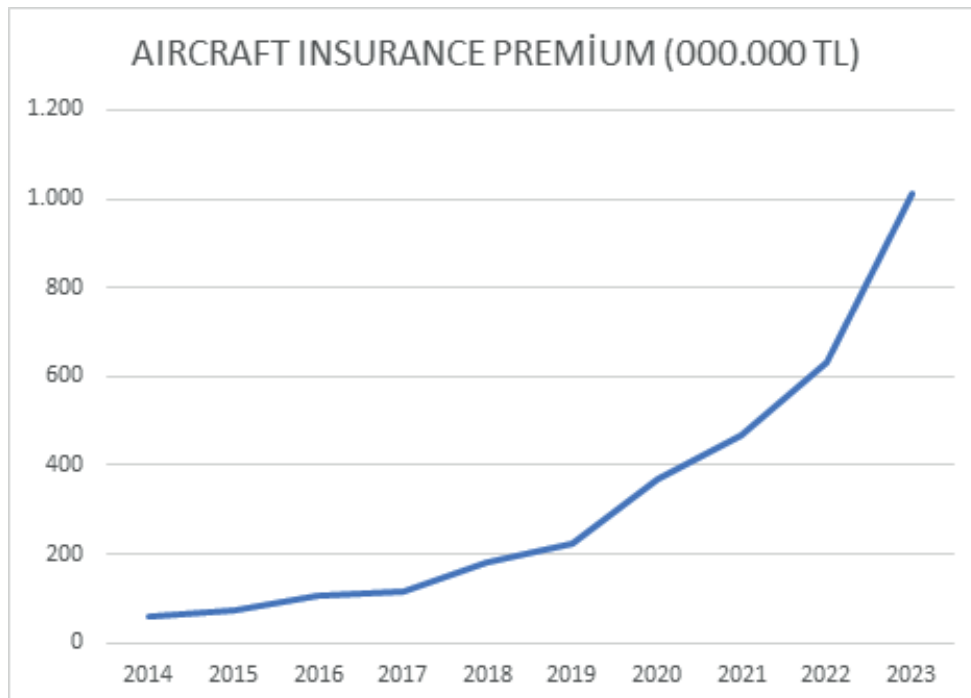
Year	Aircrafts Premium (000.000 TL)	Year	Aircrafts Premium (000.000 TL)
2014	58	2019	223
2015	75	2020	369
2016	105	2021	469
2017	114	2022	634
2018	180	2023	1.011

Reference: TSB Official Statistics (Aircraft Premium)

Aircraft insurance premium production in Türkiye grew approximately 17.5 times between 2014 and 2023.

Graphic 2

Annual Total Insurance Premium Production for Aircrafts for 2014-2023



6. APPLICATION

6.1. Objective of the Application

To determine whether there is causality between aviation insurance premium production and claims, total insurance premium production and claims in the period 2019-2023 in Türkiye

6.2. Hypothesis of the Application

- H_{0a} : Aircraft insurance premium is not the cause of total insurance premium
 H_{0b} : Paid claims on aircraft is not the cause of total insurance premium
 H_{0c} : Aircraft outstanding claims are not the cause of total insurance premium
 H_{0d} : Aircraft insurance premium is not the cause of total paid claims
 H_{0e} : Aircraft paid claims are not the cause of total paid claims
 H_{0f} : Aircraft outstanding claims are not the cause of total paid claims
 H_{0g} : Aircraft insurance premium is not the cause of total outstanding claims
 H_{0h} : Aircraft paid claims are not the cause of total outstanding claims
 H_{0i} : Aircraft outstanding claims are not the cause of total outstanding claims

6.3. Sample and Data

For the purpose of the aircraft research, five insurance companies producing aircraft premiums were selected. These companies are Türkiye Sigorta, Ak Sigorta, Anadolu Sigorta, Allianz and Eureka. The total aircraft premium production of the five selected companies corresponds to approximately 90% of the total sector production. For this purpose, total premium, paid, outstanding and aviation premium, paid, outstanding data of the five selected companies are used on a quarterly basis between 2019 and 2023. Data were obtained from the official statistics portal of TSB (Insurance Association of Türkiye).

6.4. Analysis Method

For the analysis of the variables that are the subject of the research, ADF and PP, which are unit root tests, were applied first. VAR analysis was conducted to determine the appropriate lag and Granger Causality Test analysis was used to evaluate the short-run relationship. The VAR (Vector Autoregression) model is an econometric method used to model interdependencies and causal relationships among multiple time series variables. It was first developed by Christopher Sims (1980). In this study, this method is preferred to analyze how past values affect current variables.

6.5. Findings

Table 3 shows the mean, median, maximum, minimum and standard deviation values of the descriptive statistics of total insurance premium, total paid claims, total outstanding claims, aircraft insurance premium, aircraft paid claims and aircraft outstanding claims variables before Granger Causality Analysis.

Table 3

Descriptive Statistics of Variables

	Total Insurance Premium	Total Paid Loss	Total Outstanding	Aircraft Insurance Premium	Aircraft Insurance Paid Loss	Aircraft Insurance Outstanding
Average	1.36E+08	35604955	53639369	7.66E+09	4.13E+09	8.57E+09
Medyan	1.24E+08	5273641.	12904334	5.65E+09	2.23E+09	4.83E+09
Maximum	5.88E+08	2.56E+08	5.04E+08	2.78E+10	2.81E+10	5.95E+10
Minimum	264835.4	0.000000	452634.9	1.56E+09	1.80E+08	3.61E+08
Standard Deviation	1.39E+08	55564789	89260821	6.10E+09	5.27E+09	1.06E+10

Table 4
Unit Root Test (Augmented Dickey Fuller-ADF and Phillips Perron- PP)

Variables		Phillips Perron- Pp		Augmented dickey Fuller- Adf	
		T-Statistics	Probability	T-Statistics	Probability
Total Insurance Premium	Level	1,0000	1,0000	0.9004	0.9470
	1.Difference	0.0031	0.0180**	0.5506	0.0006***
Total Paid Claims	Level	0.9997	1,0000	0.8472	0.7649
	1.Difference	0.0023	0.0309**	0.0033	0.0017***
Total Outstanding Claims	Level	0.9999	0.9996	1.0000	1.0000
	1.Difference	0.0951	0.0027***	0.0009	0.0015***
Aircraft Insurance Premium	Level	0.9576	0.3621	0.8627	0.9978
	1.Difference	0.0000	0.0000***	0.0214	0.0269**
Aircraft Paid Claims	Level	0.8029	0.5864	0.7074	0.4128
	1.Difference	0.0221	0.0005***	0.5506	0.0006***
Aircraft Outstanding Claims	Level	0.1268	0.6953	0.0996	0.6982
	1.Difference	0.0001	0.0017***	0.0000	0.0017***

An important point in the study is the stationarity of the variables. ADF (Augmented- Dickey Fuller) and PP (Phillips Perron) tests were conducted for stationarity determination. As a result of the analysis with constant and trend for each of the variables, it was observed that they were not stationary at the level, but they were stationary when the first difference was taken. In this respect, causality analysis was performed by taking the first level differences of the variables.

Table 5
Var Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-7.768.828	NA	1.4e+105	259.1609	259.3704	259.2429
1	-7.455.000	554.4289	1.4e+101	249.9000	251.3660	250.4735
2	-7.410.350	69.95234	1.1e+101	249.6117	252.3343	250.6766
3	-7.378.670	43.29518	1.4e+101	249.7557	253.7349	251.3122
4	-7.218.580	186.7727	2.61e+99	245.6193	250.8552	247.6674
5	-7.152.401	63.97264	1.34e+99	244.6134	251.1058	247.1529
6	-7.087.175	50.00668	8.97e+98	243.6392	251.3882	246.6702
7	-6.994.124	52.72872*	3.55e+98	241.7375	250.7432	245.2601
8	-6.855.901	50.68185	6.77e+97	238.3300*	248.5923*	242.3442*

LR: Ordered Modified LR test statistic (each test at 5% level), FPE: Final Forecast Error, AIC: Akaike Information Criterion, SC: Schwarz Information Criterion, HQ: Hannan-Quinn Information Criterion

Since the variables are stationary at first difference, the VAR model is run by taking their first differences. After the VAR model is established, the appropriate lag length should be determined. Findings regarding the appropriate lag length are presented in Table 5. According to FPE, SC, AIC and HQ information criteria, the appropriate lag length is 8.

Table 6
Granger Causality Analysis

H	Hypotheses	Probability	Decision
H _{0a}	Aircraft insurance premium is not the cause of total insurance premium	0.3509	Accepted
H _{0b}	Paid claims to aircraft is not the cause of total insurance premium	0.9891	Accepted
H _{0c}	Aircraft outstanding claims are not the cause of total insurance premium	0.5580	Accepted
H _{0d}	Aircraft insurance premium is not the cause of total paid claims	0.1172	Accepted
H _{0e}	Aircraft paid damage is not the cause of total paid claims	0.9022	Accepted
H _{0f}	Aircraft outstanding claims are not the cause of total paid claims	0.0004	Rejected
H _{0g}	Aircraft insurance premium is not the cause of total outstanding claims	0.0278	Rejected
H _{0h}	Damage paid for aircraft is not the cause of total outstanding claims	0.9649	Accepted
H _{0i}	Aircraft outstanding claims are not a cause of total outstanding claims	0.0186	Rejected

Granger causality analysis is used to detect bidirectional relationships when the variables are stationary at the level or stationary at the same level. Since all variables are stationary at the first difference in the findings of the study, this method was preferred to detect bidirectional relationships. Since each of the variables are stationary at the same level, Granger causality analysis is used to test the short-run relationship between the variables. According to the results obtained, it is concluded that aircraft outstanding claims are the cause of total paid claims, aircraft insurance premium is the cause of total outstanding claims and aircraft outstanding claims are the cause of total outstanding claims and a short-run relationship between the variables is detected. As a result, the hypotheses H_{0f}, H_{0g} and H_{0i} are rejected, while the hypotheses cannot be rejected for the other cases.

7. CONCLUSION AND DISCUSSION

Insurance premium production in Türkiye has been rising steadily every year and growing in real terms. Non-life insurance premium production in Türkiye grew nearly 20-fold between 2014 and 2023 and the share of insurance in GDP increased from 1.3% to 2%. Aircraft insurance premium production in Türkiye has also been steadily increasing every year and growing in real terms. Aircraft insurance premium production in Türkiye grew approximately 17.5 times between 2014 and 2023. Institutions and individuals operating in Türkiye are obliged to insure their interests in Türkiye with insurance companies in Türkiye. However, when aircraft and marine vessels are purchased with foreign loans, insurance policies can be taken out abroad until the loan debt is repaid. The share of annual insurance premium production for aircraft in total premium production is quite low; approximately 2.5 per thousand for the 2014-2023 period. Due to the high coverage risk and reinsurance capacity of insurance companies, only around 10 of them are able to provide aircraft insurance. The share of aircraft premiums in total premium production of the five companies subject to the study is higher, around 6 per thousand.

For the purpose of the study, five insurance companies that produce aircraft premiums were selected. These companies are Türkiye Sigorta, Ak Sigorta, Anadolu Sigorta, Allianz and Eureko. The total aircraft premium production of the five selected companies corresponds to approximately 90% of the total sector production. For this purpose, total premium, paid, outstanding and aviation premium, paid, outstanding data of the five selected companies are used quarterly between 2019 and 2023.

The study has 9 hypotheses; the causality of aviation premiums, paid claims and outstanding claims between total premiums, total paid claims and total outstanding claims is investigated.

Since each of the variables are stationary at the same level, Granger causality analysis is used to test the short-run relationship between the variables. According to the results obtained: Aircraft outstanding claims are the cause of total paid claims; since aircraft claims will be high depending on the coverage, the relationship between high outstanding and paid claims is in line with expectations. Air vehicles insurance premium is the cause of total outstanding claims; this result is in line with expectations as the probability of claims will increase as aircraft insurance premium production increases. Aircraft outstanding claims are the cause of total outstanding claims; it is a result consistent with expectations that losses incurred in aircraft insurance affect total outstanding claims due to high outstanding claims. Finally, while H0f, H0g and H0i hypotheses are rejected, the hypotheses cannot be rejected for the other cases.

There are many studies on the aviation sector. However, there are few studies on aviation insurance. When the literature is examined, it is seen that studies on aircraft, unmanned aerial vehicles (UAVs), risks in aviation companies, policy pricing, law, security and aviation insurance premium production are generally conducted. There is no study on the relationship between aircraft insurance premium and claims in Turkey. In this respect, it is thought that the study may provide valuable contributions to the insurance sectors, especially in the pricing and risk selection process on the premium and loss relationship.

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ORIGINAL ARTICLE

THE EFFECTS OF EMPOWERMENT ON EMPLOYEES' JOB SATISFACTION: AN ANALYSIS OF THE TURKISH INSURANCE SECTOR

Necla TUNAY

Abstract

Employee empowerment enhances job satisfaction and contributes to organizational success. Therefore, its importance in the business world is increasing, and its applications in companies are becoming widespread. Companies operating in the finance sector have also been affected by this trend. However, the number of studies on empowerment, especially in insurance companies, is quite limited. This study aims to analyze the effects of empowerment on employee satisfaction in insurance companies. The hypothesis on which the study is based is that empowerment will positively affect employees' satisfaction levels. In this context, a random sample was taken from employees of insurance companies operating in Turkey, and a survey was administered to the sample. Statistical analyses applied to the data collected as a result of the survey revealed that our hypothesis is valid. Employee satisfaction and job satisfaction increase in insurance companies that empower their employees. Thus, both individual and organizational performance increase.

Keywords

Insurance, empowerment, job satisfaction, analysis of variance, hypothesis tests, regression.

JEL Classification

C12, G22, M51.

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1. INTRODUCTION

Empowerment refers to the effort to enable or encourage a person to carry out specific actions or tasks. Employee empowerment, on the other hand, is a management approach based on authorizing employees within an organization to make independent decisions and take action as they see fit (Wong, 2023). In the remainder of the text, the term “empowerment” will be used to refer specifically to employee empowerment.

In practice, empowerment is often confused with the concept of delegation. However, there are significant differences between the two. Delegation can be thought of as giving employees a map to follow, indicating what they can do and where they can go, albeit with limited autonomy and freedom. But what happens when employees want to take a different route or explore new paths? This is where employee empowerment comes into play. Empowerment enables employees to experiment and make decisions independently, rather than merely following orders. When employees feel they have a say in how tasks are performed, they become more engaged in outcomes and contribute more effectively. As such, a successful empowerment process can lead to better problem-solving, higher performance, and ultimately an enhanced customer experience. In summary, empowered employees experience greater satisfaction and fulfillment in their jobs, which in turn improves their performance and enhances organizational success.

Numerous empirical studies on empowerment have been conducted both globally and in Turkey. A significant portion of these studies analyze how empowering employees across various sectors affects their job satisfaction. However, in the financial sector, and particularly in relation to its impact on employee satisfaction, such studies are relatively scarce. This is also true for the insurance industry and insurance companies. Research on employee empowerment within insurance companies is limited both globally and in Turkey. Consequently, studies investigating the effects of empowerment on employee satisfaction are also quite limited. These gaps in the literature constitute the primary motivation for this study. In this context, the study investigates the extent to which companies operating in the Turkish insurance sector empower their employees and how empowerment affects their satisfaction levels.

The study is based on the hypothesis that “empowering employees in insurance companies positively affects employee satisfaction or fulfillment.” To test this hypothesis, a survey was conducted with a randomly selected sample from the population of employees in insurance companies operating in Turkey. Various statistical analyses were carried out using the dataset collected through the survey, and the empirical findings were evaluated to determine whether they support the hypothesis. The study consists of two main sections: a comprehensive literature review and an evaluation of the statistical analyses and findings.

2. LITERATURE REVIEW

In management sciences, empowerment refers to involving employees in the decision-making process (Mitchell, 1973; Cole et al., 1993). Some researchers define empowerment more broadly. Frost (1987) describes empowerment as a process that entails the use of power to provide opportunities and conditions that allow employees to gain strength, make decisions, utilize and develop their abilities and skills, and create and accomplish organizational tasks in ways that are meaningful to them. Conger and Kanungo (1988) define it as the process of identifying conditions that foster powerlessness in the organization and enhancing a sense of self-efficacy among members through informal means and efficient information dissemination. Etorre (1997) defines empowerment as developing employees’ ability to make self-directed decisions and collaborate across the organization by focusing on lower levels of management.

Other researchers such as Langbein (2000), Dainty et al. (2002), and Arneson & Ekberg (2006) describe empowerment as the process of transferring power and responsibility from higher to lower levels within an organization, especially the power to make decisions. According to Abou Elnaga and Imran (2014), empowerment involves giving employees autonomy and sufficient authority to make decisions about their work without direct approval from their supervisors, thereby increasing their roles, tasks, and responsibilities.

Empowerment not only grants employees sufficient power in decision-making but also involves their participation in setting the organization's goals. In this context, Brown and Harve (2006) define empowerment as a strategy aimed at unlocking individuals' potential and involving them in building the organization—assuming that the organization's success depends on aligning individual needs with the organization's vision and long-term goals. Furthermore, it involves training, motivating, and encouraging employees to use creativity in their work and involving them in the decision-making process to help the organization achieve its goals and enhance its competitiveness in proportion to its technological, cultural, and environmental capacity.

As seen, empowerment has both narrow and comprehensive definitions. However, its fundamental philosophy is to enhance the organization's ability to respond to changing environments and support innovative and creative ideas. Empowerment allows employees to embrace creative thinking and break away from traditional ways of doing things. Moreover, it helps them engage in setting goals, making decisions, and solving problems without waiting for solutions from their superiors (Bowen and Lawler, 1995). Spreitzer (1995) notes that empowerment enables managers to focus their time on more important matters by granting autonomy to employees.

Recent studies by Lee & Koh (2010), Shahril et al. (2013), and Rehman et al. (2015) show that empowerment is now actively implemented in the business world and has become an integral part of business philosophy. Empowered employees have become more proactive and positive in delivering higher-quality services to achieve customer satisfaction.

Employees have a significant impact on organizational performance, and a quality management system depends on how individual employees are motivated and how the organization is structured to allow job improvement. In this context, Maghrabi (2016) states that competence, output, and absenteeism are key factors that organizations consider when assessing employee satisfaction. Bohlander and Snell (2014) emphasize that empowerment is a method of employee participation, offering employees the opportunity to engage in and implement decisions that affect their work life. Participation in work and decision-making processes increases motivation.

Cheshire and Kombo (2015) stress that an organization's performance is determined by its ability to meet both marketing and financial objectives. Organizations often seek to expand their market share and, in the face of increasing competition, align their business growth with what competitors offer. Thus, to consistently meet their performance targets, organizations must adopt quality management practices. Empowerment has become one of the fundamental elements of quality management and enhanced organizational performance.

According to Wong (2023), empowering employees begins with listening to and appreciating them and includes the following components:

- * Fostering an environment of trust and psychological safety,
- * Building employee confidence through recognition and encouragement,
- * Offering flexibility in work arrangements,
- * Soliciting feedback from employees and acting on it,
- * Supporting professional development through coaching and delegation.

In this context, managers or leaders should delegate responsibilities according to employees' roles and skills. Clear boundaries should be established regarding when and how tasks should be completed. However, in a dynamic work environment, managers should remain flexible and allow employees to adjust their work schedules as needed. At the same time, it is crucial to ensure that employees have access to the resources necessary to perform their jobs successfully. Leaders should focus more

on outcomes than on processes, be open to employee input and contributions, and foster a continuous learning environment to support skills development (Abuzaid, 2018; Sahu, 2018; Kanake & Kemboi, 2020). A successful empowerment process in the workplace can be implemented in four key steps (Wong, 2023; Abuzaid, 2018):

- * Demonstrate that employee feedback matters,
- * Understand employees well to empower them effectively,
- * Provide opportunities for professional development,
- * Make empowerment part of the organizational culture and vision.

The main benefits of empowering employees for company managers include increasing employee motivation, enhancing trust in leadership, boosting creativity, and thereby improving overall company performance. Empowerment also has significant advantages for employees. It increases their participation and performance, improves job quality and satisfaction, and enhances the outcomes of their work (Wong, 2023; Sahu, 2018).

Empowered employees share several characteristic traits. They are invaluable to any organization because they are willing to go above and beyond to achieve company goals (Sahu, 2018; Singh & Rahman, 2020; Wong, 2023). Indicators that an employee feels empowered include:

- * Taking initiative without waiting for directions from supervisors,
- * Not fearing risk or failure and accepting that mistakes are part of learning,
- * Taking responsibility for their actions and learning from setbacks,
- * Being in sync with the organizational culture and working methods,
- * Embracing change, such as digital transformation or new roles,
- * Feeling connected to the organization's mission and values,
- * Thinking outside the box and not fearing to challenge the status quo,
- * Trusting their abilities and communicating effectively with peers and managers,
- * Seeking extra responsibilities and opportunities to grow their skills and knowledge,
- * Being open to feedback and actively seeking development opportunities such as mentoring, workshops, and conferences.

In general, empowered employees are self-motivated, proactive, and engaged in their work, which leads to higher job satisfaction and improved overall performance.

2.1. Employee Empowerment and Its Outcomes in Insurance Companies

Although there are numerous applied studies on employee empowerment both globally and in Turkey, the number of studies specifically addressing empowerment in insurance companies is quite limited. In this context, the works of researchers such as Isimoya and Bakarey (2013), Chiekezie et al. (2015), Roy (2015), Abuzaid (2018), Sahu (2018), Gabow and Bett (2019), Abdi and Njuguna (2020), Singh and Rahman (2020), and Prebeg (2023) focusing on insurance companies in various countries can be cited. The scope and key findings of these studies are discussed below.

Isimoya and Bakarey (2013) examined the relationship between employee empowerment and customer satisfaction in the Nigerian insurance sector. Based on existing empowerment literature, it was found that perceived employee satisfaction, perceived employee loyalty, and perceived commitment had an impact on perceived product quality and perceived service quality. Using a survey conducted with 200 employees from Nigerian insurance companies, the relationship between empowerment and customer satisfaction was investigated. The hypothesis test results indicated a significant relationship between employee empowerment and customer satisfaction. Challenges identified in the Nigerian financial system and insurance sector included high employee turnover and weak service delivery. Therefore, Isimoya and Bakarey (2013) recommended that management should empower employees to foster retention, loyalty, and commitment.

Chiekezie et al. (2015) identified that frequent employee turnover and low performance among financial planners in Nigerian insurance companies led to the failure in meeting policy production

targets. Their research focused on examining the relationship between training and reduced turnover. Survey results revealed a connection between certain defined empowerment variables and achieving organizational goals. Furthermore, a positive and significant relationship was observed between employee training and reduced turnover. The findings showed that empowerment variables were powerful tools to influence employee behavior toward achieving organizational goals. Empowerment also helped employees pursue their own career goals and supported the view of the company as a learning organization rather than merely a workplace.

Chiekezie et al. (2015) concluded that the core principle of providing continuous development, flexibility, decision-making, and problem-solving power to employees made them more energetic, competent, and determined to ensure organizational success. Therefore, it is essential for insurance companies to establish policies and procedures for workplace empowerment programs. Managers should prioritize these empowerment factors according to the organization's capacity and implement them to enhance company performance.

Roy (2015) conducted a micro-level field study (survey) to identify issues related to the empowerment culture in a state-owned insurance company in India from the perspective of employees' individual attitudes, aspirations, and perceptions. The study was based on primary data collected through a structured questionnaire. The findings indicated that employees generally experienced a low level of empowerment. Item-level analysis of the data revealed a contradictory picture, indicating a gap between belief and practice regarding empowerment processes and implementations in the organization. The analysis by staff category showed that managers perceived only a moderate level of empowerment. Thus, empowerment was found to be negligible and still at a primitive stage within the organization. According to Roy (2015), empowerment is the link between organizational goals and employees' personal goals. As the organizational goals were not clear or inspiring to employees, the performance of the studied insurance company was found to be below its potential.

Abuzaid (2018) investigated the effects of employee empowerment on institutional strategic success in Jordanian insurance companies. A survey was conducted to examine how empowerment influenced strategic success. The findings indicated that empowerment enhanced strategic success, and companies that empowered their employees and delegated broader authority performed better than competitors. Empowerment efforts, in terms of delegation, participation, and work environment, had a positive impact on strategic success. Among these dimensions, employee participation in work processes had the greatest impact. Abuzaid (2018) emphasized that creating a work environment that fosters training, knowledge sharing, open communication, and creative thinking reinforces the positive effects of empowerment.

Sahu (2018) explored the factors influencing positive and negative workplace behaviors of employees and their impact on job outcomes in the Indian insurance sector, within the context of empowerment. Based on a survey conducted with a sample of 635 middle and lower-level managers, structural equation modeling was used for the analysis. The findings showed that empowerment and job engagement played significant roles in fostering positive employee behaviors and successful job outcomes. On the other hand, the effects of organizational support on employee behavior were found to be limited. According to Sahu (2018), the results can be interpreted as employee empowerment increasing positive behaviors that improve service quality offered to customers.

Gabow and Bett (2019) investigated how empowerment affected the performance of the National Hospital Insurance Fund in the Garissa region of Kenya. The target population consisted of 125 employees selected via stratified proportional sampling, and surveys were administered to 63 randomly selected participants. The data were analyzed using descriptive statistics and regression analysis. Results showed that employee empowerment had a positive effect on organizational performance. It was found that hospital management placed great importance on empowering employees and ensured fairness to maintain employee loyalty. Empowerment also enhanced service quality.

Abdi and Njuguna (2020) examined the effects of empowerment on service delivery and customer satisfaction in the National Hospital Insurance Fund in Wajir County, Kenya. Surveys conducted with

employees showed that employee involvement in decision-making improved organizational commitment, alignment between employees and managers, and overall employee capacity. Empowerment was found to have a positive impact on the quality of services provided. As seen, the findings of Abdi and Njuguna (2020) are largely consistent with those of Isimoya and Bakarey (2013), as well as Gabow and Bett (2019).

Singh and Rahman (2020) explored the impact of employee empowerment on sales performance in life insurance companies operating in India. Their survey results revealed a significant, positive, and linear relationship between the degree of empowerment and policy sales performance. This is an important finding indicating that empowered employees directly contribute to the performance of the organization.

Prebeg (2023) emphasized that employee empowerment is a key factor in corporate success because it increases motivation and enhances individual performance. In this context, the relationship between empowerment, customer satisfaction, and sales performance was examined. Prebeg (2023) conducted a survey with 60 employees of a major insurance company in Serbia. The findings indicated a positive relationship between employee empowerment and customer satisfaction. Empowered employees exhibited a greater sense of ownership and responsibility, which led to improved customer interactions and higher satisfaction levels. The results also pointed to an improvement in sales performance due to empowerment. Thus, Prebeg's findings align closely with those of Sahu (2018), Gabow and Bett (2019), Abdi and Njuguna (2020), and Singh and Rahman (2020).

When the findings of these experimental studies conducted on samples from various countries are collectively evaluated, it can be said that empowerment has significant positive effects on service quality, customer satisfaction, and sales performance in insurance companies. It is especially noteworthy that creating a supportive work environment that encourages training, knowledge sharing, open communication, and employee creativity enhances the positive effects of empowerment. Empowerment increases employee commitment to the organization, reduces turnover rates, and improves job productivity and overall performance. In this context, having clear and inspiring organizational goals is crucial, as employees are more likely to adopt such goals, thereby enhancing performance. Offering continuous development opportunities, flexibility, and decision-making and problem-solving authority makes employees more energetic, capable, and determined to ensure the organization's success.

2.2. Studies on Insurance Companies in Turkey and Key Findings

Although there are numerous studies on employee empowerment in Turkey, research specifically addressing its impact in insurance companies is quite limited. The main studies in this area were conducted by Tunay (2016 and 2019).

Tunay (2016) empirically examined the applicability of employee empowerment in insurance companies operating in Turkey. A survey was conducted with employees from 12 insurance companies of various sizes, and the dataset was analyzed using both parametric and non-parametric statistical techniques. The findings indicated the presence of common empowerment elements in insurance companies from the perspective of both employees and managers. In other words, there appears to be a favorable environment for empowerment in these companies. However, hypothesis test results also revealed that traditional organizational understandings still partially persist in the sector.

Tunay (2019) explored the effects of empowerment on job satisfaction, performance, and organizational commitment of employees in insurance companies operating in Turkey. The study used data collected from four insurance companies. Under the assumption that the empowerment climate in the analyzed companies was strong, the results showed that empowerment positively affected employees' job satisfaction, performance, and commitment to the organization. In the highly educated insurance sector, modern management approaches are increasingly becoming the norm. In this context, empowerment encourages employees, improves service quality, and enhances company performance.

The findings from studies in Turkey, in line with international studies, show that empowering employees has a positive impact on productivity, service quality, and performance. Motivated employees exhibit greater loyalty to the company and make more effort to achieve company goals.

3. RESEARCH AND FINDINGS

Our study is based on field research and experimental analyses conducted to examine the impact of employee empowerment on employee satisfaction levels in the Turkish insurance sector. The fieldwork relied on surveys administered to a randomly selected group of sector employees. In this context, the survey questions used by Voisard (2008) in his study were adapted for the Turkish insurance sector. The collected data were then analyzed using statistical methods, the details of which are explained below.

Voisard (2008) examined whether employee empowerment increased job satisfaction among employees in a U.S. healthcare organization. His findings indicated that empowered employees reported higher levels of satisfaction and contentment in their work environment. In this framework, the effect of empowerment on job satisfaction was found to surpass even other strong motivating factors such as wage levels. According to Voisard (2008), empowering employees enhances organizational competitiveness by improving performance. Therefore, the survey questions used in his study provided a solid foundation for investigating the relationship between empowerment and employee satisfaction in insurance companies and were thus adopted in this research.

3.1. Survey Process and Sampling

The research was conducted with 100 mid- and senior-level employees randomly selected from life and non-life insurance companies operating in the Turkish insurance sector. Half of the surveys were conducted through face-to-face interviews, while the remaining half were sent via email. A total of 54 participants responded, and after preliminary evaluations, 49 of these were deemed valid and included in the analysis. Therefore, the participation rate was 54%, and the rate of valid responses was 49%. All participants were asked the same set of questions, regardless of whether they were employees or managers. The survey questions, adapted from Voisard's (2008) study, are provided in the appendix of the study.

The survey consisted of two main sections. The first section contained questions designed to gather personal information about the participants and their positions within their respective insurance companies. The second section consisted of 15 questions divided into two subgroups related to employee empowerment and satisfaction in the workplace. All questions in this section were designed to be answered on a Likert scale. The reliability of the questions prepared using a five-point Likert scale was assessed using Cronbach's alpha statistic. Cronbach's alpha values were calculated for each question individually and as an average across all questions. As is well known, values above 0.5 are considered acceptable for this statistic, while values close to 1 indicate a high level of reliability. In the individual calculations, Cronbach's alpha values ranged between 0.763 and 0.879, with an average of 0.836. These results indicate that the applied surveys were highly reliable.

3.2. Statistical Analyses

The data set collected through the administered surveys was analyzed using various statistical methods. A three-stage analytical approach was adopted. In the first stage, descriptive statistics and Pearson correlation coefficients of the data set were calculated. This allowed the structure of the variables and their interrelations to be described.

In the second stage, one-way analysis of variance (ANOVA) was used to examine group differences in empowerment and job satisfaction levels based on participants' seniority, positions within the

company, and wage levels. Following this, chi-square tests were conducted for cross-group comparisons. Subsequently, hypothesis tests were applied to each survey question designed on a Likert scale to identify the existence of empowerment and job satisfaction in the workplace. In this context, each question was treated as a separate hypothesis and tested using the z-test.

In the third and final stage of the analysis, the effect of empowerment on employee job satisfaction was examined using multivariate regression estimates. Additionally, the effects of job satisfaction and other variables on empowerment were also analyzed using the same method. The regression models were developed based on the multivariate regression model used in Voisard's (2008) study, and the coefficients were estimated using the ordinary least squares (OLS) estimator. A similar methodology was used in the study by Gabow and Bett (2019), indicating that this is a current and valid analytical approach. In the specified model, the dependent variable is an index reflecting job satisfaction, calculated based on participants' responses to the relevant survey questions. The calculation of this index is as follows:

$$e_i^{it} = \frac{1}{n} \sum_{j=1}^n c_j^{it} \quad i = 1, 2, \dots, k; \quad j = 1, 2, \dots, n \quad (1)$$

In Equation (1), e_i^{it} represents the average of the responses (c_j^{it}) given by participant i to j survey questions related to job satisfaction. Using the same calculation method, another index is computed to reflect the empowerment level of the participants:

$$e_i^g = \frac{1}{n} \sum_{j=1}^n c_j^g \quad (2)$$

In Equation (2), e_i^g denotes the empowerment index, and c_j^g represents the responses given to the questions related to empowerment. Based on these definitions, Voisard's (2008) regression model can be expressed as follows:

$$e_i^{it} = \alpha + \beta_1 y_i + \beta_2 g s_i + \beta_3 i g s_i + \beta_4 \zeta s_i + \beta_5 p_i + \beta_6 \ddot{u} c_i + \gamma_1 e_i^g + \varepsilon_i \quad (3)$$

In Equation (3), y_i represents the age of the participants, $g s_i$ their tenure or length of service at their workplace, $i g s_i$ the time it takes them to commute to work, ζs_i their working hours, p_i their positions, and $\ddot{u} c_i$ their salaries. In the equation, $\alpha, \beta = \{\beta_1, \dots, \beta_6\}, \gamma_1$ are the coefficients to be estimated, while ε_i denotes the error terms, which are assumed to be normally distributed with zero mean and constant variance, and uncorrelated with each other.

In our study, unlike and in addition to Voisard's (2008) work, Equation (3) has been adapted for the estimation of empowerment.

$$e_i^g = \alpha + \beta_1 y_i + \beta_2 g s_i + \beta_3 i g s_i + \beta_4 \zeta s_i + \beta_5 p_i + \beta_6 \ddot{u} c_i + \gamma_2 e_i^{it} + v_i \quad (4)$$

This is an adaptation aimed at identifying the effects of the same set of variables and employees' satisfaction levels in the workplace on empowerment.

3.3. Findings and Evaluation

In the first stage of our analysis, the aim was to determine the basic characteristics of the variables to be analyzed and their mutual relationships through descriptive statistics and Pearson correlation coefficients. The results of the calculations conducted within this scope are presented in Table 1. In addition, the frequency distributions of responses regarding job satisfaction or employee contentment levels and empowerment are presented in Figure 1 and Figure 2, respectively.

When examining the correlation coefficients, it is observed that there are statistically significant relationships ranging from 10% to 1% between employees' age and their tenure, and between age and both commuting time and salary level. The relationships between age and both tenure and salary are positive and strong. Although not very strong, a positive relationship has also been found between age

and empowerment. On the other hand, tenure is related to workplace position, salary level, and job satisfaction. The relationship between tenure and job satisfaction is relatively weaker and negative, while the other two show a strong and positive relationship with tenure. Workplace position exhibits a strong positive relationship with both salary level and empowerment. Similarly, there is a strong positive relationship between salary and empowerment.

Furthermore, a strong positive relationship has been identified between empowerment and job satisfaction. In summary, besides job satisfaction, empowerment also appears to have a positive relationship with most variables, particularly age, position, and salary. This can be considered preliminary evidence of the strong positive effect of empowerment in the work environment.

In Figures 1 and 2, the frequency distributions of responses to the questions regarding job satisfaction and employee empowerment are presented separately as both averages and percentages. When these distributions are examined, it is seen that the majority of responses are concentrated in the positive options ranging from “somewhat agree” to “strongly agree.” In other words, employees have recognized and/or believed in the importance of both empowerment and its interaction with job satisfaction.

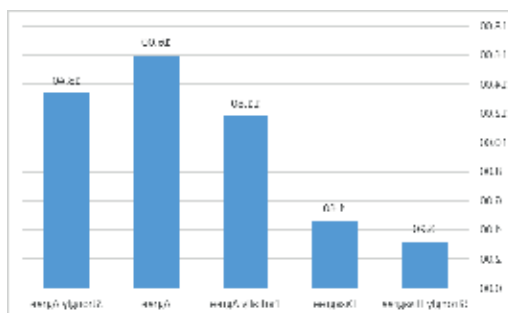
Table 1
Descriptive Statistics and Pearson Correlation Coefficients

	Mean	Standard Deviation	Age	Term of Service	Commute Time	Working Hours	Position	Wage	Empowerment	Job Satisfaction
Age	1.8571	0.5714	1.0000							
Term of Service	2.1837	0.6284	0.5846***	1.0000						
Commute Time	2.4286	0.6389	0.2236*	0.0073	1.0000					
Working Hours	1.2449	0.4300	-0.0237	0.0601	0.2122	1.0000				
Position	1.5510	0.8345	0.2079	0.3129**	0.0547	0.1358	1.0000			
Wage	1.7347	0.6632	0.3847***	0.4108***	0.1720	-0.0584	0.5592***	1.0000		
Empowerment	3.6531	0.8841	0.2331*	0.0559	0.0754	-0.0556	0.3532***	0.3512***	1.0000	
Job Satisfaction	3.2306	0.6513	-0.0102	-0.2381*	-0.2130	-0.0778	0.2093	0.1936	0.4721***	1.0000

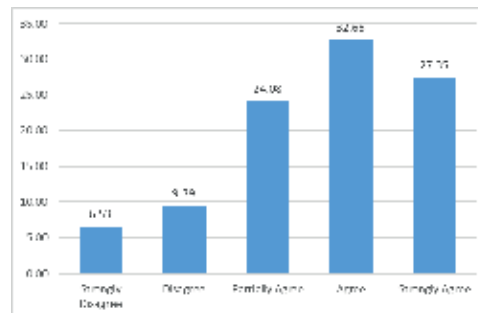
The symbols (***), (**), (*) indicate that the correlation coefficients are significant at the 1%, 5% and 10% levels, respectively.

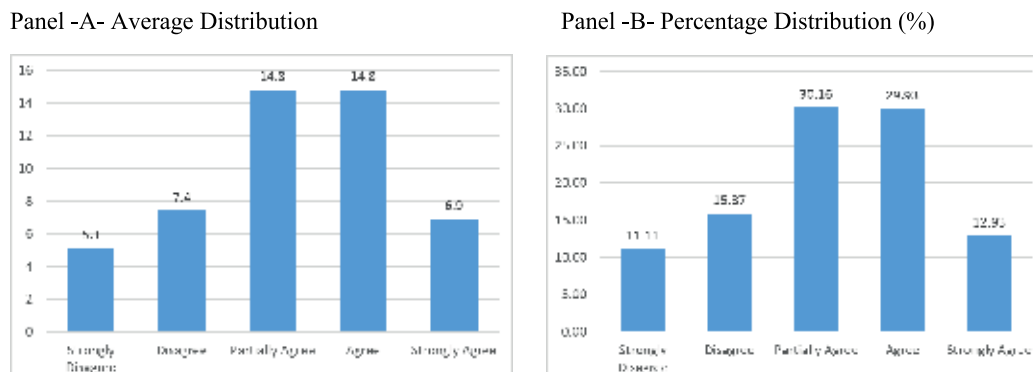
Graph 1
Frequency Distribution of Job Satisfaction of Employees in Insurance Companies

Panel -A- Average Distribution



Panel -B- Percentage Distribution (%)



Graph 2*Frequency Distribution of Employee Empowerment in Insurance Companies*

In the second stage of the analyses, one-way analysis of variance (ANOVA) was first conducted to compare intergroup differences in employees' responses to questions on empowerment and job satisfaction in terms of their seniority, positions within the company, and salary levels. When the results presented in Table 2 are examined, it is observed that there are statistically significant intergroup differences in job satisfaction according to employees' seniority at the 5% significance level. Similarly, there are also differences in empowerment levels across employee groups based on their positions in the company, again at approximately the 5% significance level. In all other tests, no statistically significant differences were found between the groups. These findings suggest that job satisfaction levels vary according to employees' seniority, and empowerment levels differ depending on their positions within the workplace.

Following the one-way ANOVA, chi-square tests were conducted to cross-compare group differences. According to the test results in Table 3, apart from the statistically significant relationship at the 5% level found between job satisfaction and salary level, no significant associations were identified among the other groups examined. In other words, the results of the cross-tabulation tests did not confirm the findings of the one-way ANOVA.

Table 2
One Way ANOVA Results

		Sum of Squares	Degree of Freedom	Mean Squares	F Stat.	p Value
H0: There is no difference between the groups according to the seniority of the employees.						
Employee Empowerment	Between Gr.	4.168	16	0.261	0.550	0.898
	Within Group	15.179	32	0.474		
	Total	19.347	48	0.403		
Employees' Job Satisfaction	Between Gr.	11.764	20	0.588	2.170	0.029
	Within Group	7.583	28	0.271		
	Total	19.347	48	0.403		
H0: There is no difference between the groups according to the employees' positions in the company.						
Employee Empowerment	Between Gr.	16.765	16	1.048	1.930	0.055
	Within Group	17.357	32	0.542		
	Total	34.122	48	0.711		
Employees' Job Satisfaction	Between Gr.	17.039	20	0.852	1.400	0.204
	Within Group	17.083	28	0.610		
	Total	34.122	48	0.711		
H0: There is no difference between the groups in terms of wage levels of employees.						
Employee Empowerment	Between Gr.	7.034	16	0.437	0.970	0.509
	Within Group	14.517	32	0.454		
	Total	21.551	48	0.449		
Employees' Job Satisfaction	Between Gr.	10.551	20	0.528	1.340	0.232
	Within Group	11.000	28	0.393		
	Total	21.551	48	0.449		

Table 3
Chi Square Tests Results

	Seniority	Position	Wage
<u>Employee Empowerment</u>			
Chi Square	21.3736	30.8721	30.5311
p Value	0.923	0.524	0.541
<u>Employees' Job Satisfaction</u>			
Chi Square	44.0319	41.6747	56.1996
p Value	0.305	0.398	0.046 **

Symbols (***), (**), (*) indicate that F statistics are significant at the 1%, 5% and 10% levels, respectively.

After these two tests, hypothesis testing was conducted. In this context, since the answers given by the survey participants to the questions would provide information on both the level of empowerment in the work environment and job satisfaction, each question was treated as a separate hypothesis. The responses to the questions were tested using z-tests. Statistically significant z-tests would indicate the rejection of the null hypothesis (H0) and the acceptance of the alternative hypothesis (H1). The test results are presented in Table 4.

When the results in Table 4 are examined, it is found that the first three of the five questions regarding the evaluation of the work environment are valid (H1). Accordingly, employees believe that they have the authority to make decisions in order to effectively carry out their daily tasks and responsibilities, and they are encouraged by their superiors to find and implement new and better ways to improve the organization. These findings indicate that participants feel empowered in the companies they work for, that they are given initiative, and that they are encouraged. Therefore, at least the existence of an empowerment climate in the insurance companies where participants work can be stated.

From the questions focusing on employees' views on their work and career opportunities, it has been found that questions numbered 6, 12, 14, and 15 are valid (H1). The other six questions or hypotheses did not yield valid results. These findings suggest that employees feel that their jobs provide them with stable employment opportunities, their performance is appreciated by their superiors, they are valued by their superiors, and if they get a better career opportunity, they would be willing to change jobs. In other words, participants feel valued and appreciated in the work environment and do not fear job termination. It can be said that they experience a certain level of job satisfaction. Additionally, the existence of an empowerment climate is confirmed by the above evaluation. However, just as in other areas of the financial sector, employees in the insurance sector would not hesitate to change jobs if a better career opportunity arises.

In the final stage of the analysis, the regression models defined in equations (3) and (4) were estimated. The parameter estimates using the Ordinary Least Squares (OLS) estimator and the results of other test statistics are presented in Table 5. In the analysis process, following Voisard's (2008) approach, the predictions that included all variables of the models were considered, and variables that resulted in insignificant parameter values were removed, and the predictions were repeated. Since the statistical significance and explanatory power of the predictions were at reasonable levels, no issues were encountered in evaluating the results.

The obtained results show that employees' job satisfaction is influenced by their tenure, commuting time, and empowerment level. While tenure and commuting time negatively affect job satisfaction, the empowerment level has a positive effect. As working hours and commuting time increase, employees' satisfaction decreases and their job satisfaction declines. However, empowered employees' job satisfaction increases. This suggests that both individual and organizational performance can be improved as a result.

When the results are examined, it is also observed that the empowerment level is positively affected only by job satisfaction and is not influenced by any other variables. Accordingly, it can be said that there is a strong and positive bilateral interaction between job satisfaction and empowerment in insurance companies. However, it would be appropriate to further investigate and confirm this issue through advanced tests, such as causality tests.

Table 4
Hypothesis Tests: z Statistics

Factor Tested in the Question	H0	H1	Mean	Std. Deviation	z Stat.		Valid Hypothesis
Questions for Assessing the Work Environment							
1 I have the authority to make the necessary decisions to effectively carry out my daily duties and responsibilities.	yoktur	vardır	4.0408	1.0872	4.3099 ***		H1
2 My decision-making authority when solving non-routine situations or problems	yoktur	vardır	3.7755	1.0354	2.7319 ***		H1
3 Encourage me to find and implement new and better ways to improve the organization.	yoktur	vardır	3.8571	1.0102	3.3658 ***		H1
4 I have the opportunity to influence how my department's goals are set.	yoktur	vardır	3.4490	1.1439	0.4745		H0
5 I am invited to join teams/committees that influence decisions for my department or the company as a whole.	hayır	evet	3.1429	1.3093	-1.2220		H0
Questions to Determine Employees' Opinions on Work and Career Opportunities							
6 I think my job provides me with stable employment..	hayır	evet	3.7347	0.8754	2.9048 ***		H1
7 I think my work and other parts of my life are balanced..	hayır	evet	3.2449	1.0791	-0.8208		H0
8 I am satisfied with the career opportunities within the company.	hayır	evet	3.0204	1.1865	-2.0709		H0
9 I am satisfied with the frequency and quality of the in-service training I received.	hayır	evet	3.0408	1.1773	-1.9657		H0
10 I am satisfied with the wage and/or bonus I receive for my work.	hayır	evet	2.5306	1.0710	-5.4956		H0
11 I am satisfied with the current bonus or bonus policy offered to me by my company.	hayır	evet	2.2653	1.1914	-6.4990		H0
12 My work performance is appreciated by my company / superiors.	hayır	evet	3.5510	1.0314	1.2189 *		H1
13 I am satisfied with the management style of my supervisor/superiors.	hayır	evet	3.5102	1.1627	0.8355		H0
14 My company/superiors value me.	hayır	evet	3.7347	0.8275	3.0730 ***		H1
15 If I can find a better career opportunity, I may leave my company.	hayır	evet	3.6735	1.0573	1.9997 **		H1
			Populasyon ortalaması:		3.3714		

Symbols (***), (**), (*) indicate that z tests are significant at the 1%, 5% and 10% levels, respectively.

Table 5
Multivariate Regression Estimation Results

Independent Variables	Models According to Dependent Variables				
	Job Satis. (e_i^{jt})		Empowerment (e_i^g)		
	Coefficient	t Stat.	Coefficient	t Stat.	
Age β_1	0.1595	0.8737	0.2265	0.8689	
Term of Service β_2	-0.4656	-2.7776 ***	-0.0267	-0.1022	
Commute Time β_3	-0.3241	-2.4360 **	0.1708	0.8478	
Working Hours β_4	0.0635	0.3280	-0.1325	-0.4800	
Position β_5	0.0655	0.5460	0.2029	1.2013	
Wage β_6	0.1933	1.2139	0.1155	0.5010	
Empowerment γ_1	0.2889	2.8978 ***	--	--	
Job Satisfaction γ_2	--	--	0.5885	2.8978 ***	
Constant α	3.1670	5.9202 ***	0.6247	0.6034	
R square	0.4108		0.3487		
F Statistic	4.0841		3.1354		
p Value	0.0018 ***		0.0096 ***		
D.W.	1.9788		1.9195		

The symbols (***), (**), (*) indicate that the relevant test statistics are significant at the 1%, 5% and 10% levels, respectively.

4. CONCLUSION

Field studies conducted in various sectors have shown that empowerment increases employees' satisfaction in their work environment, thereby improving job satisfaction. This has led to an increase in the implementation of employee empowerment practices in the business world. Generally, firms in the financial sector, and specifically insurance companies, have adopted this trend and started focusing on creating an empowerment climate in the workplace. However, little research has been

conducted on empowerment in insurance companies and its effects on employees' job satisfaction. In this context, our study examined the presence of empowerment and its effects on job satisfaction in the Turkish insurance sector. Data collected from middle and upper-level employees selected through random sampling and administered surveys were analyzed using various statistical techniques.

The variance analyses revealed that job satisfaction levels vary according to employees' tenure, and empowerment levels differ based on their positions in the workplace. However, these findings could not be confirmed through cross-comparisons. Each survey question was treated as a separate hypothesis, and their validity was tested through hypothesis tests. In this scope, questions related to the work environment, job and career opportunities, as well as whether employees are empowered and their levels of job satisfaction, were examined. The results indicate that, at least in the insurance companies studied, there is an empowerment climate. It was found that employees are empowered in their companies, are given initiative in their work, and are encouraged. On the other hand, employees feel valued and appreciated in the work environment and do not fear job termination. In summary, it is observed that employees experience job satisfaction in their companies. However, just as in most areas of the financial sector, employees in the insurance sector would not hesitate to change jobs if a better career opportunity arises.

In the final stage of the analysis, multivariate regression models were used to investigate which variables affect job satisfaction and empowerment. The prediction results show that employees' job satisfaction is influenced by tenure, commuting time, and empowerment levels. As working hours and commuting time increase, employee satisfaction decreases, and job satisfaction declines. However, empowered employees' job satisfaction increases. It can be said that this will improve both individual and organizational performance. On the other hand, it was found that the empowerment level is only positively affected by job satisfaction and is not influenced by any other variables. Therefore, it can be concluded that there is a strong, positive, and bilateral interaction between job satisfaction and empowerment. However, it would be appropriate to further investigate this through more advanced tests.

Based on our findings, it has been observed that employees' job satisfaction significantly increases when they feel empowered. Therefore, systematic empowerment practices such as granting employees decision-making authority, creating channels for suggesting innovations, and institutionalizing systems of recognition and reward should be adopted. On the other hand, employee commitment can be enhanced through practices such as flexible working hours, development of remote work opportunities, and support for commuting (e.g., company shuttles, transportation subsidies, and shift arrangements). The analyses revealed that seniority and position influence both job satisfaction and empowerment levels. Accordingly, specialized development programs focusing on expertise and leadership for senior employees, as well as position-specific rewards and development opportunities, should be designed. Finally, career management and internal promotion opportunities should be strengthened.

In the existing literature, the relationship between empowerment and job satisfaction is generally examined within the contexts of the public sector, manufacturing, education, or general service industries, while this relationship has been rarely explored specifically within the insurance sector. Our study contributes to the literature as one of the few empirical studies providing data within the context of the Turkish insurance sector. It also serves as a methodological example for future studies aiming to conduct comparative empirical analyses.

By focusing on the Turkish insurance sector, our study not only addresses a sectoral gap but also provides originality in the national context. It stands out from similar studies with the finding that the level of empowerment is not influenced by variables other than job satisfaction, but that a mutual relationship exists between empowerment and job satisfaction. Furthermore, the practical nature of the findings allows them to be directly translated into institutional governance, human resource management, and employee engagement policies, thereby offering actionable insights for the business world.

While our study presents findings regarding the presence of empowerment in the Turkish insurance sector and its positive effect on employees' job satisfaction, it serves as an introduction to

experimental studies in this area. It would be appropriate to conduct more extensive field studies and comprehensive investigations using advanced alternative analysis techniques.

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Appendix: Survey Administered to Participants

Dear participant,

This research aims to gather your views on “employee empowerment” and “job satisfaction” initiatives within insurance companies, and to analyze the presence and effects of employee empowerment in the Turkish Insurance Sector. It is a purely scientific study, and its results will be published in scientific journals. The success and value of this survey depend on your responses realistically reflecting your thoughts and the current work environment. The identity of the participants and their responses will remain entirely confidential. The survey will only be used for scientific purposes and will contribute to the creation of a data set for analysis. Completing this survey will take approximately 10 minutes. Thank you for your contributions.

1. Which age group best describes your age?

- A) 18 - 26 years;
- B) 27 - 42 years;
- C) 43 - 62 years;
- D) 63+ years.

2. How long have you been employed at the company?

- A) Less than 1 year;
- B) At least 1 year but less than 5 years;
- C) At least 5 years or more.

3. Which of the following best describes your commuting time?

- A) Less than 15 minutes;
- B) At least 15 minutes but less than 45 minutes;
- C) More than 45 minutes.

4. Which of the following best describes your planned working hours?

- A) I have a fixed working schedule (e.g., from 8:00 AM to 5:00 PM);
 B) I have a flexible working schedule as agreed with my supervisor.

5. Which category best describes your job?

- A) Ordinary employee;
 B) Leader/Supervisor;
 C) Manager/Executive.

6. Which of the following best describes your salary?

- A) My monthly salary is less than 40,000 TL;
 B) My monthly salary is more than 40,000 TL but less than 75,000 TL;
 C) My monthly salary is more than 75,000 TL.

Please indicate your level of agreement with each of the following statements:

	Strongly disagree	Disagree	Partially Agree	Agree	Strongly Agree
1. I have the authority to make the necessary decisions to effectively perform my daily tasks and responsibilities.					
2. I have the authority to make decisions when solving non-routine situations or problems.					
3. I am encouraged to find and implement new and better ways to improve the organization.					
4. I have the opportunity to influence how my department's goals are set.					
5. I have been invited to participate in teams/committees that influence decisions for my department or the entire company.					

Please indicate your level of satisfaction with each of the following statements:

	Strongly disagree	Disagree	Partially Agree	Agree	Strongly Agree
6. I believe my job provides me with stable employment.					
7. I believe my job and other areas of my life are well-balanced.					
8. I am satisfied with the career opportunities within the company.					
9. I am satisfied with the frequency and quality of the training I receive.					
10. I am satisfied with the salary and/or bonus I receive for my work.					
11. I am satisfied with the current bonus or incentive policy offered by my company.					
12. My job performance is recognized by my company/supervisors.					
13. I am satisfied with the management style of my supervisor(s).					
14. My company/supervisors value me.					
15. If I find a better career opportunity, I might leave my company.					

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ORIGINAL ARTICLE

THE DYNAMIC RELATIONSHIP BETWEEN BANKING CDS PREMIUMS, THE VIX INDEX AND SOVEREIGN CDS PREMIUMS

Ayşe Nur ŞAHİNLER

Abstract

This study investigates the dynamic relationship between Türkiye's banking sector CDS premiums, the VIX index, and sovereign CDS premiums using a time-varying Granger causality framework over the period from January 4, 2008, to April 19, 2024. The results reveal that causality from the VIX to banking sector CDS premiums is predominantly negative after 2018, indicating that increases in global volatility were associated with a relative stabilization or decline in credit risk perceptions. Conversely, causality from banking sector CDS premiums to the VIX is limited and positive during specific periods of heightened institutional risk. Regarding sovereign CDS dynamics, sovereign risk generally influenced bank-level CDS premiums in isolated periods, while the credit risk of major banks, particularly İş Bank and Akbank, had a more frequent and positive impact on sovereign risk perceptions. These findings emphasize the asymmetric and evolving nature of risk transmission between global volatility, institutional credit risk, and sovereign risk in Türkiye, underlining the importance of accounting for time-varying dynamics in financial market analyses.

Keywords

Banking Sector CDS, CDS, Time-Varying Causality, VIX.

JEL Classification

C32, F30, G15.

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1. INTRODUCTION

The increasing interconnectedness of global financial markets has amplified both the speed and extent of crisis transmission across borders. Over the past few decades, one of the central concerns in international finance literature has been the spillover effects of financial crises from advanced economies to emerging markets (Hassan et al., 2017). In this context, particular attention has been paid to how crises originating in developed countries impact the financial systems of developing economies. Since the 1990s, major financial episodes including the Asian financial crisis, the sovereign defaults of Argentina and Russia, the collapse of Lehman Brothers and the ensuing global financial crisis, as well as the erosion of investor confidence in European sovereign debt markets and the Greek debt crisis have significantly shaped research on sovereign debt markets (De Boyrie and Pavlova, 2016). A common feature of these crises is their propagation through the banking sector, which lies at the core of the financial system. During the 2008 global financial crisis in particular, the banking sector's excessive exposure to structured financial products—often referred to as “toxic assets”—served as a primary transmission channel. In addition, the crisis was deepened not only by vulnerabilities in the private sector but also by fiscal imbalances in several countries. Nations such as Greece, Portugal, Ireland, Spain, and Cyprus faced severe public finance challenges, with short-term budgetary disruptions pushing them to the brink of default. In response, these governments were either compelled to seek financial assistance from institutions such as the European Central Bank (ECB), the International Monetary Fund (IMF), and the European Union (EU), or to implement comprehensive fiscal restructuring programs targeting both their banking and public sectors (Bratis et al., 2018). During this period, financially distressed governments undertook large-scale capital injections to rescue banks; however, these interventions further deteriorated their own fiscal positions. At the same time, banks suffered losses due to the declining value of sovereign bonds they held and rising funding costs. These mutually reinforcing negative effects exemplify how feedback loops between banks and sovereigns can intensify during times of financial stress. Such dynamics have underscored the need for robust analytical frameworks to better understand the complex interlinkages between governments and financial institutions, and to assess how these interactions contribute to the transmission of systemic shocks (Gross and Kok, 2013). Consequently, large-scale and disruptive financial crises have led scholars and policymakers to explore fundamental questions concerning the causes of sovereign defaults and the ways in which markets respond to such events (De Boyrie and Pavlova, 2016).

The high credit risk associated with emerging markets is one of the main reasons why researchers focus on these countries. In this context, one of the key indicators of credit risk, namely credit default swaps (CDS), and their impacts have become increasingly researched and are emerging as a popular topic in recent years. CDS is a contract between two parties, the protection buyer and the protection seller, where the protection buyer is compensated for the loss incurred due to a credit event in a reference instrument (Cont, 2010). It was developed in 1994 by J.P. Morgan Inc. to shift the credit risk exposure from its own balance sheet to the protection sellers (Augustin et al., 2016).

The pricing of CDS contracts is primarily influenced by a variety of macroeconomic factors that directly affect a country's ability to meet its debt obligations. These factors include economic growth (Podpiera & Ötoker, 2011), external debt and exchange rates (Asonuma, 2014; Popov & Wiczner, 2014), public debt (Aizenman et al., 2013; Peat et al., 2015; Montez & Souza, 2020), and oil prices (Dai & Serletis, 2018; Chuffart & Hooper, 2019).

In this study, the focus is on the global volatility index and sovereign CDS, particularly their impact on banking sector CDS premiums. Theoretically, the interdependence between sovereign and banking sectors results in risk transmission through several key channels. The first of these is the sovereign exposure channel, where banks hold significant amounts of sovereign debt to manage liquidity and credit risk exposure. This creates a direct link between banks and sovereign risk, making the financial health of the government a crucial factor influencing the stability of the banking sector. The

second channel is the safety net channel, which emphasizes the role of government guarantees and central bank support in maintaining bank stability. However, as sovereign risk rises, the government's ability to assist struggling banks diminishes, potentially exacerbating financial instability. The third channel, the macroeconomic channel, demonstrates how increasing sovereign risk can lead to negative economic consequences, such as higher borrowing costs and economic contraction. This, in turn, impacts the quality of bank loan portfolios and threatens the overall stability of the banking system (Dell'Ariccia, 2018).

In parallel with this theoretical framework, the sensitivity of CDS to volatility is strongly tied to shifts in market participants' risk perceptions, a relationship that becomes especially pronounced during periods of heightened volatility. Alexander and Kaeck (2008) empirically demonstrated that increases in the VIX index lead to statistically significant widening of CDS spreads. Brunnermeier and Pedersen (2009) explain these dynamics through the interaction between market liquidity and funding liquidity. As volatility rises, funding requirements increase, restricting leverage and leading to liquidity constraints. The procyclical behavior of financial intermediaries further amplifies this process. Adrian and Shin (2010) demonstrate that when asset prices decline, financial institutions tend to contract their balance sheets, which in turn exacerbates liquidity conditions in the market. The reduction in liquidity results in higher borrowing costs, thereby elevating credit risk and, ultimately, expanding CDS spreads (Tang and Yan, 2007). Ericsson et al. (2009) also provide empirical evidence that increases in leverage ratios are positively and significantly related to wider CDS spreads, reinforcing the notion that liquidity constraints and credit risk are intrinsically linked.

The primary objective of this study is to investigate the relationship between the banking sector CDS premiums in Türkiye and the VIX index, as well as the link between sovereign CDS premiums and bank CDS premiums, by employing both full-sample analyses and time-varying models. Unlike the majority of existing studies, which predominantly focus on Türkiye's sovereign CDS premiums, this research uniquely emphasizes the banking sector's CDS dynamics. Furthermore, to the best of our knowledge, this study is among the first to explore how the direction and strength of these relationships evolve over time by incorporating time-varying coefficient analyses. In doing so, it provides a more comprehensive and dynamic understanding of financial risk transmission mechanisms in the Turkish context.

2. LITERATURE REVIEW

The 2008 financial crisis, followed by the subsequent sovereign debt crises, led to a rapid increase in research on CDS. In this section, the focus is on studies that examine the relationship between the VIX (Volatility Index) and CDS spreads, with particular emphasis on sector-specific research, especially those concerning the CDS spreads of the financial and banking sectors.

Tamakoshi and Hamori (2013) examined the relationship between sovereign CDS spreads and banking sector CDS spreads using causality analysis at both the mean and variance levels. Their analysis, covering the period from the beginning of 2008 to December 2011, found that banking sector CDS spreads exhibit a unidirectional causality towards sovereign CDS spreads both in terms of the mean and variance. However, during the crisis period, variance-based causality analysis revealed that sovereign CDS spreads had a significant causality effect on banking sector CDS spreads. In a subsequent study in 2014, the same authors analyzed the interactions between CDS spreads in the financial sector using similar econometric techniques, for the period from January 2004 to December 2011. Their results showed that CDS spreads in the banking sector had a significant impact on the CDS spreads in the service and insurance sectors, both in terms of mean and variance causality. In a later study conducted by Tamakoshi and Hamori (2016), the relationship between CDS spreads in three sectors—banking, insurance, and other financial sectors—was analyzed for the case of the UK, using the DCC-GARCH and Diebold-Yilmaz methods. The study found that the correlation between the sectors increased during the 2008 financial crisis but decreased afterward, providing evidence of

sectoral contagion effects.

Hammoudeh and Sari (2011) employed the ARDL method to examine the relationship between CDS spreads for three financial sectors (banking, financial services, and insurance), the S&P 500 stock market index, and both the 10-year Treasury bond rate and 6-month Treasury bill rate over the period from January 1, 2004, to October 4, 2009. The authors found that during the crisis period, the relationships between financial markets became more intricate, with a notable increase in short-term contagion across the markets. Specifically, the financial services sector was highlighted as crucial in maintaining stability within the system, suggesting the need for regulatory measures to ensure the sector's resilience. In contrast, the study indicated that existing regulations for the banking and insurance sectors were sufficient, as these sectors did not exhibit significant transmission of risk to long-term interest rates.

Similarly, Chen et al. (2013) and Hammoudeh et al. (2013) both investigated the dynamics of CDS spreads across the banking, financial services, and insurance sectors. However, their approaches differed significantly. Chen et al. (2013) employed Momentum-Threshold Autoregressive (M-TAR) models to capture asymmetric adjustments and cointegration among the sector CDS pairs. Their results revealed that adjustments occur more rapidly when the spreads are below the threshold, with only one CDS spread from each sector pair contributing to the long-run equilibrium. On the other hand, Hammoudeh et al. (2013) used VECM and cointegration techniques to analyze data from January 2004 to March 2009, and their findings indicated that, in the long run, the insurance sector exhibited the largest adjustments. However, in the short run, it was the banking sector that led the other sectors in CDS pricing.

Stanga (2011) employed a VAR model to analyze the relationship between sovereign and banking CDS spreads for Ireland and Spain over the period from January 2007 to March 2011. The study found a strong relationship between the two variables in both countries. According to the author, there was a robust link between sovereign and banking CDS, where an increase in bank risk was associated with a rise in sovereign risk due to the potential need for government bailouts. Consequently, while government bailout packages reduced bank risk, they elevated sovereign CDS spreads, thus increasing the public debt risk.

In a similar vein, Gross and Kok (2013) and Santamaría (2014) analyzed the transmission of financial risk between banks and sovereigns during financial crises. Gross and Kok (2013) demonstrated that during the crises of 2008 and 2011–2012, the CDS market experienced pronounced spillovers, with contagion initially flowing from banks to sovereigns. However, during the 2011–2012 sovereign debt crisis, this relationship reversed, signaling a shift in the flow of risk. Santamaría (2014), on the other hand, found that during the 2008–2009 period, private sector markets played a leading role in incorporating new information into risk pricing, but by 2010, sovereign CDS markets had assumed this leading role, marking a shift from private to public risk transfer. These findings emphasized the evolving dynamics between banks and sovereigns during financial crises, illustrating that while early in a crisis, risk transmission tended to flow from the private sector to the public, the relationship became more systemic and synchronized as the crisis deepened.

Similarly, Bratis et al. (2018) analyzed the contagion and interdependence between sovereign and banking CDS markets for 9 countries from 2008 to 2014. Using DCC-GARCH and VAR models, they found that short-term relationships were more dominant. The study also revealed that political risk and general risk factors were crucial in explaining contagion, and post-2012, Greece's systemic impact diminished. These findings corroborated earlier research, highlighting the increasing interconnectedness between sovereign and banking sectors, especially in times of crisis.

Stolbov (2016) investigated the causal relationships between sovereign CDS prices and the most significant quasi-sovereign CDS prices (Gazprom, VTB, Sberbank) in Russia, along with the global volatility factor embedded in the VIX index dynamics. The study focused on the post-bailout period from May 2009 to July 2013 and applied both time-domain (Hong test) and frequency-domain (Breitung-Candelon test) analyses. The results demonstrated that the dynamics of the VIX index had a

strong impact on all Russian CDS prices, while also receiving significant feedback from these CDS. A robust causal connection was observed between sovereign and quasi-sovereign CDS prices, with the influence of quasi-sovereigns, particularly banks, becoming more pronounced in the long run and at lower frequencies.

Bales (2022) analyzed the CDS spreads of 12 European and 6 American banks in conjunction with sovereign CDS spreads between 2009 and 2021. Using the Maximal Overlap Discrete Wavelet Transformation (MODWT) method, the study decomposed CDS spreads into different time scales, focusing on periods as short as six months. The findings revealed low connections in the short term, with a predominance of financially fragile banks. The introduction of the European Banking Union in 2014 weakened the short- and medium-term connections; however, the strength of the dependency in the long term significantly decreased. During the COVID-19 pandemic, the intensity of the network increased as eurozone banks acquired sovereign debt, although the strength of the dependency remained largely unaffected. This study emphasized the importance of time-frequency analysis in evaluating the risk dependence between banks and sovereigns.

Capasco (2024) examined whether financial contagion was transmitted through macroeconomic fundamentals not only in weak countries but also in strong EMU economies. For the period from 2012 to 2018, the study analyzed the impact of sovereign risk shocks in Italy on five core EMU countries using the Global Vector Autoregressive (GVAR) method. The findings revealed a “doom loop” and “bad neighbors” effect between banks and sovereign debt, with economies possessing higher deficit-to-GDP ratios being more sensitive to contagion. These results highlighted that differences in fiscal fundamentals could amplify contagion within the EMU.

Bocchman (2024) explored sovereign-bank risk spillovers in the Euro area from 2007 to 2023, using quarterly CDS data from 26 banks and sovereigns across 14 countries. Applying the Diebold and Yılmaz (2014) methodology, the study found that spillovers peaked during stress periods, such as the COVID-19 pandemic and the Russian invasion of Ukraine, but remained lower than during the sovereign debt crisis. Vulnerable sovereigns and banks, alongside higher sovereign debt holdings, were found to significantly amplify risk transmission, particularly as sovereign default risk increased.

Moser (2007) examined the relationship between the VIX index and CDS spreads for Latin American countries using panel data analysis for the period 1992-2007. The study found a positive and significant relationship between the two variables. Similarly, Pan and Singleton (2008) focused on Mexico, Türkiye, and Korea for the period from March 2001 to August 2006. Their findings suggested that the VIX index was a significant determinant of CDS spreads for these countries.

In a study by Bella et al. (2010), a panel data approach was employed to analyze 14 countries, and the results indicated that the VIX index had a positive effect on CDS spreads in the short term. This supports the findings of previous studies, including those of Moser (2007). Wang et al. (2013) also focused on Latin American countries, as in Moser's (2007) work, and found results that corroborated the earlier study, further reinforcing the connection between the VIX index and CDS spreads in this region.

In the case of Türkiye, several studies have explored this relationship. Akyol and Baltacı (2018) used the ARDL method for the period from Q2 2005 to Q4 2018 and found a positive and significant relationship between the VIX index and CDS spreads in Türkiye. Similarly, Pazarıcı et al. (2022), using the same econometric method for the period from January 2002 to February 2022, obtained similar results, suggesting that the VIX index plays an influential role in CDS pricing in Türkiye.

On the other hand, Gürel (2021) conducted a structural VAR analysis for the period from January 2011 to September 2020 and found that the VIX index did not play a significant role in determining CDS spreads during this period. This contrasts with the majority of studies, highlighting the potential variability in the relationship across different time periods and countries.

Finally, Şahinler (2024), using DCC-GARCH models, analyzed the period from February 28, 2008, to November 27, 2024, and found strong evidence of a high positive correlation between the VIX index and CDS premiums, particularly during the 2008 financial crisis and the COVID-19 pan-

demic. These findings suggest that during times of significant economic distress, the VIX index becomes an important determinant of CDS premiums.

3. METHODOLOGY

The Granger causality test, originally proposed by Granger (1980), requires that all variables in the model be stationary at levels in order to reliably examine the causal relationships among them. However, differencing non-stationary series that are integrated of order one $I(1)$ to achieve stationarity often leads to a loss of valuable long-run information. To overcome this limitation, Toda and Yamamoto (1995) developed an alternative approach that allows for the testing of parameter restrictions within a standard asymptotic framework, without requiring prior knowledge of the integration or cointegration properties of the variables. In this method, a VAR model is estimated at levels, regardless of the order of integration of the series¹. The procedure involves first selecting the optimal lag length using conventional information criteria (such as AIC or SIC), and then augmenting the VAR model by the maximum order of integration ($dmax$) observed among the variables, leading to the estimation of a $(p + dmax)$ -order VAR. This strategy enables researchers to conduct causality analysis in a statistically robust manner without violating the assumptions of the asymptotic distribution theory, and has proven particularly useful in empirical applications where the variables exhibit mixed integration orders.

On the other hand, Granger (1996) emphasizes that economic structures may be subject to structural breaks over time due to internal dynamics or external shocks, and such breaks can lead to permanent changes in model parameters. In this context, time-varying methods such as rolling regressions are recommended to examine whether the relationships between variables remain stable over time (Dlamini et al., 2016). If structural stability of the model cannot be maintained, it implies that causality relationships between variables may vary across different periods. Consequently, a variable may Granger-cause another during certain sub-periods, while this causal influence may disappear in others (Aslanturk et al., 2011).

In this study, the causality relationship between bank CDS premiums and the VIX index is examined using the rolling window Granger causality analysis method, as proposed by Balçılar et al. (2010), to observe the effect of structural changes. The VAR(p) process used in the analysis is based on the model structure defined by Balçılar et al. (2010), and the methodology is expressed through Equation (1) and Equation (2).

$$CDS_t = \theta_1 + \sum_{i=1}^p \alpha_{1i} CDS_{t-i} + \sum_{i=p+1}^{p+dmax} \alpha_{2i} CDS_{t-i} + \sum_{i=1}^p \beta_{1i} VIX_{t-i} + \sum_{i=p+1}^{p+dmax} \beta_{2i} VIX_{t-i} + \varepsilon_{1t} \quad (1)$$

$$VIX_t = \theta_2 + \sum_{i=1}^p \gamma_{1i} VIX_{t-i} + \sum_{i=p+1}^{p+dmax} \gamma_{2i} VIX_{t-i} + \sum_{i=1}^p \omega_{1i} CDS_{t-i} + \sum_{i=p+1}^{p+dmax} \omega_{2i} CDS_{t-i} + \varepsilon_{2t} \quad (2)$$

In Equation (1) and Equation (2), the parameters θ_1 and θ_2 represent the constant terms; α_i , β_i , γ_i , ω_i are the variable coefficients; p is the optimal lag length; $dmax$ indicates the highest degree of integration between bank CDS premiums and the VIX index; and ε_{1t} and ε_{2t} are the error terms of the model.

Balçılar et al. (2010) used the Likelihood Ratio (LR) test to examine the causality relationships between the series. To account for issues such as sample size, integration degree, and non-normality of error terms, they generated the LR test statistic using the bootstrap method proposed by Hacker and Hatemi-J (2006). After estimating the VAR model, the following null hypotheses were established to test the causality relationships between the variables:

$$H_0 = \beta_{1i}=0 \quad (3)$$

$$H_0 = \omega_{1i}=0 \quad (4)$$

Equation (3) tests the absence of Granger causality from VIX to CDS, while Equation (4) tests the absence of Granger causality from CDS to VIX. Here, the parameter β_{1i} indicates whether past values of VIX explain CDS, and the parameter ω_{1i} shows whether past values of CDS explain VIX. The rejection of both null hypotheses suggests a bidirectional causality relationship between CDS and VIX.

¹ This is particularly advantageous because conventional approaches often necessitate pre-testing for unit roots and cointegration relationships (Memiş Karataş, 2023)

Balcilar et al. (2010) employed the rolling window technique to analyze time-varying causality relationships. To account for issues such as structural breaks and the potential instability of parameters over time, they applied the Granger causality test, enhanced by the bootstrap method, to each subsample $t = l, l + 1, \dots, T - l$. Here, l represents the rolling window size, and the causality relationships are tested separately for each subsample based on time.

The initial window size was determined to be 61 weeks using the formula $T * (0.01 + 1.8/\sqrt{T})$ proposed by Caspi (2017). However, due to near-singular matrix errors, the window size was doubled to 122 weeks to overcome this issue. Within the rolling window approach, LR test statistics were calculated for each 122-week subsample, and the relevant bootstrap critical values were obtained. As each new weekly observation was added, the oldest observation was removed from the subsample, keeping the window fixed. Thus, each estimation was conducted on an updated and time-sensitive subsample. These steps were systematically repeated until the last observation in the dataset was reached. Using the obtained LR test statistics and bootstrap p-values, the dynamic structure of causality relationships over time was monitored, and how this structure changed across different periods was analyzed.

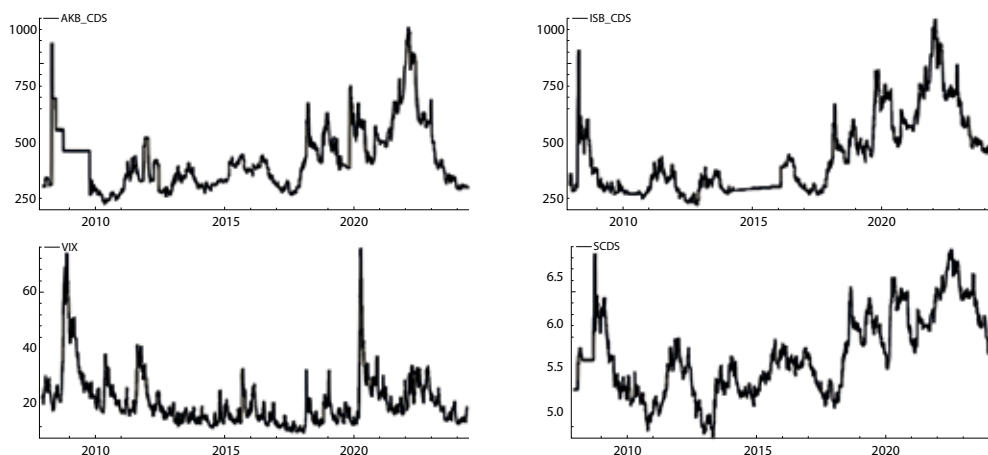
4. DATA AND FINDINGS

This study examines the dynamic relationship between the CDS premiums of the Turkish banking sector and the level of global uncertainty in the markets. The analysis, which covers weekly data from January 4, 2008, to April 19, 2024, utilizes the Volatility Index (VIX) calculated by the Chicago Board Options Exchange (CBOE) as a proxy for perceived global risk levels. VIX is an index based on S&P 500 index options that reflects investors' expectations of future volatility and is widely used in the literature as an indicator of global risk appetite. The CDS data for the Turkish banking sector is limited to the 5-year CDS premiums of Türkiye's İş Bank and Akbank, considering data availability and length. All data were obtained from the Refinitiv Datastream database, and to enhance economic interpretability, the analysis was conducted on the natural logarithms of the series.

Figure 1 illustrates the time-series movements of Akbank's 5-year CDS premiums (AKB_CDS), İş Bank's 5-year CDS premiums (ISB_CDS), sovereign CDS (SCDS), and the VIX index. Both AKB_CDS and ISB_CDS exhibit similar directional movements over time, with significant fluctuations in parallel with the VIX index at certain points. Particularly, during periods of increased global uncertainty such as the 2008 global financial crisis, the 2018 currency shock, and the 2020 COVID-19 pandemic, there was a notable rise in both banks' CDS premiums, aligning with the increases in the VIX index. This suggests that changes in global risk appetite influence the credit risk perception of the Turkish banking sector and that CDS premiums are highly responsive to global market volatility.

Figure 1

Time-Series Plots for VIX and CDS premiums



The Table 1 presents the descriptive statistics for the AKB_CDS, ISB_CDS, and VIX index. When examining the mean values of the series, it is observed that ISB_CDS (432.68) is slightly higher than that of AKB_CDS (416.91). The distribution of the CDS premiums is positively skewed, with maximum values showing a significant increase, particularly during crisis periods (AKB_CDS: 1002.49, ISB_CDS: 1083.12). İş Bankası's CDS spread has a higher standard deviation (184.96), indicating more volatility in its credit risk perception compared to Akbank. The standard deviation of the VIX index (9.06) remains lower, reflecting the overall market volatility. The skewness and kurtosis values indicate that all four series exhibit outliers and show significant deviations from normal distribution. Jarque-Bera test results suggest that all datasets significantly deviate from normal distribution.

Table 1
Descriptive Statistics

	AKB_CDS	ISB_CDS	SCDS	VIX
Mean	416.908	432.67	305.26	20.148
Maximum	1002.49	1083.12	874.399	74.62
Minimum	220.49	210	111.62	9.34
Standard Dev.	139.75	184.95	149.06	9.06
Kurtosis	1.399	1.134	4.347	2.33
Skewness	5.239	3.587	1.283	10.712
Jarque-Bera	457.24***	195.3***	298.17***	2892.7***

Notes: *** indicates 1% significance level

To ascertain the integration levels of the time series, the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Zivot-Andrews unit root tests, which account for potential sharp breaks, were employed. The outcomes of these tests are presented in Table 2. According to the ADF test results, both the AKB_CDS and ISB_CDS series are found to exhibit non-stationarity at the level in both the constant and constant & trend models. The PP test further reveals that, in the constant model, the AKB_CDS series is non-stationary; however, it becomes stationary at the 10% significance level when a constant & trend are included in the model. Given the examination of the series' time plots, which indicate fluctuations around the mean without a pronounced trend, the constant model is deemed more appropriate for analysis. When evaluating the results for the SCDS series, the ADF unit root test indicates stationarity at the 10% significance level in both models. Similarly, the PP test suggests stationarity only in the model with constant and trend, while in the structural break model, stationarity is observed at the 10% level only in the model with a constant. After first differencing, the series becomes stationary at the 1% significance level. In contrast, the VIX index is found to be stationary at the 1% significance level in both the ADF and PP tests. The results from the Zivot-Andrews test, which incorporates structural breaks, corroborate these findings, indicating that the AKB_CDS and ISB_CDS series are non-stationary at the level, while the VIX index remains stationary at the 1% significance level. Furthermore, both the AKB_CDS and ISB_CDS series are become stationary upon first differencing in both models. These findings suggest that the bank CDS premiums and the VIX index exhibit different integration properties, highlighting the necessity to account for these discrepancies in subsequent analyses.

Table 2
Unit Root Test Results

Variables	ADF		PP		Zivot-Andrews	
	Constant	Constant & Trend	Constant	Constant & Trend	Constant	Constant & Trend
AKB_CDS						
AKB_CDS	-2.526	-2.528	-3.836	-3.389*	-4.098 (27.10.2017)	-4.541 (14.05.2021)
Δ AKB_CDS	-11.173***	-11.182***	-32.343***	-32.335***		
ISB_CDS	-2.186	-2.989	-2.219	-3.025	-4.468 (27.10.2017)	-4.259 (27.10.2017)
Δ ISB_CDS	-31.310***	-31.292***	-31.381***	-31.362***		
SCDS	-2.699* (0.074)	-3.302* (0.06)	-2.552 (0.103)	-3.186* (0.087)	-4.506* (27.10.2017)	-4.349 (27.10.2017)
Δ SCDS	-18.597 (0.000)	-18.588 (0.000)	-30.466 (0.000)	-30.449 (0.000)		
VIX	-4.570***	-4.665***	-4.649***	-4.778***	-6.280*** (19.07.2019)	-6.472*** (19.07.2019)

Note: *** and * indicate statistical significance at 1 and 10%, respectively

Given the different integration orders of the series, the lag lengths employed in the VAR models based on the Toda and Yamamoto (1995) methodology were selected by considering the maximum order of integration (d_{max}) among the variables. Accordingly, the optimal lag length ($p + d_{max}$)² was set to 4 for the VIX–AKB_CDS model, 6 for the VIX–ISB_CDS model, and 2 for both SCDS–AKB_CDS and SCDS–ISB_CDS relationships. The causality results based on the full sample period are reported in Table 3. The findings reveal a unidirectional Granger causality running from AKB_CDS to the VIX index at the 5% significance level, suggesting that changes in Akbank’s credit risk premium may carry information that affects global risk sentiment. However, no significant causal relationship is detected in the reverse direction—from VIX to AKB_CDS. Regarding İş Bank, the analysis identifies a causal relationship from VIX to ISB_CDS at the 10% significance level. No causality is found from ISB_CDS to VIX, indicating an asymmetry in the transmission of credit risk between global and domestic markets. Moreover, the results concerning the causal interactions between sovereign CDS (SCDS) and the banking sector CDSs (AKB_CDS and ISB_CDS) are particularly noteworthy. The evidence strongly supports unidirectional causality from both AKB_CDS and ISB_CDS to SCDS at the 1% significance level, implying that bank-level credit risk premia significantly influence sovereign credit risk perceptions. These findings suggest that, particularly in emerging market contexts like Türkiye, the banking sector may serve as a leading indicator for sovereign risk. This supports the notion that financial sector vulnerabilities can precede broader macro-financial instability, thereby underscoring the systemic importance of bank CDS premiums in monitoring overall market sentiment.

² D_{max} is determined using unit root tests, and optimal p value is selected based on AIC

Table 3*Toda-Yamamoto Causality Test Results*

	MWALD	P-Value
VIX \nrightarrow AKB_CDS	0.510	0.966
AKCDS \nrightarrow VIX	12.172**	0.023
VIX \nrightarrow ISB_CDS	10.665*	0.093
ISB_CDS \nrightarrow VIX	10.119	0.130
SCDS \nrightarrow AKB_CDS	0.982	0.611
AKCDS \nrightarrow SCDS	17.247***	0.002
SCDS \nrightarrow ISB_CDS	0.562	0.759
ISB_CDS \nrightarrow CCDS	17.759***	0.001

Note: ***, **, and * indicate statistical significance at 1 %, 5%, and 10%, respectively

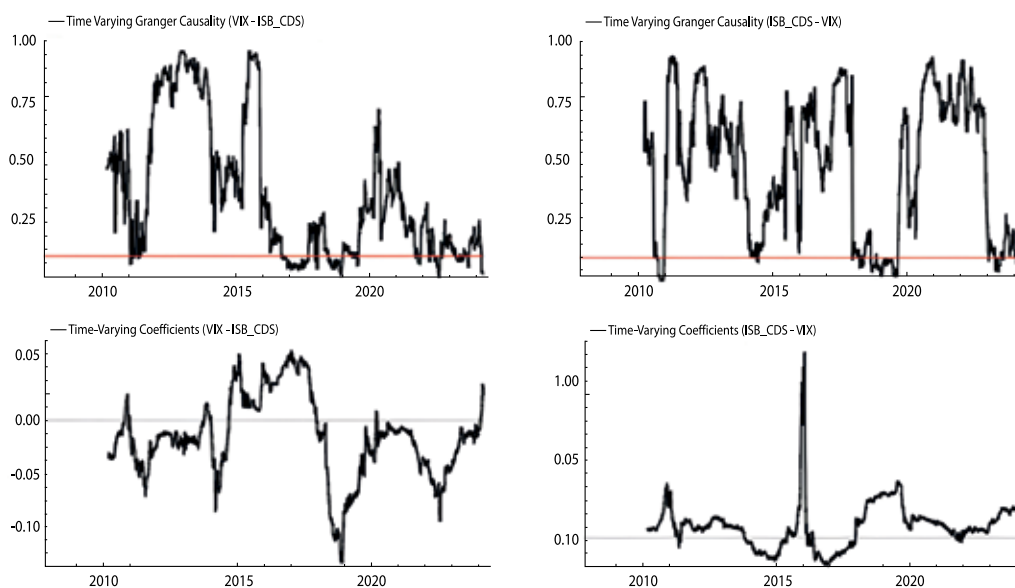
Table 4 reports the parameter stability test results and the associated p-values derived from a VAR model, where the dependent variables are bank CDS premiums and VIX, respectively. Following Balcilar et al. (2010), the p-values were obtained through Monte Carlo simulations based on 2,000 bootstrap samples generated from a constant-parameter VAR model. The Sup-LR, Mean-LR, and Exp-LR tests require a trimming and thus, the test statistics were calculated over the [0.10, 0.90] interval. Based on the results presented in Table 4, the Sup-LR, Mean-LR, and Exp-LR statistics reject the null hypothesis of parameter stability for the VIX index at the 1% significance level across both models, indicating parameter instability. For the AKB_CDS series, while the Sup-LR and Exp-LR statistics reject the null hypothesis at the 5% level, the Mean-LR test does so only at the 10% level. Regarding the ISB_CDS series, the Sup-LR test fails to reject the null hypothesis at 10%, 5%, and 1% significance level, implying stability, whereas the Exp-LR and Mean-LR tests reject the null at the 5% level, indicating possible instability over time. In Models 3 and 4, sovereign CDS (SCDS) premiums are found to be unstable at the 5% significance level, while the AKB_CDS and ISB_CDS series demonstrate parameter stability. Overall, the majority of test results indicate that both bank CDS premiums and the VIX index exhibit parameter instability, suggesting that the relationships between these variables evolve over time. Consequently, employing models that allow for time-varying parameters can provide a more appropriate empirical framework. Consistent with these findings, time-varying Granger causality tests have been additionally conducted.

Table 4
Parameter Stability Test Results

		Sup LR	Exp LR	Mean LR
Model 1 (AKB_CDS; VIX)	AKB_cds	4.525* (0.092)	0.865* (0.089)	1.654* (0.064)
	VIX	4.324*** (0.004)	1.179*** (0.003)	2.066*** (0.005)
Model 2 (ISB_CDS; VIX)	ISB_CDS	3.355* (0.084)	0.683 (0.166)	1.294 (0.192)
	VIX	2.731* (0.079)	0.829** (0.038)	1.572** (0.043)
Model 3 (AKB_CDS; SCDS)	AKB_CDS	2.247 (0.391)	0.767 (0.126)	1.507* (0.094)
	SCDS	5.298*** (0.010)	1.077** (0.031)	1.799** (0.047)
Model 4 (ISB_CDS; SCDS)	ISB_CDS	2.025 (0.533)	0.568 (0.332)	1.055 (0.329)
	SCDS	5.091*** (0.009)	0.981** (0.042)	1.634* (0.067)

*Note: ***, **, and * indicate statistical significance at 1 %, 5%, and 10%, respectively*

In this study, sub-period analyses were conducted by determining the window size as 61 observations, following the formula proposed by Caspi (2017). However, due to issues related to near-singular matrices, the window length was doubled to 122 observations to enable the computation of test statistics. Figure 2 illustrates the time-varying causality relationship and corresponding coefficient dynamics between the VIX index and İş Bank's CDS premiums (ISB_CDS). The results indicate significant causality from VIX to ISB_CDS in several periods, including March 2011; from 2016 to 2017; from July 2018 to January 2019; December 2021; from July to August 2022; from late April to September 2023; and in April 2024. An analysis of the time-varying coefficients reveals that prior to 2018, the causality coefficients were predominantly positive, implying that increases in global market volatility (VIX) led to a rise in İş Bank's credit risk perception. However, after 2018, the relationship shifted to negative, suggesting that heightened global volatility corresponded to a reduction or stabilization in İş Bank's risk premiums. This shift may be attributed to structural changes in the Turkish banking sector, stronger regulatory measures, or a decoupling effect wherein local financial dynamics diverged from global market movements. Conversely, when assessing the causality running from ISB_CDS to VIX, significant relationships were detected during December 2010, between May and June 2018, and from October 2018 to October 2019. In these periods, increases in İş Bank's CDS premiums positively affected the VIX, indicating that heightened perceptions of institutional risk within Türkiye contributed to an increase in global market volatility. Overall, the findings suggest that during periods of financial stress or global uncertainty, the relationship between institutional credit risk and market volatility becomes more pronounced and exhibits dynamic, time-varying characteristics.

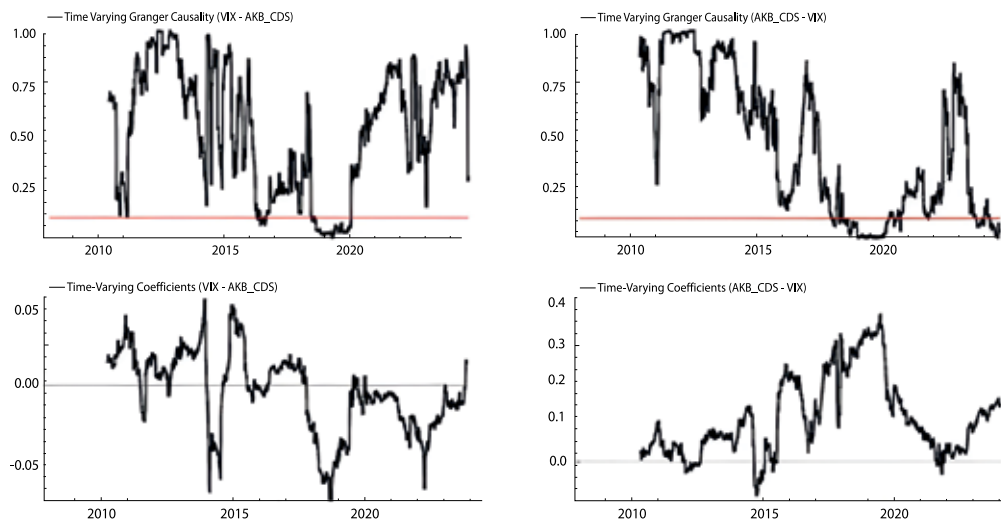
Figure 2*Time Varying Causality Graph (ISB_CDS-VIX)*

Note: The red line represents the 10% significance level

In Figure 3, the time-varying causality relationship between the VIX index and Akbank's CDS premiums is presented. The results indicate a significant causality from the VIX to Akbank's CDS premiums between early 2016 and the summer of that year. Moreover, from March 2018 until 2020, a bidirectional causality was detected, suggesting mutual influence between global market volatility and Akbank's perceived credit risk during this period. Additionally, unidirectional causality running from Akbank's CDS premiums to the VIX index was observed during March–April 2020, from May to September 2023, and at the beginning of 2024. In these periods, the causality coefficients were found to be positive, indicating that increases in Akbank's credit risk contributed to rises in global market volatility. In contrast, during the periods when causality ran from the VIX to Akbank's CDS premiums, the coefficients were negative, implying that rising global volatility was associated with a relative stabilization or decrease in Akbank's credit risk perception.

These results may be explained by the distinct economic and financial conditions characterizing the corresponding periods. The negative causality from VIX to Akbank's CDS premiums after 2018 could be attributed to Akbank's improved resilience against external shocks, strengthened by regulatory reforms and enhanced risk management practices within the Turkish banking sector. Furthermore, the periods of positive causality from Akbank's CDS premiums to the VIX coincide with times of heightened uncertainty in emerging markets, where deteriorations in the financial health of major banks may have contributed to a broader increase in global risk aversion. The bidirectional causality observed between 2018 and 2020 may reflect the intertwined effects of domestic vulnerabilities and global market turbulence during the post-crisis recovery and the COVID-19 pandemic outbreak, where feedback loops between local institutions and international markets became more pronounced.

Figure 3
Time Varying Causality Graph (AKB_CDS-VIX)

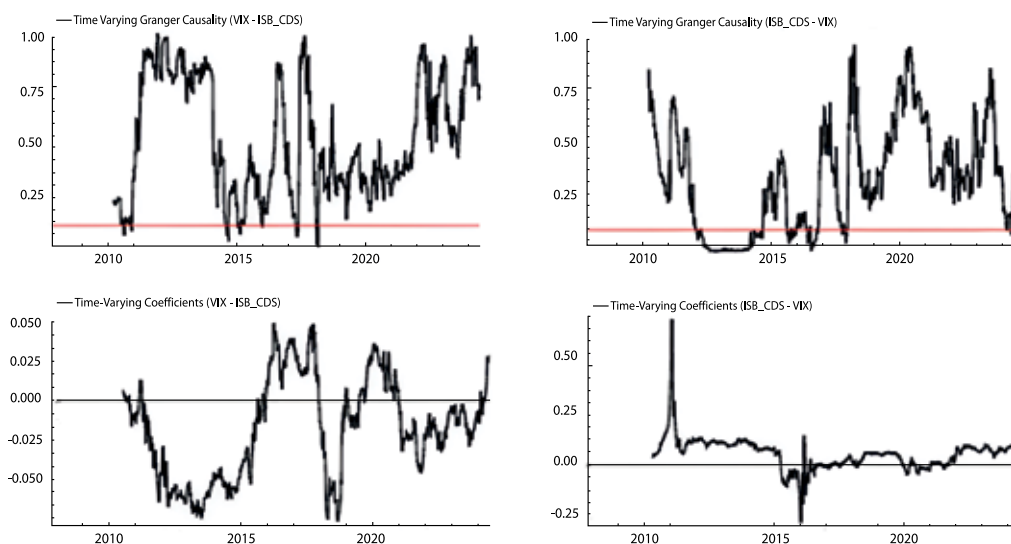


Note: The red line represents the 10% significance level

Figure 4 presents the time-varying causality relationship and the associated dynamic coefficients between sovereign CDS premiums and İş Bank’s CDS premiums. The analysis reveals that, towards the end of 2010, there was a significant causality running from sovereign CDS premiums to İş Bank’s CDS premiums, with a positive coefficient. Subsequently, during the periods of August–September 2014 and February–March 2015, causality persisted but the coefficients turned negative, suggesting that increases in sovereign risk were associated with a relative stabilization or improvement in İş Bank’s credit risk. Later, in May 2017 and February 2018, positive causality reemerged, indicating that İş Bank’s credit risk became once again sensitive to sovereign risk dynamics.

Conversely, examining the causality from İş Bank’s CDS premiums to sovereign CDS premiums, significant causality was detected from March 2012 to September 2014, from August to December 2015, and from January to June 2016. In all these periods, the coefficients were positive, implying that increases in İş Bank’s credit risk contributed to a widening of sovereign CDS premiums. These findings suggest that during periods of heightened systemic risk, major banks’ credit deterioration exerted a significant influence on country-level risk perceptions.

Figure 4
Time Varying Causality Graph (ISB_CDS-SCDS)

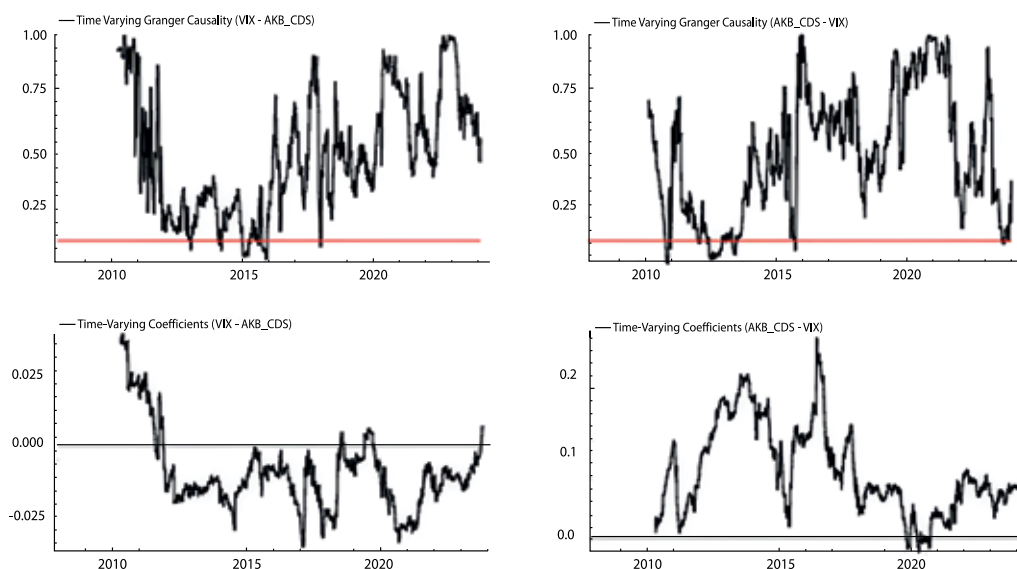


Note: The red line represents the 10% significance level

Figure 5 illustrates the time-varying causality relationship and corresponding dynamic coefficients between SCDS premiums and AKB_CDS premiums. The results indicate that causality from SCDS premiums to AKB_CDS premiums was observed only in very limited periods, specifically during March–April 2014 and in February and November 2015. During these episodes, the causality coefficients were negative, suggesting that increases in sovereign risk were associated with relative improvements or reduced risk perception for Akbank, possibly reflecting stronger fundamentals or firm-specific resilience against sovereign risk fluctuations. Conversely, causality running from AKB_CDS premiums to SCDS premiums was detected over broader and more consistent periods. Specifically, significant causality was observed from December 2010 to February 2011, in April 2012, up until March 2013, and again in September 2013. During all these periods, the coefficients were positive, indicating that increases in Akbank’s credit risk contributed to the widening of SCDS premiums. This suggests that during times of elevated financial stress or banking sector vulnerabilities, Akbank’s creditworthiness had systemic implications for the overall perception of sovereign risk. Overall, these findings highlight an asymmetrical causality structure: while sovereign risk affected Akbank’s CDS in only a few isolated periods and mostly with a negative impact, Akbank’s own credit risk exerted a more frequent and direct influence on sovereign credit risk during the sample period.

Figure 5

Time Varying Causality Graph



Note: The red line represents the 10% significance level

5. CONCLUSION

This study investigates the dynamic linkages between the credit default swap (CDS) premiums of Türkiye’s major banks, sovereign CDS premiums, and global financial volatility (proxied by the VIX index) over the period from January 4, 2008, to April 19, 2024. By employing the time-varying Granger causality approach proposed by Balcilar et al. (2010), we provide empirical evidence that the direction of these relationships have evolved substantially, especially during episodes of financial turbulence such as the 2018 Turkish currency crisis, the COVID-19 pandemic, and periods of geopolitical instability.

One of the main findings is the shifting nature of the relationship between global market volatility and institutional credit risk. Prior to 2018, increases in the VIX index, which signal heightened global risk aversion, consistently translated into higher CDS premiums for İş Bank and Akbank, in line with previous research (e.g., Moser, 2007; Pan & Singleton, 2008) on the sensitivity of emerging

markets to external shocks. However, post-2018, this causality reversed or weakened, suggesting that Türkiye's banking sector has developed greater resilience to global financial fluctuations. This structural shift may be attributed to enhanced regulatory frameworks, improved capital adequacy, and reduced foreign exchange mismatches. In contrast, the relationship between sovereign and bank CDS premiums displays a more complex and asymmetric structure. While sovereign CDS premiums occasionally influenced bank-level risk (notably in 2010–2011 and 2014–2015), the CDS premiums of major banks exerted a more consistent and stronger impact on sovereign premiums, especially during systemic stress periods between 2012 and 2019. Comparing with existing studies, our results align with Gürel (2021) and Bratis et al. (2018), who emphasized time-varying dynamics, but diverge from Şahinler (2024), who found a more stable relationship. This underscores the importance of dynamic models in accurately capturing financial linkages in emerging markets like Türkiye.

These findings have important implications for both policymakers and financial institutions. The decoupling of bank CDS premiums from global volatility after 2018 suggests that macroprudential reforms may have contributed to strengthening domestic resilience. However, the persistence of reverse causality from bank CDS premiums to sovereign premiums highlights the continued need for effective oversight of systemically important financial institutions. Regulatory authorities should adopt a proactive stance, implementing dynamic capital buffers, targeted stress testing, and enhanced surveillance of banks' exposure to sovereign risk, especially in a macroeconomic environment characterized by high inflation, exchange rate volatility, and unconventional policy measures.

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ORIGINAL ARTICLE**MULTI-CRITERIA SUSTAINABILITY PERFORMANCE ANALYSIS OF COMMERCIAL BANKS IN TÜRKİYE BASED ON MPSI AND RAWEC METHODS**

Erdal DEMİR

Abstract

This study introduces a novel decision-making framework for assessing the sustainability performance of banks listed on Borsa Istanbul (BIST) by integrating the Modified Preference Selection Index (MPSI) and the Ranking of Alternatives with Weights of Criterion (RAWEC) methods. To evaluate the applicability and effectiveness of the proposed model, a case study was conducted for the year 2022, focusing on the comparative sustainability performance of selected banks. The MPSI method was employed to objectively determine the weights of selected financial and non-financial performance indicators, while RAWEC, a relatively new Multi-Criteria Decision-Making (MCDM) technique, was employed to rank the banks. The results indicated that return on equity (ROE) was the most influential indicator in evaluating sustainability performance. According to the RAWEC rankings, Akbank demonstrated the highest level of multi-dimensional sustainability performance among the banks analyzed. Furthermore, a series of sensitivity analyses were conducted to examine the robustness of the proposed MCDM algorithm. The outcomes confirmed the stability and reliability of the results under varying conditions, thereby supporting the validity of the integrated framework.

Keywords

Banking industry, Sustainability performance assessment, MCDM, MPSI, RAWEC.

JEL Classification

C54, G17, G22, G32, G41.

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1. INTRODUCTION

Banks, which play a significant role in the sustainable functioning of the financial market, are among the major institutions that support economic growth (Scholtens, 2006). By channeling funds from agents with surpluses to those with resource deficits, banks contribute not only to financing investment but also to maintaining the continuity of economic activity (Goss & Roberts, 2011). The financial institutions' services address the financing needs of individuals and firms, while also fostering systemic confidence and financial stability (Weber et al., 2015:2). Accordingly, the impact of the banking industry extends beyond the economic dimension to include social and environmental considerations (Friede et al., 2015; Işık, 2023). In today's financial landscape, banks are no longer seen solely as profit-maximizing entities, but rather as institutions with responsibilities to society, the environment and their stakeholders (Sullivan & Mackenzie, 2017).

Especially, the growing global concerns about environmental degradation, social inequality, and governance failures have increased the relevance of sustainability in banking (Fernando, 2021). The integration of sustainability principles into credit decisions, investment strategies, and corporate governance practices is essential not only to maintain institutional reputations, but also to mitigate long-term risks (Kotsantonis et al., 2016). In this regard, the evaluation of environmental, social, and governance (ESG) performance has become a necessity in the banking system. ESG indicators provide a framework for assessing the environmental sensitivity, social responsibility, and governance quality of banks (Kotsantonis et al., 2016; Işık & Adalar, 2025). These indicators go beyond traditional financial measurements and allow for a multidimensional assessment of corporate performance (Friede et al., 2015). Particularly in sectors such as banking, where societal impacts are substantial, monitoring and reporting ESG performance is critical for transparency, accountability, and institutional reputation (Sullivan & Mackenzie, 2017).

Systematically monitoring ESG factors contributes significantly to the development of sustainable lending policies and the effective management of social and environmental risks by banks (Weber et al., 2015). In addition, ESG ratings are becoming increasingly influential in the decision-making processes of investors, regulators and rating agencies. Banks that demonstrate strong ESG performance are often able to access capital at a lower cost and benefit from increased investor confidence (Goss & Roberts, 2011). Moreover, the tracking of ESG-related data allows for the evaluation of not only a bank's current performance, but also its long-term sustainability potential (Fernando, 2021).

Consequently, measuring ESG performance in the banking system is no longer just an environmental or ethical obligation, but has become a strategic management vehicle. In the building of sustainable financial systems, ESG performance serves as an important indicator for both mitigating institutional risks and enhancing stakeholder trust (Friede et al., 2015). From this perspective, sustainability-based performance assessment frameworks should be considered as an integral part of modern banking. Accordingly, this study intends to evaluate the sustainability performance of deposit banks listed on BIST by adopting a multidimensional assessment framework. To do this, a novel decision model is proposed that integrates MPSI and RAWEC algorithms. Within this model, MPSI is used to determine the weights of the chosen sustainability indicators objectively, while RAWEC is used to rank the banks based on their performance.

The remaining part of the paper is composed as follows: Section 2 provides a review of the previous literature. Section 3 outlines the methodological frameworks of the study, while Section 4 presents the data set and sample. Section 5 introduces the empirical results, and Section 6 contains the findings of the sensitivity analyses carried out to validate the robustness of the suggested model. Section 7 discusses the theoretical and managerial implications of the present work. Finally, section 8 discusses the conclusions and provides recommendations for future studies.

2. LITERATURE REVIEW

A large number of empirical studies conducted in both domestic and international contexts have investigated the performance of the banking sector using a range of MCDM approaches. Table 1 provides a synthesized overview of selected studies on this topic.

Table 1
Literature Review

Study	Period	Approach	Sample
Lemonakis and Strikos (2012)	2005-2009	PROMETHEE	Commercial banks operating in 15 member countries of the European Union
Chaudhuri and Ghosh (2014)	2007-2013	Equal Weight, TOPSIS and M-TOPSIS	A total of 29 Indian banks with public and private ownership structures
Banu and Santhiyavalli (2018)	1999-2015	TOPSIS	40 Indian banks with various ownership structures
Marjanović and Popović (2020)	2012-2017	CRITIC and TOPSIS	25 commercial banks operating in Serbia
Işık (2020)	2014-2018	SD, MABAC, and WASPAS	Evaluating the performance of state-owned development and investment banks
Guru and Mahalik (2021)	2014	AHP and TOPSIS	26 Indian public sector banks
Gazel et al., (2021)	2007-2017	F-Entropy, F-TOPSIS and Regression analysis	Deposit-taking banks registered within the Turkish banking sector
Jaradat (2022)	2016-2020	TOPSIS and EDAS	Participation banks operating under the Jordanian banking system
Bayram (2022)	2019-2021	SWARA and CODAS	A total of 10 banks from the Turkish banking sector, including 7 traditional and 3 participation banks
Avşarlıgil et al., (2023)	2019-2020	Entropy, MOOSRA ARAS, and MOORA	13 Turkish commercial banks examined through a multi-criteria performance evaluation framework
Akbulut and Aydın (2024)	2022	MSD, MPSI and RAWEC	6 commercial banks listed on the BIST
Antunes et al., (2024)	2010-2018	DEA and SRP	39 commercial banks operating in China
Akbulut (2024)	-	Grey LOPCOW and Grey PIV	6 deposit-taking banks operating in Turkey
Mastilo et al., (2024)	2022	MEREC and MARCOS	21 banks operating within the banking system of Bosnia and Herzegovina
Islatince (2024)	2012-2022	GIA	A total of 21 deposit-taking banks in Turkey with domestic private and foreign ownership structures
Işık et al. (2025a)	-	F-LBWA, F-LMAW, and MARCOS	15 listed commercial banks operating in Pakistan

As summarized in Table 1, a review of the existing literature reveals a significant number of empirical studies that focus on the performance of the banking sector or individual banks operating within it. However, many of these studies concentrate solely on financial indicators or incorporate only a few ESG criteria in the evaluation process. Furthermore, most of these studies employ traditional MCDM methodologies, providing limited insight into the applicability of more recent models. In recent years, there has been growing academic and institutional interest in assessing bank performance using both financial metrics and sustainability-oriented ESG indicators. This study aims to address these research gaps and make several original contributions to the literature.

First, the present case study employs a comprehensive assessment framework integrating financial and ESG performance indicators to assess banks' sustainability performance from a multidimensional perspective. The proposed model moves beyond conventional, profit-centered assessment paradigms by incorporating components such as social responsibility, environmental sensitivity and corporate governance directly into the decision-making structure.

Secondly, the study presents a hybrid MCDM model based on the integration of the MPSI and RAWEC procedures, two emerging decision-making techniques that have only been applied in a limited number of studies to date. The MPSI algorithm provides a statistically robust and objective approach to allocating weights to performance criteria, while the RAWEC method offers a consistent framework for ranking alternatives based on multiple criteria. Accordingly, the study contributes to the literature on decision sciences in terms of both methodological diversity and analytical depth.

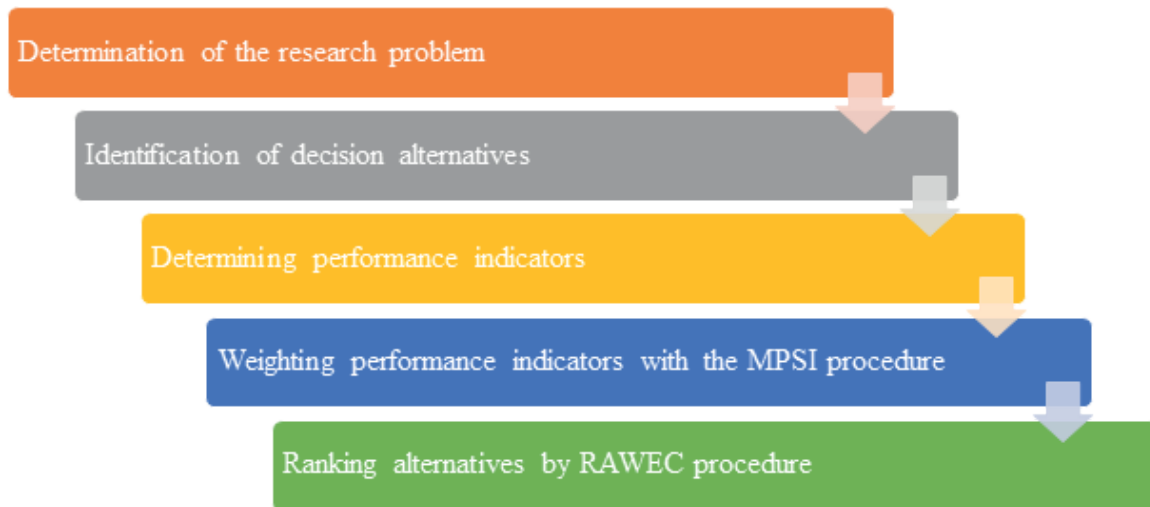
Thirdly, in addition to the proposed conceptual model, the empirical study validates its applicability through a real-world case involving six publicly traded deposit banks on Borsa Istanbul. This application demonstrates the model's capacity to support decision-making using actual financial and ESG data, and also evaluates its stability through sensitivity analyses.

Addressing a clear gap in the literature on sustainability-based performance assessment in banking, the study also advances the field of multi-criteria decision-making. With its integrative perspective and innovative methodological design, the proposed model provides a practical, informative and forward-looking framework for academic researchers and financial sector decision-makers alike.

3. METHODOLOGICAL BACKGROUND

In the existing work, the multi-criteria sustainability performance of commercial banks listed on Istanbul (BIST) is evaluated based on a novel integrated decision-making methodology. The assessment framework combines the Modified Preference Selection Index (MPSI) and Ranking of Alternatives with Weights of Criterion (RAWEC) procedures. In the initial phase, the relative importance of the selected sustainability criteria is determined through the objective weighting mechanism of the MPSI approach. Subsequently, the derived weights are employed within the RAWEC algorithm to perform a comparative analysis of bank performance. The overall structure of the proposed decision framework is depicted in Figure 1, followed by a comprehensive explanation of each procedural step in the methodology.

Figure 1
Proposed Hybrid Model



3.1. MPSI Procedure

The Modified Preference Selection Index (MPSI) procedure is an enhanced version of the original Preference Selection Index (PSI) method, initially developed by Maniya and Bhatt (2010) and later introduced into the broader decision-making literature by Gligorić et al. (2022). As an objective weighting technique, MPSI has gained growing recognition and adoption among researchers across a range of disciplines for determining the relative importance of decision criteria. For instance, Torres et al. (2023) applied the MPSI method in the selection of unmanned aerial vehicles, Akbulut and Aydın (2024) utilized it for evaluating the sustainability success of banks, and Macit (2024) employed it to measure the development levels of countries in Europe and Central Asia. The MPSI procedure follows a structured five-step process, as detailed by Gligorić et al. (2022), to ensure objective, consistent, and transparent weighting of criteria in multi-criteria decision-making applications.

Step 1. The initial decision matrix - consisting of alternatives and evaluation criteria - is constructed according to Equation (1).

$$[x_{ij}]_{m \times n} = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix} \quad (1)$$

Step 2. The decision matrix is normalized using Equations (2) and (3).

$$v_{ij} = \frac{x_{ij}}{\max(x_{ij})}, \text{ for beneficial criteria} \quad (2)$$

$$v_{ij} = \frac{x_{ij}}{\max(x_{ij})}, \text{ for non-beneficial criteria} \quad (3)$$

Step 3. The means of the assessment criteria are obtained using Equation (4).

$$g_j = \frac{1}{m} \sum_{i=1}^m v_{ij} \quad (4)$$

Step 4. The preference variation coefficients for each criterion are calculated by Equation (5).

$$s_j = \sum_{i=1}^m (v_{ij} - g_j)^2 \quad (5)$$

Step 5. At the last stage, the weights corresponding to each evaluation criterion are derived by employing Equation (6).

$$w_j = \frac{s_j}{\sum_{j=1}^n s_j} \quad (6)$$

3.2. Rawec Procedure

The RAWEC approach, recently developed in the decision-making literature by Puška et al., (2024), is used in this study to rank the decision alternatives. As a novel ranking method, RAWEC has been effectively applied in a number of empirical studies. For example, Sandra et al. (2025) used RAWEC to identify the optimal drilling technique in geothermal reservoir heat extraction, Durmuş (2025) applied it to analyze Turkey's renewable energy performance, and Karadağ (2025) utilized the methodology to assess the financial performance of Turkish football clubs. The RAWEC procedure follows a structured four-step implementation process as outlined by Puška et al., (2024) and Akbulut & Aydın (2024).

Step 1. The decision matrix is created according to Equation (1).

Step 2. A two-way normalization process is performed, taking into account the nature of each assessment criterion. In this context, Equation (7) is utilized for the beneficial criteria, while Equation (8) is employed for the non-beneficial criteria.

$$v_{ij} = \frac{x_{ij}}{\max \{x_{ij} | i = 1, 2, \dots, m\}} \text{ and } v'_{ij} = \frac{\min \{x_{ij} | i = 1, 2, \dots, m\}}{x_{ij}} \quad (7)$$

$$v_{ij} = \frac{\min \{x_{ij} | i = 1, 2, \dots, m\}}{x_{ij}} \text{ and } v'_{ij} = \frac{x_{ij}}{\max \{x_{ij} | i = 1, 2, \dots, m\}} \quad (8)$$

Step 3. The deviation scores derived from the final importance weights of the assessment criteria are obtained by means of Equation (9) for beneficial indicators and Equation (10) for non-beneficial indicators, depending on the nature of each criterion.

$$n_{ij} = \sum_{i=1}^m w_j \cdot (1 - v_{ij}) \quad (9)$$

$$n'_{ij} = \sum_{i=1}^m w_j \cdot (1 - v'_{ij}) \quad (10)$$

Step 4. In the last stage of the RAWEC procedure, the overall performance score for each alternative is obtained by Equation (11)

$$\Omega_i = \frac{n'_{ij} - n_{ij}}{n_{ij} + n'_{ij}} \quad (11)$$

Based on the resulting Ω_i scores, the alternative with the highest value is considered to be the best performing option for the given assessment period.

4. DATA SET AND SAMPLE

In this study, the sustainability performance of selected commercial banks listed on Borsa Istanbul (BIST) was assessed using a hybrid MCDM framework. As presented in Table 2, a total of six banks were considered as decision alternatives, each represented by a code (A1–A6) for simplicity in analysis. The evaluation of these banks was conducted based on a set of 14 performance indicators, categorized into financial and non-financial dimensions. These indicators are detailed in Table 3, along

with their corresponding codes and whether they follow a maximization or minimization direction.

The financial criteria (IN1–IN4) include:

- a) Share Closing Price (IN1) representing investor confidence and stock market performance
- b) Market Value / Book Value (IN2) indicating market perception of firm value
- c) Market Risk (Beta) (IN3) measuring volatility relative to the market
- d) Return on Equity (IN4) measuring profitability

The remaining indicators (IN5–IN14) represent various Environmental, Social, and Governance (ESG) dimensions, including:

- a) Environmental: Resource Use (IN5), Emissions (IN6), Innovation (IN7).
- b) Social: Workforce (IN8), Human Rights (IN9), Community (IN10), Product Responsibility (IN11).
- c) Governance: Management (IN12), Shareholders (IN13), Corporate Social Responsibility (IN14).

Table 2

Decision Alternatives

Rank	Banks	Code
1	Akbank	A1
2	Vakıflar Bankası	A2
3	Halk Bankası	A3
4	Türkiye İş Bankası	A4
5	Yapı ve Kredi Bankası	A5
6	Şekerbank	A6

Table 3

Assessment Criteria

Rank	Indicators	Code	Qualification
1	Share Closing Price	IN1	Max.
2	Market Value / Book Value	IN2	Max.
3	Market Risk (Beta)	IN3	Min.
4	Return on Equity	IN4	Max.
5	Resource Use	IN5	Max.
6	Emissions	IN6	Max.
7	Innovation	IN7	Max.
8	Workforce	IN8	Max.
9	Human Rights	IN9	Max.
10	Community	IN10	Max.
11	Product Responsibility	IN11	Max.
12	Management	IN12	Max.
13	Shareholders	IN13	Max.
14	Corporate Social Responsibility	IN14	Max.

5. FINDINGS OF THE RESEARCH

This section reports the empirical findings obtained from the integrated model proposed in the study. First, the importance weights of each performance indicator were calculated using the MPSI, one of the objective weighting techniques, and the results were comparatively evaluated. Subsequently, the ranking outcomes derived from the RAWEC procedure - used to determine the performance rankings of the banks for the year 2022 - are reported and discussed.

5.1. MPSI Procedure Results

The analysis process started with the determination of objective importance weights for the chosen performance indicators. In the first step of the MPSI procedure, the decision matrix was prepared based on Equation (1), as shown in Table 4.

Table 4
Decision Matrix

	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	IN10	IN11	IN12	IN13	IN14
A1	7.11	0.49	1.09	17.46	96.69	98.53	96.72	94.34	95.45	89.56	96.94	74.02	60.78	96.28
A2	3.86	0.28	1.2	10.84	94.16	94.58	55.33	95.18	95.45	99.39	98.96	28.92	77.94	90.43
A3	4.71	0.27	1.11	4.29	83.9	90.75	55.33	90.96	79.32	88.9	99.16	44.61	25.98	56.91
A4	3.11	0.36	1.10	17.54	99.79	99.3	96.72	99.39	95.45	99.11	99.75	43.63	60.78	81.38
A5	3.37	0.45	1.17	18.89	91.49	97.64	91.09	94.71	95.45	93.12	75.00	47.55	76.96	81.38
A6	1.15	0.65	1.29	13.82	67.72	70.85	55.33	74.58	95.45	26.26	61.19	32.84	53.43	81.38

The values associated with the performance assessment criteria were then normalized with the help of Equations (2) and (3), and the resulting normalized results are given in Table 5.

Table 5
Normalized Matrix

	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	IN10	IN11	IN12	IN13	IN14
A1	1.00	0.75	1.00	0.92	0.97	0.99	1.00	0.95	1.00	0.90	0.97	1.00	0.78	1.00
A2	0.54	0.43	0.91	0.57	0.94	0.95	0.57	0.96	1.00	1.00	0.99	0.39	1.00	0.94
A3	0.66	0.42	0.98	0.23	0.84	0.91	0.57	0.92	0.83	0.89	0.99	0.60	0.33	0.59
A4	0.44	0.55	0.99	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.78	0.85
A5	0.47	0.69	0.93	1.00	0.92	0.98	0.94	0.95	1.00	0.94	0.75	0.64	0.99	0.85
A6	0.16	1.00	0.84	0.73	0.68	0.71	0.57	0.75	1.00	0.26	0.61	0.44	0.69	0.85

At this step, the mean values of the performance indicators were first calculated based on Equation (4). Then, based on the calculated means, the coefficients of preference variation were determined for each indicator using Equation (5). The results of the preference variation coefficients are illustrated in Table 6.

Table 6
Preference Variation Matrix

	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	IN10	IN11	IN12	IN13	IN14
A1	0.21	0.01	0.00	0.04	0.01	0.00	0.05	0.00	0.00	0.00	0.01	0.15	0.00	0.02
A2	0.00	0.04	0.00	0.02	0.00	0.00	0.04	0.00	0.00	0.03	0.01	0.05	0.06	0.01
A3	0.01	0.05	0.00	0.25	0.00	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.18	0.06
A4	0.01	0.01	0.00	0.04	0.01	0.01	0.05	0.01	0.00	0.03	0.01	0.00	0.00	0.00
A5	0.01	0.00	0.00	0.07	0.00	0.00	0.03	0.00	0.00	0.01	0.02	0.00	0.05	0.00
A6	0.15	0.13	0.01	0.00	0.05	0.05	0.04	0.03	0.00	0.32	0.07	0.03	0.01	0.00

The objective weight values for each performance indicator were obtained by means of Equation (6). The MPSI weighting findings are display in Table 7.

Table 7
MPSI Results

	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	IN10	IN11	IN12	IN13	IN14
Σ	0.38	0.25	0.02	0.43	0.07	0.06	0.25	0.04	0.02	0.40	0.14	0.23	0.30	0.10
w_j	0.14	0.09	0.01	0.16	0.03	0.02	0.09	0.01	0.01	0.15	0.05	0.09	0.11	0.04
Sıra	3	6	14	1	10	11	5	12	13	2	8	7	4	9

The findings presented in Table 7 show that the most impactful indicators on the multidimensional sustainability performance of banks in 2022 were found to be IN4 (return on equity), IN10 (community), and IN1 (share closing price), respectively. Conversely, the three least impactful indicators were identified as IN3 (market risk - beta), IN9 (human rights), and IN8 (workforce).

5.2. RAWEC Procedure Results

Once the final importance weights had been determined, the RAWEC ranking algorithm was employed to comparatively assess the performance of the alternative banks based on these weights. In this context, the first step of the RAWEC procedure was to construct the initial matrix via Equation (1), as shown in Table 4. Then, the values in the decision matrix were normalized by applying Equation (7) for the beneficial criteria and Equation (8) for the non-beneficial criteria. The results of the normalization process are presented in Tables 8 and 9.

Table 8.

Benefit Normalization (v_{ij})

	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	IN10	IN11	IN12	IN13	IN14
A1	1.00	0.75	1.00	0.92	0.97	0.99	1.00	0.95	1.00	0.90	0.97	1.00	0.78	1.00
A2	0.54	0.43	0.91	0.57	0.94	0.95	0.57	0.96	1.00	1.00	0.99	0.39	1.00	0.94
A3	0.66	0.42	0.98	0.23	0.84	0.91	0.57	0.92	0.83	0.89	0.99	0.60	0.33	0.59
A4	0.44	0.55	0.99	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.78	0.85
A5	0.47	0.69	0.93	1.00	0.92	0.98	0.94	0.95	1.00	0.94	0.75	0.64	0.99	0.85
A6	0.16	1.00	0.84	0.73	0.68	0.71	0.57	0.75	1.00	0.26	0.61	0.44	0.69	0.85

Table 9

Cost Normalization (v'_{ij})

	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	IN10	IN11	IN12	IN13	IN14
A1	0.16	0.55	0.78	0.25	0.70	0.72	0.57	0.79	0.83	0.29	0.63	0.39	0.43	0.59
A2	0.30	0.96	0.70	0.40	0.72	0.75	1.00	0.78	0.83	0.26	0.62	1.00	0.33	0.63
A3	0.24	1.00	0.76	1.00	0.81	0.78	1.00	0.82	1.00	0.30	0.62	0.65	1.00	1.00
A4	0.37	0.75	0.77	0.24	0.68	0.71	0.57	0.75	0.83	0.26	0.61	0.66	0.43	0.70
A5	0.34	0.60	0.72	0.23	0.74	0.73	0.61	0.79	0.83	0.28	0.82	0.61	0.34	0.70
A6	1.00	0.42	0.66	0.31	1.00	1.00	1.00	1.00	0.83	1.00	1.00	0.88	0.49	0.70

In the final phase of the RAWEC methodology, the deviation scores derived from the importance weights of the evaluation criteria were computed using Equations (9) and (10). Subsequently, the overall performance values of each banking alternative were determined via Equation (11). A comparative summary of these results is presented in Table 10.

Table 10.

RAWEC Results

	n_{ij}	n'_{ij}	Ω_i	Rank
A1 (Akbank)	0,0771	0,5968	0,7712	1
A2 (Vakıfbank)	0,2851	0,4361	0,2095	4
A3 (Halkbank)	0,4140	0,2767	-0,1988	5
A4 (İşbank)	0,1991	0,5280	0,4524	3
A5 (Yapı ve Kredi)	0,1726	0,5452	0,5190	2
A6 (Şekerbank)	0,4399	0,2461	-0,2825	6

According to the multidimensional sustainability performance scores reported in Table 10, the best performing banks in 2022 were determined to be A1 (Akbank), A5 (Yapı ve Kredi), and A4 (İşbank), respectively. This result shows that these institutions had stronger and more balanced performance in environmental, social, and governance (ESG) dimensions compared to their competitors. On the other hand, the banks with the lowest performance scores were A6 (Şekerbank), A3 (Halkbank), and A2 (Vakıfbank), respectively. This result suggests that these banks had a relatively low performance in sustainability-oriented practices compared to other banks in the sample.

6. SENSITIVITY ANALYSES

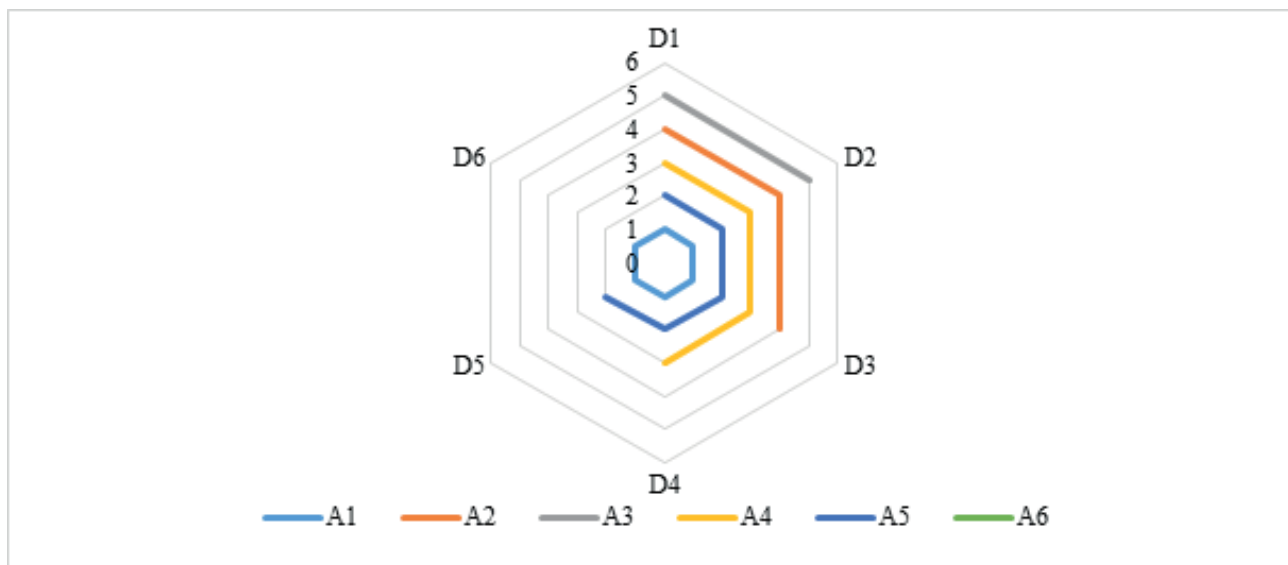
In order to assess the robustness and reliability of the proposed decision methodology for measuring the sustainability (ESG) performance of deposit banks, a number of sensitivity analyses are performed in this section. First, the phenomenon of rank reversal was investigated to identify the extent to which the ranking results are resilient to changes in the model parameters. In the second and final step of the sensitivity analysis, the effect of different weight scores of performance indicators on the ranking of alternatives was investigated.

6.1. Investigating the Impact of Rank Reversal on Ranking

As a first step in the sensitivity analysis, the effects of the rank reversal phenomenon, which is commonly discussed in the decision-making literature as a source of inconsistency, was assessed in relation to the model's ranking results (). To this end, the worst performing alternative was iteratively excluded from the model's analysis until only the best performing alternative remained, following the approach of Işık et al. (2025b). The results obtained under six different scenarios are shown in Figure 2. As Figure 2 shows, the phenomenon of rank reversal does not cause any change in the final rankings, demonstrating the internal consistency and stability of the proposed model.

Figure 2

Effect of Rank Reversal on Final Ranking



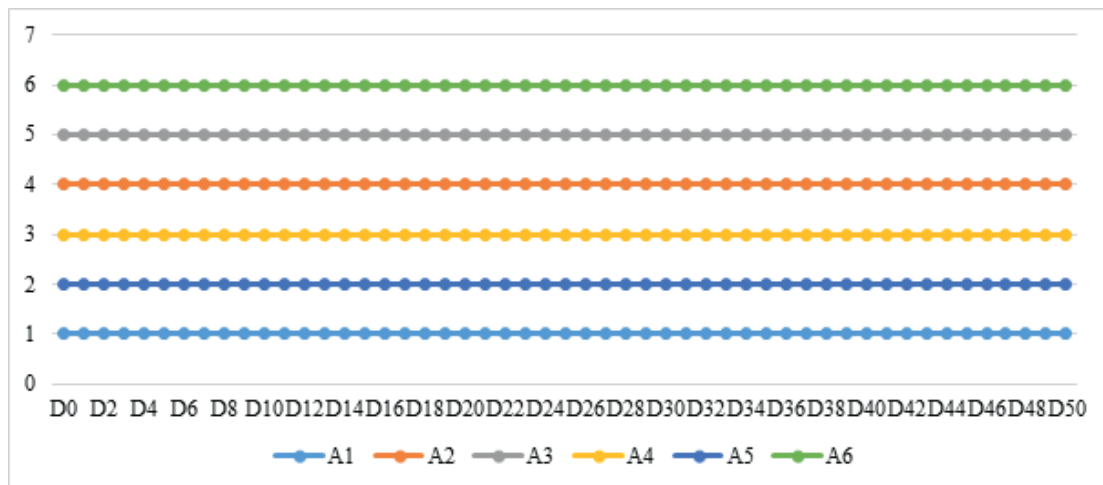
6.2. Assessment of the Impact of Weight Changes on the Ranking of Alternatives

Finally, to assess the sensitivity of the ranking results to marginal changes in the weights of the performance indicators, a scenario-based analysis consisting of 50 different scenarios was performed.

In each scenario, the most significant performance indicator (C4) was lowered by 5%. The 5% difference was then redistributed proportionally across the remaining indicators to generate a new set of weights. These revised weights were integrated into the RAWEC methodology to observe whether there were any changes in the rankings of the alternatives. The ranking results from this sensitivity assessment are shown in Figure 3. As can be seen from the figure, the variations in the weight coefficients did not result in any changes in the ranking of the alternatives, providing further confirmation of the robustness of the proposed model.

Figure 3

Impact of Weight Coefficient Variations on Final Ranking Results



7. THE THEORETICAL AND MANAGERIAL IMPLICATIONS BASED ON RAWEC AND MPSI RESULTS

7.1. Theoretical Implications

This study contributes to the theoretical advancement of sustainability performance evaluation by utilizing MCDM framework based on the MPSI and RAWEC methods to assess banks across both ESG and financial indicators. By identifying return on equity (IN4), community investment (IN10), and share price (IN1) as the most influential factors, the study challenges the conventional separation between financial and non-financial performance and promotes a more holistic, integrated understanding of sustainability in the banking sector. It presents a novel, data-driven perspective that frames sustainability not merely as an ethical or regulatory obligation but as a multidimensional construct that is inherently linked to profitability and market dynamics. Furthermore, the application of hybrid MCDM techniques enhances the methodological robustness and reproducibility of ESG performance assessments, offering valuable tools for future research in sustainable finance.

7.2. Managerial Implications

For bank managers and executives, the results have several actionable implications:

a) Top-performing banks (e.g., Akbank, Yapı ve Kredi) demonstrate that strong financial results combined with proactive social and governance practices lead to superior sustainability scores. Managers at these institutions should continue leveraging this balance as a competitive advantage in ESG-driven financial markets.

b) Lower-ranked banks (e.g., Şekerbank, Halkbank, and Vakıfbank) should interpret their rankings as a call to strengthen their ESG strategies, particularly in areas like workforce, human rights, and market risk management, which were among the least influential or poorly addressed.

c) The findings underscore the importance of embedding ESG principles into core strategic planning. Managers are encouraged to view ESG not as compliance or CSR activity, but as a source of long-term value creation.

d) Lastly, the objective weighting of indicators highlights which areas may yield the greatest returns on sustainability investments, helping managers allocate resources more efficiently.

8. CONCLUSION, DISCUSSION, AND RECOMMENDATIONS

The concept of sustainability goes beyond the traditional paradigm of profit maximization and emphasizes a long-term approach to value creation. In this context, striking a balance between the environmental impact, social and institutional responsibility and financial performance of the banking sector is critical to maintaining sector stability and fostering public trust. Evaluating multidimensional sustainability performance can help encourage banks to invest in environmentally friendly projects, support social development, and promote financial transparency and accountability. In addition, sustainable financial strategies - such as risk management, social impact monitoring and internal ethical practices - are essential components of ensuring long-term institutional success. These performance measures provide reliable insights to investors, regulators, and other stakeholders, and contribute to the achievement of sector-wide sustainability goals. Accordingly, this study introduces a novel integrated decision-making model to assess the multidimensional sustainability performance of the banking sector based on financial and non-financial ESG indicators. To test the applicability and effectiveness of the model, a real-time case analysis of six deposit-taking banks listed on BIST was conducted based on 2022 data. The proposed hybrid framework integrates the MPSI and RAWEC approaches. Within this framework, MPSI method used to calculate the weights of the chosen indicators, while RAWEC was applied to rank the banks based on their overall performance.

In the first stage of the evaluation, the results of the MPSI showed that return on equity, community, and closing stock price were the three most impactful indicators for bank performance in 2022. In contrast, market risk (beta), human rights, and workforce were identified as the lowest impacting indicators. These results, obtained from the MPSI algorithm, show that banks' institutional efficiency and their ability to optimize profitability structures have a crucial role in shaping multidimensional sustainability performance. Likewise, the high weight scores assigned to indicators such as community and stock closing price highlight the strategic importance of the relationship between social responsibility initiatives and market value. Meanwhile, the lowest weight scores were allocated to indicators such as market risk (beta) and workforce, indicating that these areas currently have a relatively limited impact on sustainability performance. This could mean that these dimensions are either not being managed effectively, or that their impact on performance is comparatively lower than that of other criteria. Therefore, greater strategic attention to these areas in the future may help banks achieve a more balanced and holistic sustainability framework.

In a second step, these weightings were integrated into the RAWEC methodology to determine the final performance scores of the banks. The results showed that Akbank emerged as the best performing bank in 2022, followed by Yapı ve Kredi, İşbank, Şekerbank, Halkbank and Vakıfbank, respectively. The ranking scores obtained through the RAWEC methodology provide important insights into the multidimensional sustainability performance of the banks assessed. The result that Akbank performed better than its competitors in 2022 indicates the bank's relative strength in reconciling financial profitability with ESG practices. The high rankings of Yapı ve Kredi and İşbank support the notion that a balanced and comprehensive sustainability strategy, encompassing both financial and nonfinancial dimensions, contributes significantly to institutional performance. In comparison, Şekerbank, Halkbank, and Vakıfbank ranked lowest, indicating potential gaps in the integration of

ESG principles into their strategic operations. These banks could take advantage of a more proactive and focused approach in areas such as environmental risk management, stakeholder engagement, and ESG disclosure practices. Lastly, the findings underscore the significance of institutional adaptability and long-term sustainability vision in maintaining competitive advantage in the evolving regulatory and market landscape of the banking industry.

In order to assess the robustness and consistency of the suggested model, a two-stage sensitivity analysis was implemented. This included an investigation of the rank reversal phenomenon, as well as an analysis of how marginal changes in the weights of the indicators affected the final rankings. The results of these investigations confirmed that the proposed decision framework is highly resilient to structural changes, reinforcing its potential as a reliable and stable tool for decision makers.

However, this research has some limitations. First, the analysis is limited to a small sample of banks listed on the BIST, which could limit the generalizability of the results to other financial institutions. Second, the performance assessment is limited to data from a single year-2022-which limits the ability to capture temporal dynamics or trends. Third, the methodological scope is limited to the integration of only two specific algorithms (MPSI and RAWEC). Future research could extend the current literature by considering different time periods, broader institutional or sectoral samples, alternative performance metrics, and diverse decision-making approaches to deepen the multidimensional understanding of sustainability performance in banking

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ORIGINAL ARTICLE

THE MODERATING EFFECT OF IMMIGRATION ON THE EFFECT OF CULTURAL DYNAMICS ON INFLATION

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Abstract

This paper investigates the impact of cultural factors on inflation and the moderating role of migration through microeconomic theories. The study aims to examine how cultural economic behaviors affect inflation dynamics using data from 66 countries between 2004 and 2023, based on Hofstede's cultural dimensions. The analysis incorporates Hofstede's subcontinental classification, World Bank inflation data, and migration rates. Cardinal utility theory explains consumer preference systems linked to cultural values and purchasing decisions. Theories of risk and uncertainty are explored in terms of the influence of uncertainty avoidance on inflation expectations and economic decision-making. Additionally, the bandwagon effect is considered, examining consumer adaptation to cultural norms and their economic outcomes. New institutional economics evaluates the role of migration in shaping consumer preferences and altering market dynamics. Empirical findings from Structural Equation Modeling (SEM) using AMOS 24 reveal that masculine cultures are associated with higher inflation rates, while migration plays a significant negative moderating role in this relationship. Similarly, the interaction between migration and the uncertainty avoidance culture significantly moderates the impact of uncertainty avoidance on inflation in a negative direction. The results highlight the importance for policymakers to effectively integrate cultural economic factors and migration in their strategies and offer new perspectives on related microeconomic theories.

Keywords

Cultural Dimensions, Migration, Inflation, Microeconomics, New Institutional Economics.
Paper Type: Research.

JEL Classification

M14, F22, B21, D01, G41.

1. INTRODUCTION

Culture not only determines the value system and social structure of a society but also provides a cognitive framework that directly influences individuals' economic decision-making processes. Microeconomic variables such as consumer preferences, risk perception, and time preference are shaped by cultural values; the processes of utility maximization undertaken by individuals are reconstructed through cultural codes (Becker, 1976; Bowles, 1998). From the perspective of cardinal utility theory, the marginal utility individuals derive from consumption is influenced not only by economic factors such as price and income, but also by the normative values imposed by the culture to which they belong.

Inflation, while being a variable that influences consumer behavior and directs the demand for goods and services at the microeconomic level, is also associated with perceptions of cultural uncertainty and levels of risk aversion (Lonner et al., 1980; Harrison & Huntington, 2000). In cultures characterized by high uncertainty avoidance, individuals are more sensitive to price stability and tend to develop alternative strategies in response to inflation (Knight, 1921; Kahneman & Tversky, 1979). At this point, theories of decision-making under risk and uncertainty are of critical importance for understanding how cultural structures shape economic behaviors.

On the other hand, the phenomenon of migration can be viewed not only as a demographic or social transformation but also as an institutional variable that brings about microeconomic-level consequences such as information asymmetries, the transformation of consumer preferences, and dynamic interactions within market structures (North, 1990; Alesina et al., 1999). The value systems of migrants from diverse cultural backgrounds interact with the established norms of host societies, potentially leading to a restructuring of economic behavior. This interaction not only reshapes individuals' attitudes toward inflation and their consumption strategies but also prompts the search for new institutional equilibriums (Acemoglu & Robinson, 2012; Greif, 1994).

In this context, this study aims to evaluate the impact of cultural values on inflation within the framework of the moderating role of migration. Microeconomic behavior models—particularly utility maximization, the bandwagon effect (Leibenstein, 1950), conspicuous consumption (Veblen, 1899), and mechanisms such as cultural learning—allow for the analysis of differences in inflation perceptions between migrant individuals and the settled population. Thus, the regulatory effect of migration on economically driven behaviors shaped by cultural codes generates microeconomic outcomes at the individual level, while also potentially being reflected in macroeconomic indicators.

Accordingly, this study approaches the relationship between cultural factors and economic indicators from the perspective of microeconomic behavior models and aims to systematically reveal the moderating role of migration in this relationship. The findings offer significant contributions not only for understanding the interaction between culture and the economy in the academic literature but also for assessing the potential impacts of migration policies on economic stability.

In line with this objective, the following sections of the study first elaborate on the microeconomic foundations of culture and migration, presenting a theoretical framework particularly grounded in consumer theory, decision-making under risk and uncertainty, the bandwagon effect, and the perspective of new institutional economics. The second section details the datasets, variables, and methodology employed in the study, outlining the analytical strategy that relates Hofstede's (2001) cultural dimensions, World Bank inflation data, and migration rates. The third section presents the results of the empirical analysis, discussing the direct impact of the cultural dimension of masculinity-femininity on inflation, the significant interaction between uncertainty avoidance and migration, and how these dynamics are reflected in decision-making behavior at the micro level. Finally, the conclusion interprets the findings in terms of their implications for both the theoretical microeconomic framework and policy-making, offering a multilayered assessment that considers the impact of cultural factors and

migration on economic indicators.

2. LITERATURE REVIEW

Migration is not merely a spatial movement; it is a multidimensional economic process in which individuals make decisions aimed at maximizing utility (Batista & Wiese, 2010). Within the framework of cardinal utility theory, migration decisions can be considered the result of rational choices made by individuals comparing their current and potential levels of well-being. In this context, migration—whether internal or international—is shaped by micro-level motivations such as economic expectations, the pursuit of social status, uncertainty avoidance, and cultural adaptation (De Haas et al., 2019).

The economic dimension of migration emerges when individuals, seeking to compensate for imbalances in labor supply and demand through market mechanisms, are motivated by expectations such as higher wages, employment security, and improved quality of life (Borjas, 1994). In this regard, individuals' decision-making processes under conditions of risk and uncertainty become decisive; cost-benefit analyses comparing future gains with present costs form the basis of the migration decision. The integration process, when evaluated in terms of consumer behavior and cultural adaptation, is closely associated with individuals' ability to adapt to new market conditions (Alba & Nee, 2003).

The participation of migrants in the labor market may exert supply-side pressure, potentially affecting local wage levels; at the same time, it brings about economic externalities such as the emergence of new consumer profiles, entrepreneurial activities, and the expansion of the tax base (Borjas, 1995). However, this process may also trigger the bandwagon effect due to divergent cultural norms, potentially weakening social cohesion. In microeconomic terms, this reflects a restructuring of individual preferences as people are influenced by the behavior of others.

Migration driven by socio-cultural motivations is shaped not only by economic interests but also by behavioral factors such as access to educational opportunities, the desire to engage with different value systems, and the accumulation of social capital (Schiller et al., 1992). At this point, the integration of migrants into the established market system—both as consumers and producers—holds significant relevance for microeconomic analysis.

As a result, migration flows between 2004 and 2023 have led to lasting transformations not only in labor markets and consumption patterns but also in institutional structures and societal norms. These transformations reveal that migration decisions are shaped not solely by individual utility maximization, but also by cultural codes and institutional arrangements. In this sense, migration emerges as a multilayered phenomenon that intersects microeconomic decision theories and the perspective of new institutional economics.

Neoclassical economic theory provides a framework for explaining migration decisions based on income maximization and cost-benefit analysis (Todaro, 1969; Harris & Todaro, 1970). According to this approach, migration is a rational choice made by individuals to reduce the disparity in the marginal value of labor across different regions. From the perspective of utility theory (Marshall, 1890), individuals migrate not only in pursuit of increased income but also to maximize their expected utility in uncertain environments (Sjaastad, 1962; Borjas, 1989). In this process, factors such as individual risk preferences (Arrow, 1996) and time preferences explain the micro-level heterogeneity of migration decisions.

The decision-making process of migrants also overlaps with the literature on decision-making under risk and uncertainty. Factors such as the level of cultural acceptance in the destination country, the stability of the labor market, and expectations regarding future income influence the decision-making process through both objective risks and perceived uncertainties (Knight, 1921). The cardinal utility approach, in particular, suggests that migrants act by assessing and weighing these risks. Indeed, migration decisions are influenced not only by real wage differentials but also by cultural adaptation costs and the level of social capital (Borjas, 1989).

The migration flows toward Western Europe following the accession of new member states to the

European Union in 2004 can be analyzed within this theoretical framework (Burrell, 2016; Dustmann & Frattini, 2014). However, this process has been shaped not only by income maximization but also by behavioral motivations such as the pursuit of social status, the transformation of consumption patterns, and the bandwagon effect. The bandwagon effect is a micro-behavioral framework that explains how individuals make migration decisions by observing the behavior of others, turning these decisions into sequential flows of information (Banerjee, 1992).

The Push-Pull Migration Theory provides a comprehensive framework that explains individuals' migration decisions based on push and pull factors (Lee, 1966). This approach considers not only economic reasons but also social and political motivations. From a microeconomic perspective, the weight individuals assign to these factors reflects their relative importance within the individual's utility function. The perceived level of risk determines the marginal effects on migration decisions, while prospect theory (Kahneman & Tversky, 1979) suggests that individuals may postpone or expedite migration decisions based on their tendency to avoid losses.

Following the 2008 global financial crisis, rising insecurity and unemployment made push factors more dominant, while welfare systems and labor demand in destination countries acted as pull factors (De Haas et al., 2019). According to consumer theory, migrants during this period aimed not only to secure higher incomes but also to access more stable consumption opportunities.

Institutional and structural approaches evaluate migration not only within the framework of individual, social, and political preferences but also from the perspective of new institutional economics. According to this approach, individuals make decisions based not only on market price signals but also on the rights, services, and normative structures provided by institutions (North, 1990). Government policies, immigration laws, and societal acceptance constitute institutional parameters that determine the opportunity cost of migration (Castles & Miller, 2003).

Structural theory, which emphasizes the inherent inequalities of the capitalist system, suggests that migration is more closely linked to systemic imperatives than to individual choices (Sassen, 1990). Structural inequalities are also associated with factors such as gender, ethnicity, and class. In this framework, migrants often find themselves compelled to work in low-status, low-wage jobs (Portes, 1995). At the micro level, this situation highlights the limitations of consumer choice and utility maximization theories, as individuals' preferences are shaped within structural constraints.

Between 2014 and 2020, economic collapse, political repression, hyperinflation, social unrest, and lack of access to basic needs in certain countries triggered substantial migration flows to neighboring regions. In addition to these dynamics, the escalation of gang violence and the expansion of drug trafficking in Central America intensified regional security challenges, laying the groundwork for further population movements. This process has led to significant demographic changes at the regional level and has generated economic, cultural, and social impacts.

The Theory of Forced Migration explains situations in which individuals are compelled to migrate due to circumstances beyond their control—such as war, political oppression, natural disasters, or human rights violations (Castles, 2003; Zolberg et al., 1989). These types of migration are shaped not by rational choices based on cost-benefit analyses, but rather by the fundamental instinct for survival. However, from a microeconomic perspective, the economic impacts of forced migration extend beyond the displaced individuals themselves, affecting the consumption preferences, labor market equilibrium, and social welfare functions of host societies as well. In this context, decision-making under risk (Knight, 1921; Arrow, 1971) becomes crucial for understanding how migrants act to maximize basic utilities such as safety, health, and shelter.

The wave of forced migration from the Middle East and North Africa to Europe during the Arab Spring (2011–2015) illustrates how individuals, operating in environments of uncertainty and limited information, engage in risk assessments that lead to migration chains via bandwagon effects (Betts & Collier, 2017). In such information cascades, utility functions are shaped not only by income expectations but also by the fear of social disintegration, the desire for safety, and the capacity for adaptation (Banerjee, 1992).

Between 2020 and 2023, the COVID-19 pandemic caused significant disruptions in global migration patterns, leading to imbalances in labor supply and the redefinition of mobility under the concept of digital migration (IOM, 2021). In this context, micro-level utility maximization was not solely tied to physical relocation but also to the ability of online labor to transcend geographic boundaries and engage in competitive markets. In this new paradigm of remote work, the parameters of individual utility curves—particularly uncertainty and time preference—have been reshaped.

The Human Security Approach acknowledges that individuals act within multidimensional sets of utility, which include not only economic, but also social, environmental, and political security levels (UNDP, 1994; Alkire, 2003). This approach provides an appropriate framework for assessing the choices individuals face under risk from a microeconomic perspective. In the case of the Ukraine-Russia War, millions of individuals' decisions to migrate can be explained not by classical rational utility theories, but rather through thresholds of basic utility that involve survival instincts. In this regard, the economics of human security focuses on the struggle of individuals to exceed their minimum utility levels.

Environmental Migration Theory links the causes of migration not only to social and political factors, but also to environmental uncertainties and resource scarcity related to ecosystems (Black et al., 2011; McLeman & Smit, 2006). When viewed at the micro level, the decline in agricultural income expectations triggers shifts in individuals' consumer preferences, which in turn drive migration decisions. Climate change, sudden disasters, and resource scarcity alter individuals' perceptions of marginal utility, prompting them to seek new paths to utility maximization (Hugo, 1996). Particularly, increased time pressure due to environmental threats causes migration decisions to be shaped by both planned and reactive behaviors.

In this context, forced, environmental, and post-pandemic migration forms should be addressed not only in terms of external pressures but also through individuals' cultural contexts, the boundaries of microeconomic rationality, their perceptions of utility, and their risk assessment strategies. Migration decisions should be redefined not only through labor supply or wage disparities, but also through elements such as personal security, belonging, and access to basic needs. Therefore, the regulatory role of these factors on migration tendencies can be better understood through the mutual interaction of economic processes and cultural norms.

Culture is a system of shared values, norms, beliefs, traditions, language, art, rituals, and other symbolic elements within a society (Kluckhohn, 1962). These cultural elements shape how individuals act, think, and interact within social structures (Hofstede, 1990). Culture is a powerful factor that influences both the macro-level structures of society and the micro-level daily lives of individuals. Social culture is one of the fundamental components that forms a society's collective identity and sense of belonging. Through these cultural structures, individuals take on social roles, form social relationships, and integrate into social life. Culture also provides a framework that determines how individuals act within social structures and interact with society.

According to Parsons' (1970) General Systems Theory, social action consists of processes individuals engage in to meet their needs or achieve specific goals. In this theory, actions are organized at three levels: the cultural system, the personality system, and the social system. These actions guide individuals' behaviors and allow for the restructuring of the social system. Shared personality traits and values create harmony and continuity among group members (Parsons, 1970). This theory allows for the interpretation of individuals' social actions within a cultural context.

Culture is also a reflection of the experiences and traditions passed down through generations within a society. In this context, cultural heritage is considered a dynamic part of social culture (Geertz, 1973). The values of societies can be defined as the core beliefs and ideals adopted by their members. Norms, on the other hand, are the unwritten rules that determine how these values are applied in social life. For example, values such as freedom, equality, and justice are often emphasized in Western societies, while in some cultures, the prioritization of community and family may be more significant (Hofstede, 2001). Language is the cornerstone of a society's cultural heritage and intellectual

structure. It plays a critical role in the creation of social meaning, as individuals convey their social experiences and form social connections through language (Searle, 1969). Family structure, class relations, gender roles, and other social hierarchies are also important components of culture. Different societies structure these systems in various ways, leading to the diversification of social culture (Bourdieu, 1986). Social culture is reinforced through traditions and rituals that keep social memory alive. These rituals, by materializing society's values, ensure their transmission to new generations. Religious holidays, wedding ceremonies, and other social events play a significant role in the transmission of culture (Turner, 2017).

Hofstede's (2001) cultural approach aims to understand how national cultures shape individuals' values, beliefs, and behaviors. This approach defines culture as the mental programs that individuals acquire and share through social learning. Hofstede and Bond (1988) identified four key dimensions for understanding cultural differences: Power Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, and Uncertainty Avoidance.

Power Distance is an important cultural dimension that refers to the level of acceptance regarding the unequal distribution of power and authority within a society. In societies with high power distance, hierarchical structures are prominent, and power differences are accepted without question. This is associated with obedience to authority and the view of social inequalities as a natural reality. In contrast, societies with low power distance adopt a more egalitarian approach. Power differences between individuals are reduced, and democratic governance becomes more prominent. In these societies, open communication and cooperation are encouraged (Hofstede & Bond, 1988; House et al., 2004; Den Hartog et al., 1999).

Uncertainty Avoidance is a cultural dimension that explains how tolerant the members of a culture are toward new, unknown, or deviant situations. The level of uncertainty avoidance reflects the mechanisms that societies develop to cope with change and risk, influencing social and organizational structures deeply. Societies with high uncertainty avoidance tend to adopt strict rules, regulations, and safety measures to minimize uncertainty and risk. In these societies, predictability and security emerge as fundamental elements guiding individual behaviors and societal norms. Risk-averse individuals generally exhibit a more emotional approach, increasing their intrinsic motivation toward uncertainty, and adopting a regular and systematic lifestyle (Hofstede & Bond, 1988; Hofstede, 2001). In contrast, cultures that are more tolerant of uncertainty demonstrate a more flexible attitude towards uncertainty and change. In these societies, rules and regulations are typically fewer, and there is a more open approach to differing opinions and behaviors. Coping with uncertainty, adapting to the flow, and openness to innovation are key characteristics, facilitating the dynamic and innovative transformation of the social structure (Hofstede & Bond, 1988, pp. 10-11).

The Individualism-Collectivism dimension is an important cultural dimension that explains the level of commitment individuals have to a group and its impact on social structures. In individualistic societies, personal autonomy and individual interests are prioritized, and social ties tend to be looser and more independent. In these societies, individuals emphasize achieving their own goals and personal success. In contrast, collectivist societies place group and family interests ahead of individual ones. In these societies, social solidarity and intra-group harmony are highly valued. Strong social bonds and group loyalty between individuals form the foundational elements of the social structure (Hofstede, 1980; Hofstede & Bond, 1988; Triandis & Gelfand, 1998).

The Masculinity-Femininity dimension is one of the fundamental elements of cultural analyses that explain the differences in gender roles and values across societies. In feminine cultures, humility, modesty, empathy, and nurturing values are prioritized. In these societies, cooperation, harmony, and interpersonal relationships are important, and gender roles are defined more flexibly and supportively. Social needs and social harmony emerge as the fundamental elements that guide individual behaviors (Hofstede & Bond, 1988). On the other hand, in masculine cultures, assertiveness, competitiveness, and personal success are emphasized. In these societies, ambition and competitive behaviors are valued, and gender roles are typically defined in a more rigid and traditional manner. In interpersonal

interactions, power and success-oriented social norms emerge as dominant elements shaping the social structure (Hofstede & Bond, 1988; Hofstede, 2001).

In addition to these cultural dimensions, Hofstede's (1991) proposed "Long-Term vs. Short-Term Orientation" dimension, the "Indulgence vs. Restraint" dimension defined by Hofstede et al. (2010), and the "Tightness vs. Looseness" dimensions discussed by Triandis (1989) and Gelfand et al. (2006) also play an important role in cultural analysis. The Long-Term vs. Short-Term Orientation dimension examines societies' approaches to future planning and saving, revealing how cultures focus on long-term and short-term goals (Hofstede, 2001; Hofstede & Minkov, 2010). The Indulgence vs. Restraint dimension explains the extent to which societies permit or restrict individual pursuit of happiness, freedom, and pleasure (Hofstede et al., 2010). The Tightness vs. Looseness dimension is considered as a measure of how much a society preserves its social and cultural values and how resistant it is to change (Hui & Triandis, 1989; Triandis, 1996; Gelfand et al., 2006).

Cultural diversity can have significant effects on a society's economic, social, and political structures. The integration of immigrants may, at times, enhance cultural richness, while at other times, it may lead to social tensions. Migration, as a phenomenon interacting with social culture, plays a central role in this context. Immigrants, while adapting to the culture of the society they have moved to, also strive to preserve their own cultural identity (Castles, 2000). This process may lead to social and cultural changes through integration or assimilation.

In this study, in order to ensure the breadth of the research sample and prevent a reduction in the number of countries, the cultural dimensions of power distance, individualism vs. collectivism, masculinity vs. femininity, and uncertainty avoidance, as proposed by Hofstede (2001), will be used.

3. CULTURAL DESCRIPTIVE NORMS, MIGRATION, AND INFLATION: HYPOTHESIS DEVELOPMENT

Culture is one of the key determinants of economic decision-making processes. When examined within the framework of consumer theory and utility maximization, individuals' consumption, saving, and investment behaviors are significantly influenced by the cultural context they are embedded in, societal norms, and institutional structures (Harrison & Huntington, 2000; Hofstede, 1980). Migration not only involves physical mobility but also the transfer of cultural norms and cognitive maps. This leads to the creation of new utility functions by migrants within host societies, which in turn can have an impact on macroeconomic indicators, particularly inflation. Migration can trigger bandwagon effects through cultural interactions (Banerjee, 1992) and reshape consumer expectations in uncertain environments, altering market equilibrium conditions.

The interaction of cultural dimensions with macroeconomic variables such as inflation can be explained through consumer behavior, trust in institutions, price perception, and saving tendencies. The following hypotheses, grounded in microeconomic principles, are presented in this context:

Culture determines the utility function and expectations underlying consumer behaviors. According to consumer theory, individuals attempt to maximize their utility in line with culturally internalized values. This normative framework affects their responses to prices and tolerance levels for inflation (Kuznets, 1955; Arrow, 1971; Becker, 1976; Hofstede, 1980; Murphy, 1997; Harrison & Huntington, 2000). In this context:

Hypothesis 1: "Culture has a significant impact on inflation through norms that guide individuals' consumption, saving, and price perceptions."

Power distance determines individuals' trust in economic institutions and the pressure exerted on demand-side policies. This affects institutional independence, information asymmetry, and budget discipline within the public economy (North, 1990; Acemoglu et al., 2001; Treisman, 2000; Cukierman, 1992; Hofstede, 1980; House et al., 2004; Kuznets, 1955). Thus:

Hypothesis 1a: "High power distance has an inflationary effect through centralized economic decision-making, low institutional scrutiny, and income inequality."

According to decision-making models under risk (Knight, 1921), individuals maximize secure utility rather than expected utility in the face of uncertainty. This behavior may increase the pursuit of price stability, while excessive protectionism can lead to inflationary costs in the long term (Alesina & Summers, 1993; Fischer, 1993; Hofstede, 1980; Rogoff, 1985). In this context:

Hypothesis 1b: “High uncertainty avoidance levels limit inflationary pressures in the short term through risk-averse saving and investment behaviors, while in the long term, anti-crisis interventions may lead to supply-side inflation.”

Communitarian structures shape individuals’ utility functions based on group dynamics. This contributes to price stability both in terms of social preferences and institutional alignment behaviors (Hofstede, 1980; Triandis, 2001; House et al., 2004; Greif, 2006; Barkema & Shvyrkov, 2007). Therefore:

Hypothesis 1c: “In individualistic societies, increased consumption and higher risk appetite raise demand-side inflation, while in collectivist societies, saving-oriented behaviors and trust in government policies have a counteracting effect on inflation.”

The masculinity-femininity dimension is related to time preference theory. In masculine cultures, a low level of patience leads to a high discount rate, which increases inflationary behaviors (Laibson, 1997). In feminine cultures, a tendency to value achieved utility prevails (Hofstede, 1980; Alesina et al., 1999; House et al., 2004). In this context:

Hypothesis 1d: “In masculine societies, competition and success-oriented consumption patterns increase inflation, while in feminine societies, solidarity, welfare priority, and long-term behaviors contribute to price stability.”

Migration not only involves labor mobility but also transforms the cultural foundations of consumer preferences. This transformation reshapes the formation of inflation under the theory of expected utility, consumer behavior based on social norms, and asymmetric information conditions. The cultural codes carried by migrants can directly affect the economic policies and price perceptions of the host society, creating a rupture or adjustment space in the culture-inflation relationship (Hofstede, 1980; Borjas, 1995; Card, 2005). In this context:

Hypothesis 2: “Migration restructures the impact of cultural norms on inflation, taking on a regulatory role in this relationship.”

At the micro level, migrants’ market and policy expectations affect cardinal utility approaches and rational ignorance behaviors. Migration can create a more participatory and egalitarian institutional perception, increasing the flexibility of centralized economic decisions. This, in turn, balances the cultural effects on inflation through institutional regulations such as monetary policy independence (Treisman, 2000; Cukierman, 1992; Dustmann & Glitz, 2011). Thus:

Hypothesis 2a: “Migration can diversify decision-making processes in high power distance societies, influencing the direction of inflationary pressures.”

The behaviors of migrants in the face of uncertainty influence the risk preference curves of the host society, changing saving and investment patterns. This transformation, in the context of portfolio choice theories and stability-demand models, can either amplify or reduce the effects of monetary policies. Migration plays a role in rebuilding institutional trust in the fight against inflation (Hofstede, 1980; Alesina & Summers, 1993; Fischer, 1993). In this context:

Hypothesis 2b: “Migration can reshape risk perception in high uncertainty avoidance societies, regulating the effects on inflation.”

Collectivist structures are related to the public expansion of social utility functions. Migrants can alter the pressure on public prices by influencing both demand and supply side factors that affect the fiscal sustainability of these structures. The level of integration of migrants into the labor force becomes a determining factor for inflation, along with welfare state expenditures (Esping-Andersen, 1990; Triandis, 2001; Borjas, 2003). In this context:

Hypothesis 2c: “Migration can influence the approach of collectivist cultures to social expenditures, guiding inflationary pressures.”

In masculine cultures, migrants' high consumption and rapid income expectations influence marginal utility and consumption function curves. In feminine societies, however, migrants' social integration process ensures price stability through solidarity-based economic behaviors. This transformation is particularly noticeable in sectoral price structures and the housing market (Hofstede, 1980; Alesina et al., 1999; Barkema & Shvyrkov, 2007).

Hypothesis 2d: "Migration reshapes the inflationary effects by transforming the consumption, saving, and competition behaviors of masculine or feminine cultures."

In areas with high concentrations of migrants, the increased demand for housing, especially when supply is inflexible in the short term, puts upward pressure on marginal rental prices, creating price pressure in the housing market (Camarota, 2001; Saiz, 2007). This situation directly affects the general price level, particularly in inflation baskets where housing has a high weight. Additionally, migrants' contributions to production, combined with increased demand for public infrastructure and social services, can create fiscal pressures, resulting in indirect price effects (Camarota, 2001). This effect is particularly evident in sectors where public costs are reflected in private sector pricing.

The effect of migration on labor supply varies depending on the skill distribution in the market and the labor intensity of the sectors. In cases where there is a high concentration of low-skilled migrants, a rightward shift of the labor supply curve may lead to a decrease in real wages and a reduction in cost-push inflationary pressures (Borjas, 2003). However, this situation may also create a new risk of demand-pull inflation, driven by increased consumption demand. Moreover, the impact of rising inflation rates on the cost of living creates a motivation for migration within the native population, making migration both a cause and an effect of inflation (Sjaastad, 1962).

The sectoral distribution of migrants is also significant; their concentration in certain sectors can increase sensitivity to sectoral demand shocks, which can cause asymmetric price responses (Bolin, 2006). From a microeconomic perspective, demand increases in sectors where price elasticity is low due to the presence of migrants may lead to more pronounced inflationary effects. In contrast, integration into sectors that lead to increased productivity can reduce costs, playing a balancing role.

The level of migrant integration is a key factor in determining the direction of these price dynamics. High cultural integration increases the marginal productivity of migrants in the labor market, raising labor efficiency and reducing the social transfer burden on the budget (Dustmann & Glitz, 2011). Therefore, migration becomes a mechanism that balances price stability and growth. Ortega and Peri (2012) highlight that successful integration of migrants into the labor force enhances the scale effect of the production function, contributing to the long-term balancing effect on inflation.

In conclusion, the migration-culture-inflation triangle is shaped through multi-layered micro-mechanisms such as market supply-demand balances, housing and public goods supply, labor productivity, and social integration policies at the micro level. The economic contribution of migrants to price levels is closely related not only to their numerical size but also to their cultural alignment, consumption behaviors, and level of integration into production capacity.

4. METHODOLOGY

This study utilizes secondary data obtained from various sources. The dataset includes 20 years of inflation outcomes, migration flows, and cultural practices for 66 countries from 2004 to 2023. The countries, variables, and values in the dataset are presented in Table 1.

Table 1
Countries, Cultural Dimensions, Net Migration, and Average Inflation Rates (2004–2023)

No	Countries	CODE	PD	UA	I/C	M/F	Net Migration (NM) (2004-2023)	Inflation (Average) and Consumer Prices (Annual %) (INF) (2004-2023)
1	Australia	AUS	58	90	90	42	194030.9	2.7060
2	Austria	AUT	11	70	55	79	40558.6	2.5396
3	Bangladesh	BGD	80	60	20	55	-447614.8	7.1228
4	Belgium	BEL	64	95	75	52	50411.7	2.3961
5	Brazil	BRA	69	76	38	49	17365.25	5.7735
6	Bulgaria	BGR	70	85	30	40	-9475.5	4.3926
7	Canada	CAN	47	54	77	49	252160.25	2.1546
8	Chile	CHL	63	86	23	28	61158.45	3.8675
9	China	CHN	80	30	20	66	-273896.8	2.4384
10	Colombia	COL	67	80	13	64	45422.3	4.8640
11	Costa Rica	CRI	35	86	15	21	4598.3	5.5487
12	Czech Republic	CZE	57	74	58	57	14816.7	3.3523
13	Denmark	DNK	18	23	74	16	18826.85	1.8414
14	Ecuador	ECU	78	67	8	63	12050.05	2.7559
15	Estonia	EST	40	60	60	30	-415.15	4.2283
16	Finland	FIN	33	59	63	26	14213.9	1.8877
17	France	FRA	68	86	71	43	67900.85	1.6676
18	Germany	DEU	35	65	67	66	275702.65	1.9676
19	Greece	GRC	60	112	35	57	-18968.3	1.8866
20	Guatemala	GTM	95	101	6	37	-38211.1	5.2091
21	Hong Kong	HKG	68	29	25	57	13704.1	2.3932
22	Hungary	HUN	46	82	80	88	36741.1	4.8717
23	India	IND	77	40	48	56	-415315.85	6.5717
24	Indonesia	IDN	78	48	14	46	-59794.55	5.4755
25	Ireland	IRL	28	35	70	68	18743.8	1.7340
26	Iran	IRN	58	59	41	43	116799.8	22.9555
27	Israel	ISR	13	81	54	47	12284.95	1.5765
28	Italy	ITA	50	75	76	70	170062.65	1.9762
29	Jamaica	JAM	45	13	39	68	-12509.1	8.4330
30	Japan	JPN	54	92	46	95	141893.45	0.5106
31	South Korea	KOR	60	85	18	39	91791.4	2.3740
32	Luxembourg	LUX	40	70	60	50	8281.65	2.1682
33	Malaysia	MYS	104	36	26	50	125990.25	2.2293
34	Malta	MLT	56	96	59	47	5515.2	2.1901
35	Mexico	MEX	81	82	30	69	-124098.4	4.4413
36	Morocco	MAR	70	68	46	53	-66302.05	1.9456
37	Netherlands	NLD	38	53	80	14	40916.45	2.1661
38	New Zealand	NZL	22	49	79	58	29192.05	2.5732
39	Norway	NOR	31	50	69	8	29774.85	2.4062
40	Pakistan	PAK	55	70	14	50	-1002248.75	10.5647
41	Panama	PAN	95	86	11	44	6576.55	2.4715
42	Peru	PER	64	87	16	42	-62818.8	3.3623
43	Philippines	PHL	94	44	32	64	-117123.7	4.0264
44	Poland	POL	68	93	60	64	110223.35	3.3831
45	Portugal	PRT	63	104	27	31	4465.5	1.8488
46	Romania	ROU	90	90	30	42	-29582.2	5.2761
47	Russia	RUS	93	95	39	36	327562.9	8.1464
48	Singapore	SGP	74	8	20	48	67114.65	2.1001
49	South Africa	ZAF	49	49	65	63	38652.25	5.0340
50	El Salvador	SLV	66	94	19	40	-52688	2.5925
51	Slovakia	SVK	104	51	52	110	16838.6	3.3778
52	Spain	ESP	57	86	51	42	226611.8	2.1759
53	Suriname	SUR	85	92	47	37	-995.05	18.6971
54	Sweden	SWE	31	29	71	5	62843.45	1.9087
55	Switzerland	CHE	43	61	67	67	57223.75	0.5395
56	Thailand	THA	64	64	20	34	54464.6	2.1183
57	Trinidad	TTO	47	55	16	58	-344.65	5.3188
58	Turkey	TUR	66	85	37	45	27438.55	15.4123
59	Uruguay	URY	61	100	36	38	-6389.4	7.8070
60	United States	USA	40	46	91	62	1128513.45	2.5701
61	Venezuela	VEN	81	76	12	73	-220606.15	72.7403
62	Vietnam	VNM	70	30	20	40	-43854.35	6.6956
63	West Africa	CAF	77	54	2	46	-54808.8	4.0331
64	Yugoslavia/Croatia	HRV	73	80	33	40	-8099.25	2.5938
65	Yugoslavia/Serbia	SRB	86	92	25	43	1129	6.9823
66	Yugoslavia/Slovenia	SVN	71	88	27	19	5508.45	2.4589

Note: PD= Power Distance, UA= Uncertainty Avoidance, I/C= Individualism/Collectivism, M/F= Masculinity/Femininity, NM= Net Migration, INF = Inflation, CPI (annual %) = Consumer Price Index (annual percentage).

5. MEASUREMENTS

In this study, data on cultural norms, migration, and inflation for countries were analyzed using average values from the period 2004–2023. It is assumed that annual fluctuations may arise from country-specific conditions, which could reflect as statistical noise in the model. Therefore, long-term average values were used instead of annual data.

Dependent Variable

Inflation Measured by Consumer Prices (Annual %): The inflation rates calculated based on the annual Consumer Price Index (CPI) for each country were obtained from the World Bank database. The average of annual data from 2004–2023 was used for each country. This variable serves as the dependent variable in the model to examine its relationship with cultural norms and migration data.

Independent Variables

Cultural Descriptive Norms: This variable is derived from Hofstede's (2001) cultural dimensions theory. Four cultural dimensions were considered for each country:

- Power Distance (PD): The degree of acceptance of authority and hierarchy in society.
- Uncertainty Avoidance (UA): The tolerance of a society toward uncertain situations.
- Individualism/Collectivism (I/C): Whether individual success or group solidarity is prioritized.
- Masculinity/Femininity (M/F): Whether competition, success, and power, or cooperation, welfare, and care are the focal values. These scores are based on Hofstede's comprehensive research on IBM employees and are standardized at the country level.

Regulatory Variable

Net Migration: This variable, obtained from the World Bank's World Development Indicators dataset, shows the net difference between immigrants coming into a country and those leaving. The average of annual net migration figures from 2004–2023 was taken for each country. This variable is considered a regulatory factor that may influence the relationship between cultural dimensions and inflation (<https://datacatalog.worldbank.org/public-licenses#cc-by>).

6. FINDINGS

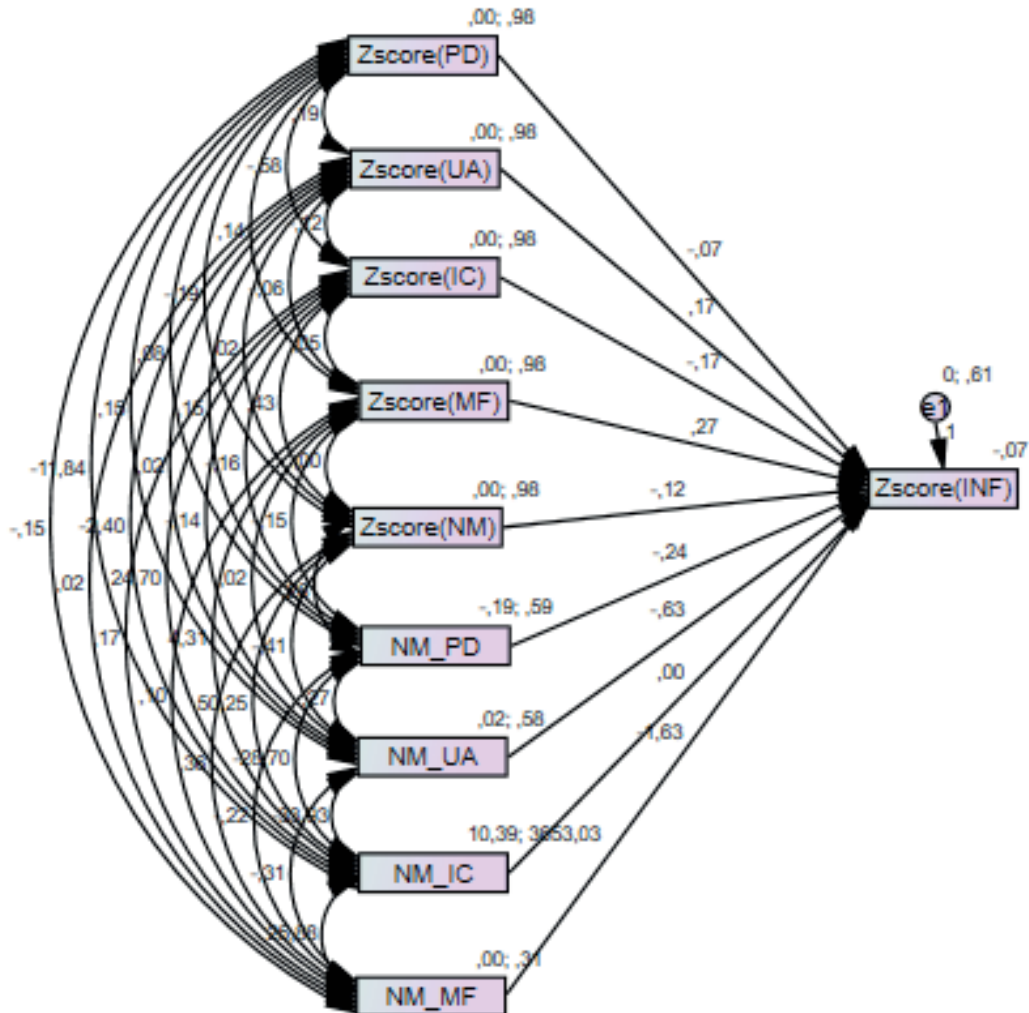
Before testing the theoretical model, the data were standardized using SPSS z-scores to reduce potential multiple accuracy gaps among the variables included in the research model, each with different units: cultural values, inflation, and immigration (Cheung et al., 2009). This procedure is in place to increase the flexibility of the model and ensure comparability of the analyses.

In the second stage, to assess the moderating effect of migration, interactions between the dependent variable (inflation) and the migration variable were calculated. In the third stage, regression analyses were performed to test the effect of cultural practices on inflation and the moderating role of migration in this relationship.

In this context, the observed variables were transformed into a structural equation model (SEM), and a moderating effect model was constructed using the AMOS 24 software. Through the obtained model, the direct relationships between cultural dimensions and inflation, as well as the potential mo-

derating effect of migration in these relationships, were tested in a multi-layered manner. The relevant analysis results and path model are presented in Figure 1.

Figure 1
Structural Equation Model Between Variables



The structural equation model developed in this study (Figure 1) aims to explain the multidimensional relationship between cultural norms, net migration levels, and inflation. The model analyzes the impact of individual economic decision-making processes on macroeconomic outcomes at the micro level, based on Hofstede's (2001) cultural dimensions. Specifically, the influence of cultural values on consumption, savings, and risk behavior provides a fundamental conceptual framework for understanding inflation dynamics.

According to the structural equation model, the strongest relationship in the effect of cultural norms on inflation is observed in the masculinity/femininity (M/F) dimension. Masculine societies, where individuals exhibit more consumption, competition, and success-driven behavior, tend to fuel demand-pull inflation. This corresponds to classical demand shocks that shift the consumption curve to the right and lead to higher price levels. The positive and statistically significant regression coefficient ($\beta = 0.267$, $p < 0.05$) confirms the empirical validity of this structural relationship. Therefore, Hypothesis 1d: "In masculine societies, competition and success-oriented consumption patterns increase inflation, while in feminine societies, solidarity, welfare priorities, and long-term behavior contribute to price stability," is strongly supported.

On the other hand, the direct relationship between the uncertainty avoidance (UA) dimension and inflation was found to be non-significant in the model ($\beta = 0.169$, $p > 0.05$). However, the moderating effect of migration in this dimension is negative and significant ($\beta = -0.629$, $p < 0.01$). This finding suggests that the uncertainty management strategies of immigrants' cultures may infiltrate the monetary policies and economic behaviors of the host society. Immigrants from high uncertainty avoidance cultures tend to exhibit more cautious consumption and saving behaviors, which could reduce total demand and price pressures, thereby stabilizing inflation. This indicates that, at the microeconomic level, immigrant behavior influences price stability through marginal propensity to consume and risk perception. In this context, Hypothesis 2b: "Migration can reshape risk perceptions in high uncertainty avoidance societies and moderate the inflationary impacts" is supported.

Similarly, in the masculinity/femininity (M/F) dimension, the moderating effect of migration is also significant and negative ($\beta = -1.625$, $p < 0.01$). This finding shows that immigrant groups with masculine cultural values tend to soften consumption and competition-driven economic behaviors when interacting with resident societies that have feminine values. At the micro level, such cultural conflicts and adaptation processes may lead to temporary shocks in market demand or price adjustments. However, over time, these interactions create more sustainable consumption behaviors and stable price mechanisms, thereby exerting a balancing effect on inflation. Thus, Hypothesis 2d: "Migration reshapes the consumption, savings, and competition behaviors of masculine or feminine cultures, altering the inflationary effects" is also supported.

However, both the direct effects of the power distance (PD) and individualism/collectivism (I/C) dimensions, as well as their interactions with migration, were found to be non-significant in the model ($p > 0.05$). This suggests that the effects of these cultural norms on inflation may operate through more indirect mechanisms at the micro level. For instance, authoritarian structures or group-oriented values may exert indirect pressures on consumption decisions. However, these effects may not translate into measurable macro price movements.

Overall, the findings suggest that migration plays a moderating role in the relationship between cultural norms and economic outcomes. From a microeconomic perspective, these findings indicate that individuals' value orientations influence their consumption, savings, and investment behaviors, which, in turn, are reflected in price levels. Migration emerges as a variable that influences price stability not only through labor supply but also via the transfer of cultural norms. As a result, Hypothesis 2: "Migration moderates the impact of cultural norms on inflation, restructuring this relationship" is supported within the general model context.

In Table 2, when examining the regression coefficients calculated for the model, the values in the p column indicate that the masculinity/femininity (M/F) cultural dimension has a significant positive effect on inflation (INF) at a $p < 0.05$ significance level. The impact of the masculinity/femininity (M/F) dimension on inflation (INF) is moderated by migration (NM), with a significant negative moderating effect at $p < 0.05$. Similarly, the effect of the uncertainty avoidance (UA) cultural dimension on inflation (INF) is moderated by migration (NM), with a significant negative moderating effect at $p < 0.01$.

Table 2
Model Regression Coefficients

			Estimate	S.E.	C.R.	P	Label
ZINF	<---	ZPD	-.069	.133	-.519	.604	par_1
ZINF	<---	ZUA	.169	.104	1.624	.104	par_2
ZINF	<---	ZIC	-.165	.139	-1.184	.236	par_3
ZINF	<---	ZMF	.267	.109	2.458	.014*	par_4
ZINF	<---	ZNM	-.117	.200	-.584	.559	par_5
ZINF	<---	NM_PD	-.239	.178	-1.347	.178	par_6
ZINF	<---	NM_UA	-.629	.218	-2.884	.004*	par_7
ZINF	<---	NM_IC	.005	.005	.972	.331	par_8
ZINF	<---	NM_MF	-1.625	.313	-5.196	***	par_9

******* $p < 0.01$ is considered statistically significant.

***** $p < 0.05$ is considered statistically significant.

According to the regression results presented in Table 2, the direct effects of the cultural dimensions of power distance (PD), uncertainty avoidance (UA), and individualism/collectivism (IC) on inflation were found to be statistically insignificant ($p > 0.05$). This finding suggests that the responses of individuals to price changes, within the framework of rational expectations in microeconomic theory, may not always directly reflect cultural dimensions. Specifically, micro-level factors such as the diffusion of information in markets, price stickiness, and consumer behavior may limit the influence of cultural norms on macroeconomic variables (Akerlof & Shiller, 2009). Additionally, it should be noted that the impact of cultural differences on dynamic indicators such as inflation may unfold over time and become more apparent in the long run. Therefore, Hypotheses H1a, H1b, and H1c were not supported.

The direct effect of the masculinity/femininity (MF) cultural dimension on inflation was found to be statistically significant and positive ($\beta = 0.267$, $p = 0.014$), indicating that masculine cultures, characterized by a focus on consumption, competition, and short-term success, can exacerbate demand-driven inflation in economic systems. In masculine societies, individuals are more inclined to spend, which leads to a higher marginal propensity to consume, thereby increasing overall demand and exerting upward pressure on general price levels (Hofstede, 2001; Alesina et al., 1999). This finding demonstrates that consumption-based inflationary trends are directly influenced by cultural values and provides empirical support for Hypothesis 1d. As a result, Hypothesis 1 has been generally supported.

The lack of a statistically significant moderating effect of migration on the relationship between power distance and individualism/collectivism dimensions and inflation ($p > 0.05$) suggests that, at the micro level, the behaviors of migrants related to these cultural dimensions may influence the price-setting behaviors of the host societies in an indirect and time-dependent manner. In societies with low integration levels, the impact of migrants on economic decision-making processes may remain limited (Borjas, 1995). This could lead to the moderating effect of migration being weak in specific cultural domains.

The significant negative moderating effect of migration on the relationship between uncertainty avoidance and inflation ($\beta = -0.629$, $p = 0.004$) indicates that the cultural norms of the societies from which migrants originate are altering the host society's approach to managing uncertainty. Societies with high uncertainty avoidance tend to favor stable monetary policies (Alesina & Summers, 1993), and the influence of migrants from lower uncertainty avoidance cultures may reduce this stability.

On a microeconomic level, this may lead to increased risk-seeking behaviors in investment and consumption decisions, thereby weakening price stability (Fischer, 1993). Consequently, Hypothesis 2b has been supported.

The finding of a significant negative moderating effect of migration on the relationship between the masculinity/femininity dimension and inflation ($\beta = -1.625$, $p < 0.001$) can be explained by the fact that migrants typically come from masculine cultures, where high consumption and competition-driven behaviors are prevalent. At the micro level, even if migrants work in low-wage jobs, their ability to increase overall demand and intensify competition can exacerbate both cost- and demand-driven inflationary pressures (Dustmann & Glitz, 2011). Moreover, the behaviors of migrants, which conflict with the more feminine and sustainable economic norms of host societies, can negatively impact price stability. This finding suggests that until the process of cultural assimilation is complete, the economic effects of migration may be destabilizing. Therefore, Hypothesis 2d has also been supported.

The results highlight how culture and migration, when considered together, create multilayered effects on inflation. At the microeconomic level, factors such as consumption tendencies, risk perception, saving behaviors, and labor force participation are shaped in conjunction with cultural norms. Migration, in turn, leads to the restructuring of these norms, influencing both individual behaviors and macroeconomic outcomes in a significant manner.

7. DISCUSSION

In this study, the model developed based on Hofstede's cultural dimensions treats migration as a moderating variable while explaining the culture-inflation relationship. The findings show that the direct and indirect effects of cultural norms on inflation are both significant and multilayered. In particular, the direct positive effect of the masculinity/femininity dimension on inflation and the negative moderation of this effect by migration highlights the intersection of culture and migration in economic behavior models.

Evaluation Based on Hypothesis 1 and Sub-Hypotheses

Hypothesis 1d: "In masculine societies, competition- and success-oriented consumption patterns increase inflation, while in feminine societies, solidarity, welfare priorities, and long-term behavior contribute to price stability."

In societies with high masculinity scores, individuals are known to exhibit more competitive, success-oriented, and material gain-based economic behaviors (Hofstede, 1980; Alesina et al., 1999). These structures increase consumption tendencies and borrowing tolerance, while simultaneously decreasing the tendency to save, thus laying the groundwork for demand-driven inflationary pressures.

This finding, when assessed at the microeconomic level through consumer theory, non-arbitrary preferences, marginal utility maximization, and the consumption-savings dilemma, leads to the conclusion that masculinity-oriented values cause individuals' intertemporal decision-making processes to deviate toward favoring present benefits over future ones. This, in turn, naturally increases overall demand and drives up inflation.

In cultures characterized by high masculinity, the emphasis on competition, material success, and status consumption intensifies individuals' susceptibility to the bandwagon effect, thereby amplifying inflationary pressures through increased aggregate demand driven by mimetic consumption behavior.

H1a, H1b, and H1c: The other cultural dimensions (PD, UA, IC) did not have a significant impact on inflation. This suggests that the economic effects of cultural dimensions do not operate in a unidirectional or mechanical way; rather, structural factors such as political stability, central bank independence, and fiscal discipline in countries may absorb cultural effects. Additionally, the influence of

cultural factors on the functioning of an economic system is largely shaped in conjunction with the institutional environment and market structures.

Interpretation of Hypothesis 2 and Moderating Effects

Hypothesis 2d: “Migration reshapes inflationary effects by transforming the consumption, saving, and competitive behaviors of masculine or feminine cultures.”

This result is quite striking. On one hand, masculine values increase inflation, while on the other hand, migration moderates this effect negatively and significantly. From a microeconomic perspective, this contradiction can be explained by the integration of migrants into the labor market, their impact on wage levels, and their contribution to consumption dynamics.

When migrants are integrated into the labor market as low-wage workers, they have the potential to increase aggregate supply, thereby reducing costs and limiting inflation (Borjas, 1995). However, this situation can result in lower demand pressure due to the interaction of migrant groups with masculine cultural norms that tend to spend more, and feminine economies with more restrained consumption patterns. Thus, while migrants may not directly increase inflation, their behavioral and cultural impacts on the economic structure play a moderating role, softening the inflationary effects of masculine values.

In societies with high masculinity levels, individuals tend to follow collective consumption behaviors in response to inflation, reinforcing price increases through the bandwagon effect; however, the moderate and negative effect of migration mitigates this tendency by fostering more balanced and solidarity-oriented spending patterns associated with feminine values

This finding shows that cultural assimilation processes function not only as a sociological mechanism but also as an economic regulatory tool.

Hypothesis 2b: “Migration reshapes the perception of risk in high uncertainty-avoidant societies, thereby moderating its effects on inflation.”

Societies with high uncertainty avoidance levels tend to prefer stable monetary policies and low volatility (Alesina & Summers, 1993). These societies are sensitive to government intervention, tight monetary policies, and regulations to ensure economic stability. In such societies, demand may be more controlled, as high uncertainty often leads to delayed or constrained spending (Furnham, 1997). Although migration can act as an external shock to these systems, the cultural norms brought by migrants can either expand or limit the economic tolerance of the established systems.

When analyzed at the microeconomic level, migrants’ cultural impact on risk perception, liquidity preferences, and expectations curves alters individual decision-making processes, thereby affecting total demand and investment trends in the market. Therefore, migration can moderate inflation by balancing trends that either align with or contradict the pursuit of price stability.

In high uncertainty avoidance cultures, individuals are more likely to engage in herd-like consumption under inflationary stress, intensifying the bandwagon effect; however, migration exerts a moderate negative influence by introducing diverse risk perceptions and adaptive consumption behaviors that temper this inflation-amplifying dynamic.

Hypotheses 2a and 2c were not supported.

The lack of significant evidence that migration moderates the effects of power distance and collectivism suggests that these cultural dimensions play a more indirect and long-term role in inflationary mechanisms. Additionally, the fact that migrants’ differences in these two cultural dimensions do not directly translate into economic behavior that would influence the labor market can explain this outcome.

6. CONCLUSION

This study, using a microeconomic-based approach, has analyzed the effects of cultural dimensions

on inflation while examining the moderating role of migration in this relationship from a multidimensional perspective. The findings support some of the hypotheses derived from Hofstede's (2001) cultural dimensions theory, particularly highlighting the significant negative moderating effect of migration in the relationships between uncertainty avoidance (UA) and masculinity/femininity (MF) dimensions and inflation. These findings provide a unique framework that explains not only the relationship between culture and inflation but also the impact of migration on macroeconomic indicators through cultural norms.

Societies with high levels of uncertainty avoidance may exhibit more stable consumption and saving tendencies as a result of risk-averse individual behaviors. This, in turn, reduces marginal consumption propensity at the micro level, thereby decreasing the pressure on aggregate demand; thus, an economic structure may emerge where demand-driven inflation is contained (Hofstede, 2001; Dutta, 2011). On the other hand, in societies with low levels of uncertainty avoidance, innovation, entrepreneurship, and consumption desire may be more dominant. These tendencies lead individuals with a high tolerance for uncertainty to adopt more aggressive investment and consumption strategies (Furnham, 1997).

Immigrants coming from cultures with low uncertainty avoidance norms may emerge as a factor that increases inflationary pressures in the host society. However, the analysis findings indicate that this relationship is reversed, meaning that migration negatively moderates the relationship between uncertainty avoidance and inflation ($p < 0.01$). This suggests that the process of immigrants adapting to the rules and norms of societies with high uncertainty avoidance levels results in stable inflation rates at the macro level (Berry, 1997; Harrison & Huntington, 2000). At the same time, the uncertainties immigrants experience during their economic integration process may make their consumption and saving behaviors more cautious. This, in turn, may dampen the expected increase in aggregate demand (Borjas, 1995). Thus, H2b hypothesis is significantly supported.

Masculine cultures, emphasizing values such as success, power, and competition, have the potential to increase consumption tendencies and risk-taking behaviors in the economic realm. In this context, from a microeconomic theory perspective, in societies dominated by masculine norms, individuals' subjective utility functions are shaped in a way that encourages consumption focused on status and success. This shifts the consumption function to the right, creating an upward effect on the general price level (Becker, 1976; Hofstede, 2001). As a result of the analysis, this relationship was found to be statistically significant ($p < 0.05$) and positive. This finding supports H1d hypothesis.

However, it is noteworthy that this direct positive effect is reversed with the presence of migration. The migration variable plays a statistically significant moderating role in this relationship, with a negative direction and a high level of significance ($p < 0.001$). This supports H2d hypothesis and can be interpreted from a microeconomic perspective as follows: The integration of immigrants from masculine cultures into established feminine societies may create imbalances in consumption patterns, particularly in the early stages. This increase in consumption may lead to price pressures in the short term. However, the inclusion of immigrants in low-wage labor can reduce production costs and alleviate supply-side inflationary pressures (Ortega & Peri, 2012). Additionally, in societies dominated by feminine norms, the strength of social policy implementations can facilitate faster integration of immigrants, thereby increasing the capacity to buffer consumption shocks (Schwartz, 1999).

According to the regression analysis findings, neither the power distance (PD) nor the individualism/collectivism (IC) dimensions had a significant effect on inflation or their interaction with migration. This result suggests that individuals' perceptions of hierarchy or individual/collective preferences may have an indirect and weak impact on macro-level price dynamics such as inflation. Indeed, Hofstede's studies also emphasize that these dimensions primarily affect areas such as political trust, organizational structure, and decision-making processes; their relationship with direct economic indicators is context-sensitive (Hofstede, 2001; Treisman, 2000).

Policy Recommendation

The findings of this study highlight the importance of comprehensively addressing the effects of culture and migration on inflation within the framework of microeconomic theory. In particular, the direct and indirect effects of uncertainty avoidance (UA) and masculinity/femininity (MF) dimensions on inflation align with the microeconomic foundations that shape consumer and producer behavior.

In societies with a high level of uncertainty avoidance, individuals' expectations for the future and their perception of risk tend to be more rigid. In these societies, consumption may be delayed, savings rates may increase, and this could reduce total demand in the short term, alleviating demand-side inflationary pressures (Furnham, 1997; Hofstede, 2001). However, the presence of excessive regulation and rigid institutional structures in the face of external shocks could reduce production flexibility and exacerbate supply-side inflationary pressures.

When immigrants from cultures with lower uncertainty avoidance (UA) levels integrate into such societies, conflicts may arise between their consumption and spending patterns and the structural behavior patterns of the host society. This conflict could lead to inflationary pressures at the macro level through mechanisms such as micro-level pricing decisions (firms' cost-passing behavior), labor supply (flexibility and productivity), and public resource allocation (infrastructure, healthcare, etc.).

On the other hand, masculine cultures tend to make individuals' motivations for consumption, investment, and work more competitive, while feminine societies lean towards social welfare, solidarity, and equal distribution. In societies with high masculinity, migration, coupled with an influx of low-skilled labor, can increase price competition in the labor market, leading to wage suppression and, indirectly, helping to control inflation (Schwartz, 1999). However, this situation could also increase societal conflicts due to cultural mismatches among immigrants, potentially harming productivity. At the micro level, adaptation costs in firms' production techniques and losses in labor productivity are linked to these cultural conflicts.

Policy makers should develop integrated approaches that consider microeconomic behavioral patterns and interactions in the labor market while managing cultural assimilation processes in migration. In countries with a high level of uncertainty avoidance:

- Institutional trust should be enhanced. Central bank independence, predictable monetary policies, and strategies based on price stability provide a more predictable economic environment for both the native population and immigrants (Alesina & Summers, 1993).

- Transparent and fair mechanisms for the integration of immigrants into the labor market should be established, which will reduce asymmetric information issues and productivity losses in the market (Stiglitz, 2002).

In countries with high masculinity levels:

- Competition should be increased, but at the same time, social cohesion policies should be strengthened. Policies focused solely on production and productivity may create an exclusionary effect on immigrants' labor force participation (Sen, 1999).

- Redistribution policies aimed at reducing income inequality could stabilize immigrants' consumption and savings tendencies. This would help manage demand shocks.

For economic actors, these findings necessitate the development of multi-layered strategies in practice:

- In labor-intensive sectors, flexible employment models should be implemented to enhance the productivity of the immigrant workforce and reduce informal employment.

- In societies with a high level of uncertainty avoidance, providing financial literacy and cultural awareness training for immigrants can rationalize individual spending, saving, and investment behaviors.

- Public investments in housing supply can reduce rental pressures and limit housing costs, which are a significant component of inflation. Especially in regions with high levels of immigration, social housing policies can increase price flexibility and make it easier to reach equilibrium prices.

- Firms should implement cultural awareness training and incentivizing leadership models for the effective use of the immigrant workforce. This approach can enhance productivity while reducing transaction costs (Coase, 1993).

- Sectoral incentive packages for small and medium-sized enterprises (SMEs) can integrate immigrant labor more productively and contribute to the more efficient functioning of market mechanisms.

This study presents important findings; however, there are also some limitations. First, incorporating all cultural dimensions could provide significant contributions to future studies. Additionally, due to the dynamic causal nature of migration, culture, and inflation, comparative studies conducted over different time periods may yield different results. The relationship between migration and inflation is also influenced not only by labor supply-demand balance but also by economic and social factors as well as government policies. Although inflation is a globally observed macroeconomic indicator, its measurement varies significantly across countries due to differences in the composition of consumer baskets, weighting methods, and data collection practices. These methodological divergences can lead to discrepancies in cross-national inflation comparisons, potentially affecting empirical findings in international studies. Lastly, research addressing the economic impacts of migration can yield varying results based on the cultural characteristics of both sending and receiving countries, as well as the reasons for migration. Therefore, the migration process should be considered as a multi-dimensional interaction.

In conclusion, within a framework where individual behavior patterns such as consumption, saving, risk perception, and labor supply are shaped by cultural norms, and these patterns change through migration, policy recommendations must be multidimensional and culture-based, rather than one-dimensional. In this context, integrating cultural dimensions into economic policies will form the foundation of strategies that ensure both economic efficiency and social harmony in a sustainable manner.

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