

REVIEW OF ECONOMIC AND BUSINESS STUDIES

INTERDISCIPLINARY PERSPECTIVES



This work is licensed under a
[Creative Commons Attribution-
NonCommercial-NoDerivatives 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Copyright © 2024 by Doctoral School of Economics and Business Administration
Alexandru Ioan Cuza University

Published by Alexandru Ioan Cuza University Press

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior permission of Doctoral School of Economics of the Alexandru Ioan Cuza University.

Address:

26thLăpuşneanu Street, 4th Floor, Room 412
Iaşi – Romania, Zip Code 700057
E-mail: rebs@feaa.uaic.ro
Web: www.rebs.feaa.uaic.ro

ISSN 1843-763X



This work is licensed under a
[Creative Commons Attribution-
NonCommercial-NoDerivatives 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Founding Members

Professor **Vasile IȘAN**

Professor **Ion POHOAȚĂ**

Gabriel CUCUTEANU, PhD

Managing Editors

Editor-in-chief: Professor **Vasile IȘAN**

Co-Editor-in-chief: Professor **Alin Marius ANDRIEȘ**

Senior Editor: **Gabriel CUCUTEANU, PhD**

Technical Editor: **Ovidiu-Ilie STOFOR, PhD**

Editorial Board

Professor **Jean-Pierre BERDOT**, Université de Poitiers, France

Professor **Enrique BONSÓN**, Universidad de Huelva, Spain

Professor **Henri BOUQUIN**, Université de Paris-Dauphine, France

Professor **Régis BOURBONNAIS**, Université de Paris-Dauphine, France

Professor **Oana BRÂNZEI**, University of Western Ontario, Canada

Professor **Mihai CALCIU**, Université de Lille, France

Professor **Laura CISMAȘ**, West University of Timișoara

Professor **Cristian CHELARIU**, Suffolk University Boston, United States of America

Lecturer **Roxana HALBLEIB**, University of Konstanz, Germany

Professor **Bernard COLASSE**, Université de Paris-Dauphine, France

Professor **Christian CORMIER**, Université de Poitiers, France

Professor **Daniel DĂIANU**, Member of the Romanian Academy, National Bank of Romania

Professor **Emilian DOBRESCU**, Member of the Romanian Academy

Professor **Aurel IANCU**, Member of the Romanian Academy

Professor **Mugur ISĂRESCU**, Member of the Romanian Academy, Governor of the National Bank of Romania

Professor **Vasile IȘAN**, Alexandru Ioan Cuza University of Iași, Romania

Professor **Jaroslav KITA**, University of Economics Bratislava, Slovakia

Professor **Raymond LEBAN**, Conservatoire National des Arts et Métiers, France

Professor **Liviu-George MAHA**, Alexandru Ioan Cuza University of Iași, Romania

Professor **Dumitru MIRON**, Academy of Economic Studies, Bucharest

Professor **Luiz MONTANHEIRO**, Sheffield Hallam University, United Kingdom

Professor **Mihai MUTAȘCU**, West University of Timișoara

Professor **Bogdan NEGREA**, Academy of Economic Studies, Bucharest
Professor **Louis G. POL**, University of Nebraska at Omaha, United States of America
Professor **Gabriela PRELIPCEANU**, Ștefan cel Mare University, Suceava
Professor **Danica PURG**, President of CEEMAN, Bled School of Management,
Slovenia
Professor **Gerry RAMEY**, Eastern Oregon University, United States of America
Professor **Ravinder RENA**, North-West University, South Africa
Professor **Jacques RICHARD**, Université de Paris-Dauphine, France
Professor **Cristina-Teodora ROMAN**, Alexandru Ioan Cuza University of Iași,
Romania
Professor **Antonio García SÁNCHEZ**, Universidad Politécnica de Cartagena, Spain
Professor **Alan SANGSTER**, University of Sussex, Sussex, United Kingdom
Professor **Victoria SEITZ**, California State University, United States of America
Professor **Alexandru TODEA**, Babeș-Bolyai University, Cluj Napoca
Professor **Gabriel TURINICI**, Université de Paris-Dauphine, France
Professor **Peter WALTON**, ESSEC Business School Paris, France

Editors

Professor **Daniela Tatiana AGHEORGHIESEI**
Professor **Mircea ASANDULUI**
Professor **Marin FOTACHE**
Professor **Iulia GEORGESCU**
Professor **Costel ISTRATE**
Professor **Gabriel MURSA**
Professor **Mihaela ONOFREI**
Professor **Carmen PINTILESCU**
Professor **Adriana PRODAN**
Professor **Adriana ZAIT**

Editorial Secretary

Ph.D **Marius ALEXA**
Ph.D **Anca BERȚA**
PhD **Marinela-Carmen CUMPĂȚ**
PhD **Roxana-Aurelia MÂRȚ**
PhD **Vladimir POROCH**
PhD **Nicu SPRINCEAN**

Ph.D **Silviu TIȚĂ**

Table of Contents

RESEARCH ARTICLE

- An Econometric Study on the Impact of Financial Leverage on Economic Value Added
(A Case Study of Algerian Economic Institutions for the Period 2010-2021) 11
Sebaa Bilal, Amorabda Samia
- Cultural Tightness-Looseness and Foreign Bias: How Cultural Norm Differences
Influence International Portfolio Diversification 35
Anita Todea
- The Impact of Glass Ceiling Determinants on Organizational Justice in the Public Sector
A Case Study of Several Public Institutions in the Wilaya of Ghardaia in Algeria 53
Nour El Houda Bouguerra
- What Increases more Systemic Risk: Panic or Stringency? 73
Alexandra Maria Chiper
- The EU Membership Effect on Rule of Law Dynamics and the Relationship Between
Rule of Law and Control of Corruption 91
Ion Mușchei, Ionuț-Andrei Pricop

CASE STUDY

- Entrepreneurial Intention of Business Graduate Students: The Role of Social
Entrepreneurial Support (Algerian Case Study) 111
Ayoub Messikh, Hanane Omeiri
- ICT in Affordable Housing: Hamburg's Role in Advancing Germany's Sustainability
Goals 125
Brigitte Steinhoff



RESEARCH ARTICLE



This work is licensed under a
[Creative Commons Attribution-
NonCommercial-NoDerivatives 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



AN ECONOMETRIC STUDY ON THE IMPACT OF FINANCIAL LEVERAGE ON ECONOMIC VALUE ADDED (A CASE STUDY OF ALGERIAN ECONOMIC INSTITUTIONS FOR THE PERIOD 2010-2021)

SEBAA BILALⁱ, AMORABDA SAMIAⁱⁱ

Abstract: *This study aims to measure the impact of financial leverage on the economic value added (EVA) of a sample of 22 Algerian economic institutions over the period from 2010 to 2021. The study's variables included the effect of financial leverage (ELEV) and the ratio of total debt to equity (LEV) as explanatory variables representing financial leverage, and economic value added (EVA) as the dependent variable.*

The size of the company (SIZE) was used as a moderating variable for the impact of financial leverage on economic value added. To achieve the study's objective, the selected variables were calculated from the financial statements of the sample institutions during the specified period and analyzed using panel data methodology with EViews v13 software. Based on the Vector Error Correction Model (VECM), the study found that the explanatory variables have a long-term effect on the dependent variable, and that financial leverage, as measured by ELEV, has a statistically significant impact on economic value added. In contrast, the ratio of total debt to equity does not affect the economic value added in Algerian economic institutions. Additionally, the estimated model does not suffer from any standard errors.

Keywords: *Company Size, Financial Structure, Financial Leverage, Value Creation, Economic Value Added, Vector Error Correction Model, Algerian economic institutions*

JEL Classification: *O43, C33, H32, Z23, G32*

ⁱ Faculty Of Economic, Trade And Managment Sciences Endogenous Development Laboratory, Self Development and Good Governance University 8 may 1945- Guelma, Algeria, E-mail: Sebaa.bilal@univ-guelma.dz

ⁱⁱ Faculty Of Economic, Trade And Managment Sciences Endogenous Development Laboratory, Self Development and Good Governance University 8 may 1945- Guelma, Algeria, E-mail: Amorabda.samia@univ-guelma.dz



1. INTRODUCTION

The business environment has experienced significant advancements in the fields of finance and investment, profoundly impacting companies as the cornerstone of this environment. To stay abreast of these changes, companies must accurately understand and assess the various challenges that may arise within the business environment. This requires the integration, coordination, and alignment of efforts across all levels and functions, aiming to achieve profitability and growth alongside the primary goal of value creation. This objective surpasses other managerial goals in importance, as it is intrinsically linked to the company's performance and the interests of its owners. Consequently, this goal has become paramount for company managers who strive to achieve it, as the company's existence hinges on creating value for its stakeholders. Without value creation, companies cannot attract capital, thereby jeopardizing their survival.

To ascertain value creation, it is essential to measure it using various indicators, which, despite differing in calculation methods, share the common purpose of determining whether the company has generated value. Among the most important indicators of financial performance from a value creation perspective is the Economic Value Added (EVA). This metric has garnered significant attention from researchers because it represents the true profit of the company, considering the total cost of capital. EVA serves as a measure of both performance and management effectiveness. Moreover, EVA focuses on net profit, necessitating several adjustments to eliminate potential accounting distortions, unlike traditional financial performance measures based solely on realized accounting returns.

To achieve value creation, companies must meet their financial needs arising from investment activities by adopting plans and strategies to establish an appropriate financial structure. This structure varies from one company to another based on several determinants, one of which is size, considered a static concept as it represents a specific measure at a given point in time. The financial structure delineates the various funding sources that may be utilized to finance the company's activities and achieve the minimum required financial equilibrium by identifying the specific funding sources employed.

Debts are considered one of the funding sources that a financial manager might use to finance a company's activities to generate returns for its owners, ultimately leading to an increase in the company's value, which is the objective of modern financial management. Financial structure theories, such as the traditional theory and the net profit theory, have explored this topic and concluded that using financial leverage minimizes the total cost of funds, thereby maximizing Economic

Value Added (EVA). This is because the cost of funds is a critical component in calculating EVA. Furthermore, financial leverage emerges as one of the strategies employed by companies to meet their financial needs due to the tax savings it offers, as interest expenses are deducted from taxable profits. Therefore, if the cost of debt is lower than the cost of equity, financial leverage becomes an essential element in the financial structure.

Although the impact of financial leverage on Economic Value Added (EVA) has garnered significant interest among researchers in the field of finance, it remains characterized by varying results that differ depending on the environment or sample. The core issue of this study is encapsulated in the following question: What is the effect of financial leverage on EVA in Algerian economic companies during the period 2010-2021?.

The importance of this topic stems from its connection to the modern objective of financial management, which is rooted in contemporary financial theories that emphasize value creation. Focusing on this objective is considered the best approach to achieving long-term company prosperity. To assess a company's ability to generate value, several indicators must be considered, with EVA being one of the key measures of value creation in companies as it reflects their true profit. This is because accounting results often do not accurately reflect the actual condition of the company and fail to consider the total cost of capital. Additionally, it clarifies whether the use of financial leverage in companies, regardless of their size, has a relationship with EVA.

The rest of the study will be organized as follows: First, we start by defining the variables of the study by tracing the theoretical paths of the specialized literature, and rooting the knowledge involved in it, measuring the effect of financial leverage on economic value added in addition to understanding the role of company size in the effect of financial leverage on economic value added, ultimately delving into the followed methodology and the used tools, then discussing the results and testing the hypotheses.

2. THEORETICAL LITERATURE

In this section we are introducing the study variables that is by defining the financial leverage and the economic value added.

2.1 The financial leverage:

The company operates in a rapidly changing environment that both affects and is affected by it, as it is the foundation around which any economy revolves. The

company is composed of human, material, and financial resources that interact to achieve specific objectives. Among the many functions within the company, the financial function is the most crucial, acting as the nerve center for all other functions. It plays a key role in determining the financial structure, which varies from one company to another based on each company's future plans and size. The optimal financial structure remains a topic of significant debate among researchers despite its critical role in achieving the objectives and strategies set by company managers, as most internal decisions are influenced by it. In pursuit of these objectives, the financial manager is always seeking funding sources, which are essential for the company's ongoing operations. The ability to secure these funds is vital for achieving the predefined goals, with various methods available to finance the company's operational activities.

Whether it involves long-term sources represented by equity or external funding through debts (financial leverage), it refers to the employment of assets or funds paid by the company at a fixed cost or fixed return (Eugene and Michael, 2008: 98) Financial leverage can also be described as the ability to use fixed costs or funds to increase shareholder returns before accounting for interest and taxes. Essentially, it relates to the connection between a company's earnings before interest and taxes (Paramasivan and Subramanian, 2009:122), or in other words, operational profits and the profits to be distributed to shareholders.

Researchers focus on studying financial leverage, which entails using debt in the financial structure, due to several reasons: the lower cost of borrowed funds compared to the cost of owned funds, leading to a reduction in the weighted average cost of capital as debt (both short and long term) increases in the financial structure; the ease of estimating the cost of borrowed funds with interest, represented by paid interest, compared to the difficulties in estimating the cost of borrowed funds without interest; the reduction in the cost of borrowed funds with interest for tax purposes; and the association of financial risk with long-term debt due to financial obligations (interest) (Al-Amri, 2010: 122).

As is known, financial leverage begins when companies borrow to fund their investment activities with the aim of obtaining a return higher than the cost of the acquired debt, thereby contributing to increasing the profitability of equity without affecting economic profitability, provided that the latter is greater than the debt cost (Vernimmen *and all.*, 2002:312).

We can point out that financial leverage determines the financial structure. When the weighted average cost of capital is at its minimum and the rate of return is at its maximum, depending on the proportion of mixed funding, if it is less than the

optimal ratio, this leads to an increase in the weighted average cost of capital due to the rise in internal funding costs, which subsequently reduces the return on equity. Conversely, if debt increases in the financial structure, this will decrease the weighted average cost of capital, ultimately increasing the return on equity (Al-Amri, 2013: 343).

The effect of financial leverage can be measured using the following equation (Jean Guy and Stéphane, 2011: 122):

$$RF = (Re + (Re - i) (D/CP)) (1 - t)$$

Where the financial return equals the economic return increased by the effect of financial leverage, divided by the leverage gap (Re-i) or the degree of financial leverage $\frac{D}{CP}$. This aligns with the following three scenarios (Ogien, 2011:96):

- $e - i > 0$: The company has a positive effect of financial leverage; as debt increases, profits also increase.
- $e - i < 0$: The company has a negative effect of financial leverage; as debt increases, profits decrease.
- $e - i = 0$: The company has no effect of financial leverage, meaning profitability is independent of financial leverage.

In addition to the ongoing deductions to equity: This ratio shows the relationship between the amount of funds provided by the company owners and the amount of funds coming from external sources. If the company owners do not fund the assets from the equity, then long-term sources will not fund the current assets due to the need to respect the rule of equilibrium. Therefore, the company is obligated to use short-term funding to finance these assets (Eugene and Michael, 2008: 129).

And the ratio of long-term debt to equity: This ratio expresses the extent to which the company relies on external sources to finance its assets. A lower ratio indicates a greater reliance on internal funding sources (Philip and Eugene, 2019:290).

2.2 The economic value added:

The concept of value holds significant importance in economic thought, having sparked extensive debate regarding its nature and dimensions. The evolution of the concept of value creation can be attributed to past economic thinkers, each viewing the term from the perspective of their own specialization and building on the knowledge of their predecessors. Reviewing the methodologies of Plato and his student Aristotle in the 14th-15th centuries BC reveals that Plato approached the

concept of value by explaining the process of exchange within society at that time. According to him, value manifests itself in a particular form, which he referred to as exchange value. However, Plato was unable to precisely define or comprehend the value of a product (Mawaei and Brainees, 2016). In contrast, Aristotle offered a different perspective by distinguishing between two types of value: value in use and value in exchange. He highlighted the relationship between these two types by addressing the issue of justice in price determination, which was a crucial motivator for discussing how value is set in markets.

At this point, Aristotle deduced the concept of exchange, which entails that both the seller and the buyer should receive equal value (Shaban and Abu Abda, 2009: 15). Subsequently, the contributions of economic researchers followed, gradually shaping the modern theory of value by establishing a relationship between future economic outcomes of a company and its current value. Fisher was the first to put the theory of value into practice in 1930. He pointed out that the value of money decreases over time and that the interest rate plays a significant role in the valuation process. He also emphasized that measuring value depends on the sum of future cash flows and maintaining an appropriate discount rate.

As for the value of the company, it was traditionally calculated based on accounting documents that focused on the company's past, essentially adopting a cost-based evaluation approach. However, financial thought began to broaden the concept of value by incorporating a future vision for the company, particularly regarding expected cash flows based on risk and profitability assessment (Omani and Ben Ali, 2021: 64). This shift in perspective draws from economic thought, particularly "Fisher's" vision. Additionally, "Gordon & Shapiro (1956) Modigliani & Miller (1958)" introduced new elements essential for understanding and measuring value, such as the financial structure and the informative contribution of accounting data in defining a new classical concept of value, all centered around meeting shareholder expectations (Ouvrand and Signorini, 2016). A company is said to have created value when its management achieves integration among all stakeholders, especially shareholders, by making sound decisions (Helfert, 2001, p. 15).

We can say that the main idea behind the term of value generation or value creation is: "creating shareholders' value by achieving a return on capital greater than the cost of the funds used in financing" (Michel, 2006). Additionally, the new role of financial management now relies on tools and means to measure the company's performance based on the principle of value maximization, rather than relying on profit to indicate the company's success. This necessitates that the companies' managers take

on the responsibility of economic evaluation, rather than the accounting evaluation, which only focuses on measuring accounting profitability or the profitability of the share.

However, they need to look at the long-term horizon, which is economic profit, now commonly referred to as Economic Value Added (EVA). EVA is one of the most widely used measures of value creation, proposed by Stern & Stewart in 1991 to determine and measure a company's ability to create net value. This concept is linked to the residual income, which is the net operating profit after taxes exceeding the required profit, represented by the rate of return on investment. In other words, it is the operating profit minus the invested capital after interest (Jiambalov, 2018: 464). Additionally, EVA is an absolute periodic measure that governs and manages all hierarchical levels of the company, as it is the correct procedure used in evaluating the company, setting objectives, communicating with investors, and budgeting (Matthias, 2003:66). The economic value added can be measured using one of the following equations (Caby and all, 2013:35):

$$EVA = (R_e - CMPC)CI$$

$$EVA = NOPAT - (CMPC * CI)$$

$$EVA = CFD + \Delta CI - (CMPC * CI)$$

- Re: Economic profitability calculated as the operating result to the invested capital.
- CI: Invested capital.
- CMPC: Weighted average cost of capital.
- NOPATt: Net operating profit after tax.
- ΔC_t : Change in invested capital.
- CFDt: Available cash flow.

2.3 Study methodology and used data:

In order to achieve the main objective of the study, which is to determine the impact of financial leverage on the economic value added, Algerian economic companies were chosen as the study community. The study sample included 22 Algerian economic companies for the period 2010-2021. The selection of the companies was random and based on the availability of their financial statements, while for the rest, obtaining the financial statements was difficult. The financial data for the selected companies were acquired through various methods including internet sources, personal visits, and contacting the companies under study. This approach aimed to address the research question and answer the following questions:

- Does the ratio of total debt to equity affect the economic value added in the Algerian economic companies under study?

- Does the size of the company contribute to increasing the explanatory power of financial leverage for changes in the economic value added in the Algerian economic companies under study?

The variables were calculated based on the financial statements of the selected sample in order to achieve the desired objectives of this study. Additionally, previous studies were relied upon to determine the variables that will be used in the measurement. The study variables included the dependent variable (EVA), which represents the economic value added proposed by Stern & Stewart in 1991 to determine and measure a company's ability to create net value. It is a measure for evaluating the performance of a company and assessing the extent to which management adds to the wealth of the owners. It differs from traditional accounting measures due to its exclusion of direct capital costs and has a close relationship with economic profit. It was calculated based on the following equation:

$$EVA = (ROCI - CMPC) CI$$

where:

- EVA: Economic Value Added.
- ROCI: Return on Capital Invested, calculated using the following equation:

$$ROCI = RO / CI$$

where:

- RO: Operating Result.
- CI: Capital Invested, calculated using the following equation:

$$CI = INVE + BFR$$

where:

- INVE: Non-Current Assets.
- BFR: Working Capital Requirement.
- CMPC: Weighted Average Cost of Capital, calculated as follows:

$$CMPC = K_{cp} \times CP / (D + CP) + K_D \times (1 - t) \times D / (D + CP)$$

where:

- K_{cp} : Cost of Equity.
- K_D : Cost of Debt.
- D: Debts.
- CP: Equity Capital
- t: Tax Rate.

The value is then divided by the arithmetic mean for each company to avoid variance between variables. The independent variables were the financial leverage,

which is the use of debts to achieve returns on equity, leading to an increase in shareholders' equity. This was expressed in two ways: one is the effect of financial leverage (ELEV), measured using the following equation:

$$\text{ELEV} = \text{RF} - \text{Re}$$

where:

- RF: Financial Return.
- Re: Economic Return.

The other method involved the total debt to equity ratio, expressed as (LEV):

$$\text{LEV} = \text{D} / \text{CP}$$

where:

- D: Total Debt.
- CP: Equity Capital

The size of the company was used as a moderating variable for the impact of financial leverage on the economic value added in the studied companies. The size of the company reflects its production capacities, resources, or the diversity of services it can simultaneously provide to its clients across all active markets. It is expressed through the total assets, where larger total assets indicate larger companies. The company size is represented by the natural logarithm of the total assets (SIZE).

Since we are studying a sample of Algerian economic companies to develop an econometric model that expresses the relationship between financial leverage and economic value added, we will rely on panel data using the statistical software Eviews, version 13.

To achieve the study's objective, the selected variables were calculated from the financial statements of the sample to be studied. The data was initially tabulated using Excel and then all variables were entered into Eviews to determine the descriptive characteristics of the variables, as shown in the following table.

Table 1: Descriptive statistics

	EVA	ELEV	LEV	SIZE
Mean	0.953184	0.075438	5.326621	23.01218
Median	0.700000	0.040000	0.805000	23.20500
Maximum	11.00000	2.880000	881.0000	28.91000
Minimum	-11.00000	-0.713000	-8.720000	18.00100
Std. Dev.	2.105959	0.267686	55.15103	1.984746
Sum	251.6405	19.91559	1406.228	6075.215
Observations	264	264	264	264

Source: Eviews13output.

From the table above we can see:

- The average economic value added (EVA) index was 0.95, with a standard deviation of 2.10, a maximum value of 11, and a minimum value of -11, based on 264 observations during the period from 2010-2021 in the selected companies. This indicates a fluctuation in the recorded values of economic value added, suggesting that the Algerian economic companies under study do not prioritize value creation.
- The average financial leverage effect (ELEV) was calculated to be 0.07, with a standard deviation of 0.26, a maximum value of 2.88, which means that the financial return is greater than the economic return and that the economic return is higher than the interest rate. The minimum value was -0.71, indicating that interest rates are higher than the economic return, proving that the companies under study during the studied period do not manage their debts effectively.
- The average financial leverage (LEV) was 5.3, with a standard deviation of 55.15, the highest deviation among all variables. The maximum value was 881 recorded in the Technical Landfill Company, indicating that the total debts in the company far exceed the equity, exposing the company to bankruptcy risk. The minimum value was -8.71, which means that in 2013, the equity for El Hadjar Complex was negative, showing that the companies under study heavily rely on debts to finance their assets.
- The average company size was 23.01, with a standard deviation of 1.98, a maximum value of 28 indicating a large company, and a minimum value of 18 indicating a medium-sized company.

The correlation matrix is conducted to detect multicollinearity between variables. It also indicates the nature of the relationship between two or more phenomena. This relationship can be positive or negative, and its strength is determined by the correlation coefficient. If the coefficient is greater than 0.5, it suggests a potential multicollinearity between the variables. The following table demonstrates this:

Table 2: The correlation matrix

	EVA	ELEV	LEV	SIZE
EVA	1	-0.0795308	-0.01320015	0.0183757
ELEV	-0.079530	1	0.0324490	-0.10412036
LEV	-0.0132001	0.0324490	1	-0.0716097
SIZE	0.01837577	-0.1041207	-0.0716097	1

Source: Eviews13output.

The table above shows the results of the correlation matrix between the study variables. It reveals that most of the correlation coefficients between the variables are weak, indicating the absence of multicollinearity between the variables.

3. PANEL DATA UNIT ROOT TEST

Unit root and cointegration tests are among the most crucial steps in estimating models. We will rely on one of these mentioned tests specific to stationarity tests, including the ADF test, which provides better results as it accounts for autocorrelation. Meanwhile, we will use the Kao (1999) test to determine whether there is cointegration or not. The hypotheses are as follows:

- **H0:** Panel data has a unit root (non-stationary).
- **H1:** Panel data does not have a unit root (stationary).

Table 3: ADF Test

Variables	Prob	Statistic	Prob	Statistic
	first difference		Level	
ELEV	0.0045	72.4050	0.1300	54.6709
EVA	0.0290	63.42298	0.4910	43.5450
LEV	0.0016	76.9196	0.4555	44.3819
SIZE	0.0000	101.597	0.1252	54.9177

Source: Eviews13output.

The previous results, according to the Augmented Dickey-Fuller (ADF) test, indicate the presence of a unit root at the level of variables such as long-term debt to equity, firm size, the effect of financial leverage, and economic value added. This means that the results reveal non-stationarity at the level, leading to the rejection of the hypothesis that panel data does not contain a unit root and the acceptance of the null hypothesis indicating the presence of a unit root and non-stationary data. However, they become stationary after taking the first difference of the same test. This result suggests the possibility of a long-term equilibrium relationship between the study variables.

After testing the stationarity of the panel data, which was found to be integrated of the first order, we need to confirm the presence or absence of a long-term relationship. Given the condition of stationarity at the first order, we can use the Kao (1999) cointegration test, based on the ADF tests, as it does not consider individual heterogeneity. The hypotheses are as follows:

- **H0:** No cointegration exists.
- **H1:** Cointegration exists.

Table 4: Kao1999 Test

	t-Statistic	Prob.
ADF	-2.161347	0.0153
Residual variance	7.754398	
HAC variance	3.254186	

Source: Eviews13output

It can be observed from the table that the p-value is less than the significance level of 0.05. Therefore, we accept the alternative hypothesis, which indicates the existence of cointegration among the variables, and reject the null hypothesis of no cointegration. This confirms the presence of a long-term equilibrium relationship between the study variables. Accordingly, we will use the Vector Error Correction Model (VECM).

1. Estimation of the Study Model:

Before estimating the chosen model, it is necessary to first determine the optimal lag length, followed by testing for causality. Once these steps are completed, the model can be estimated, and diagnostic tests can be conducted at the end.

Table 5: Lag Order

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-466.0413	NA	0.017461	7.303656	7.653087	7.445649
2	-424.9569	77.18890	0.011946	6.923589	7.622450	7.207574
3	-400.4206	44.61139	0.010512	6.794252	7.842543	7.220229
4	-342.8592	101.1685	0.005616	6.164533	7.562256*	6.732504*
5	-334.5202	14.15099	0.006336	6.280609	8.027762	6.990572
6	-306.3152	46.15372*	0.005303*	6.095684*	8.192268	6.947640

Source: Eviews13output

Based on the results shown in the table, we will select period 6 as the optimal lag period, as the majority of tests have indicated it. After determining the lag period, we will estimate the relationship between financial leverage and economic value added, with the company's size as a moderating variable at the sixth lag period using the Vector Error Correction Model (VECM).

Table 6: Long-term parameters

Cointegrating Eq:	CointEq1
EVA(-1)	1.000000
ELEV(-1)	5.419386 (1.40368) [3.86083]
LEV(-1)	-0.120803 (0.09603) [-1.25793]
SIZE(-1)	-0.023639 (0.05454)

C	[-0.43345]			
	-0.596907			
Error Correction:	D(EVA)	D(ELEV)	D(LEV)	D(SIZE)
COINTEQ1	-1.630439	-0.032200	0.115896	0.047147
	(0.27286)	(0.01903)	(0.19456)	(0.04222)
	[-5.97529]	[-1.69229]	[0.59568]	[1.11674]

Source: Eviews13output

According to the table above, we observe the following:

- The error correction coefficient is negative and significant at the level of significance, meaning that its p-value is greater than 0.05. This indicates that (1.6304) of short-term errors are automatically corrected over time to achieve long-term equilibrium, taking approximately 6 months to reach long-term equilibrium.
- There is a statistically significant effect of financial leverage (ELEV) on the economic value added in the Algerian economic companies under study.
- The ratio of total debt to equity (LEV) does not affect the economic value added in the Algerian economic companies under study.
- The size of the company does not affect the economic value added in the Algerian economic companies under study.

Table 7: Short-term parameters

D(ELEV(-1))	8.638743 (2.56122) [3.37290]	0.193781 (0.17860) [1.08500]	-1.914929 (1.82624) [-1.04856]	0.258977 (0.39628) [0.65352]
D(ELEV(-2))	1.198104 (2.42147) [0.49478]	0.179583 (0.16885) [1.06354]	-1.210689 (1.72659) [-0.70120]	-0.880525 (0.37466) [-2.35021]
D(ELEV(-3))	-1.383307 (2.64705) [-0.52258]	0.118017 (0.18458) [0.63937]	0.928422 (1.88744) [0.49190]	0.187670 (0.40956) [0.45822]
D(ELEV(-4))	0.765271 (1.60650) [0.47636]	-0.104564 (0.11203) [-0.93340]	0.246103 (1.14549) [0.21484]	0.005017 (0.24856) [0.02018]
D(ELEV(-5))	3.021478 (1.12757) [2.67965]	-0.054199 (0.07863) [-0.68931]	0.113465 (0.80399) [0.14113]	0.337616 (0.17446) [1.93520]
D(ELEV(-6))	2.551295 (0.71571) [3.56468]	-0.084589 (0.04991) [-1.69489]	0.578545 (0.51033) [1.13367]	0.859888 (0.11074) [7.76509]
D(LEV(-1))	-0.266703 (0.24062) [-1.10840]	-0.010946 (0.01678) [-0.65234]	0.473859 (0.17157) [2.76189]	-0.066358 (0.03723) [-1.78241]
D(LEV(-2))	0.408798 (0.27419) [1.49095]	-0.006401 (0.01912) [-0.33477]	0.363972 (0.19550) [1.86171]	0.072170 (0.04242) [1.70120]

D(LEV(-3))	-0.094727 (0.50350) [-0.18814]	0.004439 (0.03511) [0.12642]	0.021628 (0.35901) [0.06024]	-0.106449 (0.07790) [-1.36643]
D(LEV(-4))	-0.239254 (0.36156) [-0.66172]	0.001730 (0.02521) [0.06861]	-0.041884 (0.25781) [-0.16246]	-0.054576 (0.05594) [-0.97558]
D(LEV(-5))	-0.008521 (0.00297) [-2.87363]	9.85 ^E -05 (0.00021) [0.47651]	0.000342 (0.00211) [0.16154]	0.000172 (0.00046) [0.37491]
D(LEV(-6))	-0.010199 (0.00205) [-4.97485]	3.25 ^E -05 (0.00014) [0.22714]	-0.000163 (0.00146) [-0.11141]	0.000121 (0.00032) [0.38265]
D(SIZE(-1))	1.133155 (0.63576) [1.78235]	-0.007689 (0.04433) [-0.17344]	0.109388 (0.45332) [0.24130]	-0.341317 (0.09837) [-3.46982]
D(SIZE(-2))	-0.204343 (0.87280) [-0.23412]	0.011603 (0.06086) [0.19064]	-0.094945 (0.62234) [-0.15256]	-0.332676 (0.13504) [-2.46348]
D(SIZE(-3))	0.369922 (0.84212) [0.43927]	-0.011994 (0.05872) [-0.20424]	0.083274 (0.60046) [0.13868]	0.244534 (0.13030) [1.87676]
D(SIZE(-4))	-0.108368 (0.76358) [-0.14192]	0.006950 (0.05325) [0.13052]	0.316933 (0.54446) [0.58210]	0.162218 (0.11814) [1.37305]
D(SIZE(-5))	-0.512951 (0.67004) [-0.76555]	0.010534 (0.04672) [0.22545]	-0.283332 (0.47776) [-0.59304]	0.060193 (0.10367) [0.58062]
D(SIZE(-6))	-0.730838 (0.42975) [-1.70060]	0.000884 (0.02997) [0.02950]	0.067800 (0.30643) [0.22126]	-0.013423 (0.06649) [-0.20187]
C	-0.028223 (0.29315) [-0.09628]	-0.005759 (0.02044) [-0.28173]	0.105761 (0.20902) [0.50597]	0.053947 (0.04536) [1.18940]

Source: Eviews13output

- There is a short-term positive and significant effect, with lags of one year, five years, and six years, of financial leverage measured by the financial leverage effect on the economic value added in the Algerian economic companies under study.
- There is a negative effect of the ratio of total debt to equity, with lags of five years and six years, on the economic value added in the Algerian economic companies under study.
- The size of the company does not affect the economic value added in the short term in the companies under study.

Table 8: Statistical evaluation of the model

R-squared	0.631861	Mean dependent var	-0.042259
Adjusted R-squared	0.522296	S.D. dependent var	2.596247
S.E. of regression	1.794425	Akaike info criterion	4.210310
Sum squared resid	270.4768	Schwarz criterion	4.848605
Log likelihood	-205.5671	Hannan-Quinn criter.	4.469206
F-statistic	5.766996	Durbin-Watson stat	2.571332
Prob(F-statistic)	0.000000		

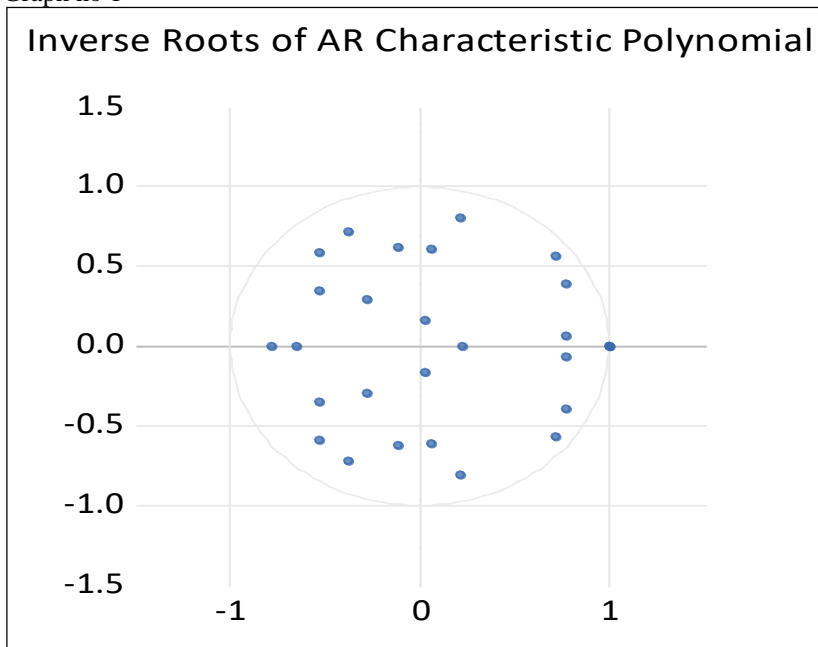
Source: Eviews13output

It is evident from the table above that the coefficient of determination reached 0.63, which means that the independent variables explain 63% of the variations in the dependent variable, with the remaining attributed to other variables not included in the model. It is also noted that the adjusted variable has altered the explanatory value of the changes occurring in the economic value added due to changes in financial leverage and company size. Moreover, the overall significance of the model is statistically acceptable, as the p-value for F was less than 0.05, being equal to zero.

3.1 Explanatory Tests for Model Quality

3.1.1 Roots Test:

Graph no 1



Source: Eviews13output

According to the figure, we observe that all the points are located inside or on the perimeter of the circle, indicating that all coefficients are less than or equal to one.

3.1.2 Autocorrelation Test:

The estimated values of the error term at a given time period should be independent of the estimated values of the error term at a previous time period. This hypothesis is tested as follows:

- **H0:** There is no autocorrelation in the errors.
- **H1:** There is autocorrelation in the errors.

The results are shown in the following table:

Table 9: VEC Residual Serial Correlation LM Tests

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	19.19329	16	0.2588	1.212277	(16, 235.9)	0.2591
2	11.34613	16	0.7876	0.705035	(16, 235.9)	0.7878
3	19.25030	16	0.2559	1.216022	(16, 235.9)	0.2563
4	16.22206	16	0.4376	1.018285	(16, 235.9)	0.4380
5	NA	16	NA	NA	(16, NA)	NA
6	NA	16	NA	NA	(16, NA)	NA

Source: Eviews13output

From the table, we observe that the values are greater than the significance level of 5%, which indicates the acceptance of the null hypothesis stating that there is no autocorrelation in the errors.

3.1.3 Homoscedasticity Test:

Table 10: VEC Residual Heteroskedasticity Tests

Chi-sq	Df	Prob.
481.2959	500	0.7183

Source: Eviews13output

Since the p-value indicated in the table is greater than the significance level of 0.05, we accept the hypothesis that the variance of the residuals is constant. This means that the estimated model does not suffer from either the problem of autocorrelation or the problem of heteroscedasticity.

3.1.4 Variance Decomposition Analysis:

Table 11: Variance Decomposition of EVA

Period	S.E.	EVA	ELEV	LEV	SIZE
1	1.794425	100.0000	0.000000	0.000000	0.000000
2	1.843164	96.47592	0.885709	0.010525	2.627847
3	1.935688	88.24256	4.686778	4.303923	2.766736
4	2.294506	64.96875	26.02942	6.996053	2.005777

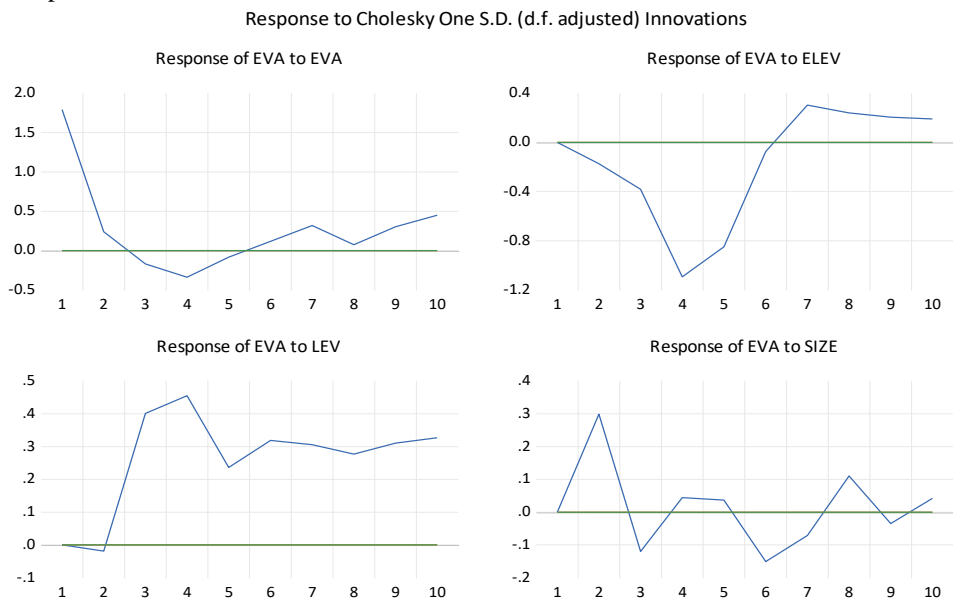
Period	S.E.	EVA	ELEV	LEV	SIZE
5	2.459561	56.65338	34.56600	7.013031	1.767582
6	2.488566	55.56692	33.85097	8.488864	2.093249
7	2.546721	54.62479	33.75190	9.546151	2.077160
8	2.576428	53.45814	33.84491	10.48394	2.213006
9	2.620944	52.99011	33.31986	11.53368	2.156338
10	2.686330	53.23860	32.22655	12.45752	2.077328

Source: Eviews13output

We notice that most of the short-term fluctuations in EVA are primarily due to the self-shocks of the variable itself. These shocks explain all the changes in the dependent variable during the first year of the shock. However, this percentage sees a significant decline in the long term, reaching 53% by the tenth year. The relative importance of the financial leverage effect variable gradually increases in explaining the changes in EVA in the long term, reaching 32% in the tenth year. Additionally, the size of the company affects the economic added value. The structural shocks of the total debt to equity ratio also increasingly explain the changes in EVA in the medium term, reaching 12% by the tenth year, and these changes tend to increase year by year

3.1.5 Shock analysis:

Graph no 2



Source: Eviews13output

- When a shock of one standard deviation occurs in ELEV, it will have a negative impact on EVA. A change of one unit in the financial leverage effect leads to a decrease in the economic value added by 0.17 in the first period. This negative effect continues until the sixth year, after which the shock changes to a positive direction, reaching its maximum value in the tenth year. Overall, any change in ELEV by one standard deviation results in varying shocks over different periods.
- When a shock of one standard deviation occurs in the LEV variable, it does not cause any change in EVA in the first period. It causes a negative shock in the second period, decreasing the economic value added by 0.01. It then continues to rise and fall positively. Therefore, changes in shocks over the years affect the economic value added depending on the type of shock.
- A change in the company's size due to a shock of one standard deviation does not cause any shock to EVA in the first year. However, it leads to an increase in the economic value added by 0.29 in the second year, followed by a negative decrease of 0.11 in the third year. The differences in impacts continue depending on the nature of the shock.

4. HYPOTHESES TEST

- Hypothesis 1: "There is a long-term equilibrium relationship between financial leverage and economic value added in the studied companies." This hypothesis has been validated through the error correction term, which was negative and significant. This indicates a statistically significant long-term equilibrium relationship between financial leverage and economic value added in the Algerian companies under study during the period from 2010 to 2021.
- Hypothesis 2: "There is a statistically significant impact of financial leverage (ELEV) on economic value added in the Algerian companies under study." The validity of this hypothesis was confirmed through the long-term coefficients, which indicated that an increase in the financial leverage effect leads to a corresponding increase in the economic value added in the same direction.
- Hypothesis 3: "The ratio of total debt to equity (LEV) does not affect the economic value added in the Algerian companies under study." This hypothesis was validated through the long-term coefficients, indicating that when the studied companies heavily rely on debt surpassing their equity, it leads to a decrease in economic value added due to the heightened risks associated with increased indebtedness in these companies.

5. RESULTS AND DISCUSSION

- The error correction term is negative and significant at the significance level, meaning its p-value is greater than 0.05. This indicates that (1.6304) of short-term errors are automatically corrected over time to achieve long-term equilibrium, which takes approximately 6 months to reach.
- There is a statistically significant positive effect of financial leverage (ELEV) on economic value added in the studied companies. This suggests that the Algerian companies have achieved financial returns that exceed economic returns. Therefore, it can be said that these companies have created a margin between profitability and borrowing. Resorting to borrowing will maximize financial profitability, leading to a reduction in the total cost of financing due to reliance on debt, which in turn maximizes the economic value added of these companies under study. An increase of one unit in ELEV will result in an increase of 5 units in EVA for the studied Algerian companies. Generally, this result can be explained by the fact that when the companies under study borrow and invest these funds in their activities, they achieve a return higher than the cost of borrowing, resulting in a surplus representing the difference between financial and economic returns. This is known as the effect of financial leverage. This result aligns with the net profit approach, which assumes that reliance on financial leverage in financing more than equity leads to a reduction in the total cost of funds used in financing within optimal limits. This represents an important part of calculating economic value added, thereby allowing its maximization.
- The ratio of total debt to equity (LEV) does not affect the economic value added in the Algerian companies, which aligns with the Modigliani-Miller theory. This indicates that financial leverage did not impact the total cost of funds due to the high costs of equity resulting from increased financial risk borne by the owners, or that the investments financed by debt did not yield returns exceeding the cost of financing. Additionally, it can be justified that the cost of debt financing remains a low-cost funding source, as the increase in debt compensated for the rise in the cost of equity in these companies, resulting in a fixed cost of funds against a decline in the returns on these invested funds. This aligns with the net operating profit approach, which posits that increasing reliance on lower-cost debt results in heightened risks for the owners, thereby negating the advantages of this debt due to the owners' demands for higher returns and the fixed returns

on these invested funds, ultimately diminishing the economic value added for these companies.

- The results of the model estimation showed the extent of the economic added value responsiveness to the financial leverage variables in the short term, derived from the error correction model. The results indicated a positive effect of financial leverage represented by ELEV during the lag periods (t-1, t-5, t-6) on economic value added. This means that the companies under study have maximized their economic value added in the previous periods, impacting changes in EVA in the current period t, with no effect during the lag periods (t-2, t-3, t-4).
- Statistically, the estimated model's coefficient of determination was 63, indicating that 63% of the changes in economic value added are attributable to the financial leverage variables as a whole and the company size, with the remaining changes attributed to other variables not considered in the model estimation.
- From the analysis of the variance decomposition of errors, it is evident that the fluctuations in economic value added are attributable to the variable itself from the first to the tenth period. Additionally, there is a long-term correlation between economic value added and the increased effect of financial leverage, as the variance in the magnitude of financial leverage's effect loses a third of its components in favor of economic value added after 10 years. This indicates a long-term effect between ELEV and economic value added in the studied companies, unlike the total debt to equity ratio, where the correlation between it and economic value added did not exceed 12%. Furthermore, the selected variables of financial leverage contributed only 44% of the variances in economic value added after ten years. This may be due to the studied companies not investing the obtained debts or not adhering to the balance rule of matching long-term financing with long-term assets and short-term financing with short-term assets. It may also be due to these companies not selecting the optimal financing mix in their financial structure, or the managers of these companies not prioritizing the maximization of economic value added.

7. DEDUCTIONS AND SUGGESTIONS

This study attempted to measure the impact of financial leverage on economic value added, considering a moderating variable represented by company size. A standard model was estimated to explain this effect in a sample of Algerian companies using dynamic panel data and the Vector Error Correction Model

(VECM) with the aid of Eviews software, version 13. This study reached a set of results and recommendations, which are summarized as follows:

- Value creation is the primary strategic objective for a company that modern financial management seeks to achieve through its activities and operations.
- Economic value added is an old-new term developed by Stern Stewart & Co. The old concept refers to its first appearance in the eighteenth century when it was referred to as economic profit. The new concept indicates that it has undergone many modifications and developments by its developers.
- The results indicated the non-stationarity of the study variables at the level and their stationarity at the first difference. This prompted us to conduct a cointegration test to determine whether there is a possibility of cointegration among the variables. The results, based on the Kao test, indicated the presence of cointegration, leading us to use the VECM to estimate the relationship between the study variables.
- The optimal lag length for the VECM was determined by relying on several criteria, including the AIC, SIC, HQ, EPE, and LR criteria. The sixth lag was chosen as the optimal lag period based on the majority of these tests, which were used in all analyses.
- The error correction term was negative and significant in estimating the relationship between financial leverage and economic value added, indicating that the speed of achieving equilibrium values in the long term is approximately 6 months.
- The results indicated a statistically significant positive effect of financial leverage, measured by the financial leverage effect (ELEV), on economic value added (EVA) in the studied companies. The total debt to equity ratio does not affect the economic value added in the Algerian companies under study.
- The VECM meets the stability condition, as all coefficients were less than or equal to one, whether considering the company size or not. Additionally, the model does not suffer from heteroskedasticity or autocorrelation of errors, indicating the validity of the estimated model from an econometric perspective.
- The variance decomposition analysis showed that the fluctuations in economic value added are attributable to the variable itself. The variance in the magnitude of the financial leverage effect loses a third of its components in favor of economic value added in the long term after 10 years, while the total debt to equity ratio did not exceed a 12% correlation.

- There are differences in the shocks of independent variables affecting the dependent variable, which vary according to the nature of the shock from one period to another.
- Efforts should be made to balance funding sources that rely on equity financing with those that rely on debt financing, aiming to achieve economic value added by employing them in effective investment projects that yield high returns, such as by targeting the financial market.
- Company managers should exercise caution when resorting to debt financing to avoid the risk of insolvency. This can be done by conducting a financial feasibility study of the debt financing process.
- Algerian company managers should reconsider evaluating the efficiency of their companies by relying on modern metrics, such as economic value added, to assess the quality of their use of commercial assets.
- These companies must shift away from the traditional objective of profit maximization, which is a conventional goal of financial management, to the modern objectives of financial management, which include maximizing and creating value.
- Establish special departments dedicated to financial decision-making within companies.
- Disclose the economic value added index in the companies' financial statements and clarify the changes occurring in it to highlight the actual profits achieved by these companies.

REFERENCES

1. Al-Amri, M.A.I. (2010) *Advanced Financial Management*. Jordan: Ithraa.
2. Al-Amri, M.A.I. (2013) *Modern Financial Management*. Jordan: Dar Wael.
3. Caby, J., Hirigoyen, G. and Prat dit Hauret, C. (2013) *Création de valeur et gouvernance de l'entreprise*. 4e éd. Paris: Économica (Connaissance de la gestion).
4. Eugene, F.B. and Michael, C.E. (2008) *Financial Management, Theory & Practice*. USA: South-Western.
5. Helfert, E.A. (2001) *Financial analysis: tools and techniques: a guide for managers*. New York: McGraw-Hill
6. Jean Guy, D. and Stéphane, G. (2011) *Gestion Financiere*. paris: Eyrolies.
7. Jiambalov, J. (2018) *Managerial Accounting*. USA: John Wiley.
8. Matthias, M.S. (2003) *vestitionssteuerung, Periodenerfolgsrechnung und Economic Value Added*. Frankfurt: Deutscher Universitats-Verlag.

9. Mawaei, B. and Brainees, A. (2016) 'The Dialectic of Value Between Economic Thought and Financial Thought', *Economic Good Tidings Journal*, 2(3), pp. 85–98.
10. Michel, A. (2006) 'Théorie Applications et limites de la mesure de la création de valeur', *Revue française de gestion*, 1(160), pp. 138–157
11. Ogien, D. (2011) *gestion Finance de l'entreprise*. paris: Dunod.
12. Omani, L. and Ben Ali, S. (2021) *Financial Engineering and Financial Strategy*. Algeria: Dar Algerian.
13. Ouvrand, S. and Signorini, C. (2016) 'La juste valeur expliquée par la théorie Cengage Learning.. économique', *revue française de comptabilite*, pp. 2–5.
14. Paramasivan, C. and Subramanian, T. (2009) *C. Paramasivan, T. Subramanian Financial Management*. India: New Age.
15. Philip, R.D. and Eugene, F.B. (2019) *Intermediate Financial Management 13ed*. Canada.
16. Shaban, M.A.H. and Abu Abda, mohammed O. (2009) *The History of Economic Thought*. Egypt: United Arab Company.
17. Vernimmen, P. *et al.* (2002) *Finance d'entreprise*. 5e éd. / par Pascal Quiry & Yann Le Fur, avec la participation de Franck Ceddaha. Paris: Dalloz (Dalloz gestion. Série finance).



CULTURAL TIGHTNESS-LOOSENESS AND FOREIGN BIAS: HOW CULTURAL NORM DIFFERENCES INFLUENCE INTERNATIONAL PORTFOLIO DIVERSIFICATION

ANITA TODEAⁱ

Abstract: *In this study, we examine the impact of differences in cultural tightness looseness between destination and investor countries on foreign bias in international equity allocation. Using data from 29 investor countries and 28 destination countries over the 2001–2022 period, we show that as the destination market is perceived as culturally “looser” compared to the investor’s home market, investors tend to diversify their portfolios less, resulting in an increased foreign bias. Therefore, the difference in cultural tightness looseness between the destination and home country represents a new unfamiliarity variable that explains foreign bias. From a policy perspective, we show that enhancing the informational environment and strengthening insider trading laws reduce the impact of this unfamiliarity variable on foreign bias.*

Keywords: *foreign portfolio investments; foreign bias; unfamiliarity; cultural tightness/ looseness.*

JEL Classification: *C24, G15, Z10*

Funding. This work was supported by the project “A better understanding of socio-economic systems using quantitative methods from Physics” funded by the European Union – NextgenerationEU and the Romanian Government, under National Recovery and Resilience Plan for Romania, contract no 760034/23.05.2023, cod PNRR-C9-I8-CF255/29.11.2022, through the Romanian Ministry of Research, Innovation and Digitalization, within Component 9, Investment 18.

1. INTRODUCTION

In an increasingly interconnected global economy, investors continually seek to diversify their portfolios across international markets to mitigate risk and maximize returns. However, despite the apparent financial benefits of global diversification, substantial evidence reveals that investors exhibit a persistent “foreign bias,” meaning they invest disproportionately within familiar markets rather than diversifying broadly (French and Poterba, 1991; Tesar and Werner, 1995).

ⁱ Faculty of Economics and Business Administration, Babes-Bolyai University, Department of Statistics-Forecasts-Mathematics, 58-60 Teodor Mihali Street, RO-400591, Cluj-Napoca, Romania; anita.todea@econ.ubbcluj.ro



While foreign bias has traditionally been attributed to factors like informational asymmetries and institutional barriers, recent studies have begun to investigate the role of cultural dimensions in shaping investors' cross-border decisions (Guiso et al., 2009; Chui et al., 2010). A series of studies directly highlight the impact of cultural values on foreign bias (Beugelsdijk and Frijns, 2010; Anderson et al., 2011; Siegel et al., 2011; Aggarwal et al., 2012). Among these cultural dimensions, the construct of cultural tightness-looseness (CTL) – the extent to which societies enforce strict social norms – offers unique insights into how differences in cultural norms might influence investors' foreign bias.

Cultural tightness-looseness reflects the extent to which societal norms are enforced and deviant behavior is tolerated (Gelfand et al., 2011). Societies that are “tight” often have rigid social expectations and low tolerance for deviation, whereas “loose” societies exhibit more flexibility and openness to diverse behaviors. This dimension of cultural variation can impact trust, predictability, and perceived risk within social and economic exchanges, making it a potentially significant factor in investors' willingness to engage with foreign markets. Specifically, when investors from “tight” cultures consider markets in “loose” societies, perceived risks related to differing norms may exacerbate foreign bias, limiting their willingness to diversify internationally.

This study investigates the impact of differences in CTL between investor home countries and target investment markets on foreign bias. We hypothesize that as the destination country becomes “looser” compared to the investor's home country, foreign bias intensifies, resulting in a lower degree of international portfolio diversification. By analyzing the relationship between CTL discrepancies and foreign bias, this study contributes to a nuanced understanding of the psychological and cultural factors influencing investment behavior. In doing so, it also extends the literature on international finance by highlighting how non-economic factors—such as cultural norms—can impact market integration and investment flows. This study is most closely related to the one conducted by Todea and Harin (2023), which shows that investors from loose societies diversify their international portfolios better, exhibiting a lower foreign bias. In contrast, we focus on the difference in social norms as a predictor of foreign bias. From a policy implication perspective, we demonstrate that enhancing the informational environment and enforcing insider trading laws in destination countries moderates the association between CTL differences and foreign bias.

2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

The persistence of *foreign bias* – a tendency for investors to favor domestic or culturally similar international assets over those from unfamiliar markets – has been well-documented in international finance (French and Poterba, 1991; Tesar and Werner, 1995). Early studies attributed foreign bias largely to economic and informational barriers, such as transaction costs and the availability of financial data (Portes and Rey, 2005). However, as global financial integration has increased and economic barriers have decreased, scholars have increasingly turned to cultural and behavioral explanations, suggesting that sociocultural factors significantly shape cross-border investment preferences (Guiso et al., 2009).

One prominent cultural dimension relevant to foreign bias is *cultural tightness-looseness* (CTL). The CTL framework, developed by Gelfand et al. (2011), classifies societies along a continuum from “tight” to “loose” based on the strength of their social norms and tolerance for deviance. The impact of CTL on various economic outcomes is well-established, with links to factors such as stock price synchronicity (Eun et al., 2015), cross-border acquisition performance (Li and Gelfand, 2022), accounting conservatism (Noh and Cho, 2022), and foreign bias from the perspective of the investing country (Todea and Harin, 2023). Our study contributes to this body of literature by focusing on a novel unfamiliarity variable that captures the difference between the CTL of the destination country and that of the investing country.

Tight societies, such as Japan or Singapore, maintain strict social norms and display low tolerance for behaviors that deviate from those norms, while loose societies, like the United States or Brazil, exhibit more leniency toward diverse behaviors and social norms. This distinction has meaningful implications for how individuals from different cultures perceive and assess risk in social and economic interactions (Gelfand et al., 2011; Triandis, 1995).

From a financial perspective, cultural tightness-looseness can influence investor behavior by impacting the degree of perceived risk associated with foreign markets. Investors from tight societies may perceive loose societies as unpredictable or risky due to the openness and flexibility in social norms. Consequently, this perceived cultural dissimilarity may increase foreign bias, reducing international diversification (Chui et al., 2010). Research in cultural psychology also supports this, showing that people from tight cultures often exhibit higher levels of uncertainty avoidance and are less likely to engage in decisions involving unfamiliar cultural contexts (Hofstede, 2001; Gelfand et al., 2006). Additionally, research suggests that cultural differences affect cross-border trust, which is crucial in international investment decisions. Guiso et al. (2009) found

that cultural differences between countries reduce mutual trust, leading to lower bilateral investment levels. Investors may therefore prefer familiar or culturally aligned markets where they feel greater trust in the legal and social norms, avoiding destinations with looser social norms that might be perceived as lacking regulatory stability (La Porta et al., 1998; Stulz, 2005).

To explain how cultural tightness-looseness (CTL) differences contribute to foreign bias, we propose several mechanisms illustrating how social norm discrepancies impact the degree of international portfolio diversification.

Firstly, variations in CTL influence risk perception, affecting investors' views on stability and predictability in foreign markets. For example, investors from culturally tight societies may perceive looser countries as less predictable and thus riskier. This heightened risk perception, rooted in associations between looser norms and social volatility, can significantly influence investment decisions (Chui et al., 2010; Gelfand et al., 2011).

Secondly, greater CTL disparities expand cultural distance, which often results in diminished trust toward the institutions and business practices of the destination country. Since trust plays a fundamental role in investment security perceptions, the reduced trust between culturally distant countries has been linked to lower investment flows (Guiso et al., 2009; Bottazzi et al., 2016).

Another factor is investment compatibility. Investors from tight cultures, which prioritize regulatory rigor, may see countries with looser social norms as incompatible with their investment objectives. This perceived misalignment can deter investors from engaging in markets that lack similar standards, reinforcing foreign bias through cultural aversion (La Porta et al., 1998; Stulz, 2005).

Lastly, social norm internalization affects investment choices, as individuals from tight cultures internalize stricter norms that inform their financial behavior. This leads to a bias against markets with more flexible norms, where behaviors and practices may significantly diverge from familiar expectations. This "cultural discount" makes diversification into culturally distant markets less attractive (Hofstede, 2001; Triandis, 1995).

Together, these mechanisms suggest that CTL differences between an investor's home country and potential target markets are a significant predictor of foreign bias in portfolio diversification. Particularly, pronounced CTL differences may lead investors to avoid culturally looser markets due to perceived risk and unpredictability, amplifying foreign bias.

While CTL differences between countries are relatively stable in the short term, they can have substantial implications for international investment behavior.

Our empirical findings suggest that enhancing the informational environment and the enforcement of insider trading laws in destination countries moderates the association between CTL differences and foreign bias. Specifically, richer informational environments, characterized by higher internet usage and macroeconomic transparency, coupled with strong enforcement of insider trading laws, significantly impact international portfolio allocation.

Drawing on the work of Kwabi and Boateng (2021), we adopt two measures to assess the enforcement of insider trading laws, providing a robust framework for evaluating their influence on foreign bias. This integration of informational quality and legal enforcement into the analysis allows for a more nuanced understanding of how cultural dimensions interact with structural factors in shaping investment behavior.

Based on the literature reviewed, we formulate the following hypotheses:

Hypothesis 1: There is a significant negative relationship between the difference in CTL between the destination and investing country and foreign bias, such that greater differences in CTL lead to higher foreign bias among investors.

Hypothesis 2: The relationship between CTL differences and foreign bias is moderated by the quality of the informational environment; specifically, a richer informational environment reduces the impact of CTL differences on foreign bias.

Hypothesis 3: The enforcement of insider trading laws positively influences the relationship between CTL differences and foreign bias, such that stronger enforcement diminishes the association between CTL differences and foreign bias.

3. DATA, VARIABLES AND RESEARCH DESIGN

The primary data source for the panel data on bilateral portfolio allocation is the Coordinated Survey of Portfolio Investment (CPIS) conducted by the International Monetary Fund (IMF). The CPIS database provides annual reports on portfolio holdings of equity and debt securities, beginning in 2001, categorized by the residence of the issuer. In our analysis, we focused specifically on equity holdings to construct the portfolio allocation shares. To address gaps in reported domestic holdings, we backfilled the missing data using total market capitalization and foreign liabilities. This data was sourced from Thomson Reuters Eikon, which was also utilized to calculate the benchmark allocation based on market share relative to the total world market capitalization. Initially, our sample included both developed and emerging markets, in accordance with the MSCI classification. However, due to the limited availability of CTL scores and the need to exclude

offshore financial centers such as Switzerland, Ireland, and Luxembourg, the sample was refined to consist of 29 home investor countries and 28 destination countries. The period analyzed is 2001–2022, resulting in a sample of 17,864 observations (29 investor countries \times 28 destination countries \times 22 years).

3.1 Dependent variable

We construct foreign bias (FB_{ij}) in line with the methodology outlined by Chan et al. (2005), focusing on the extent to which investors either under-allocate or over-allocate their portfolios to foreign markets compared to the theoretically optimal allocation that enhances diversification benefits. The annual calculation for FB_{ij} is defined as follows:

$$FB_{ij} = \log \left(\frac{W_{ij}}{W_{ij}^*} \right)$$

Here, W_{ij} represents the weight of stock holdings from the home country i in destination country j , while W_{ij}^* signifies the market value of destination country j within the context of global market capitalization. This metric yields higher foreign bias values under negative scores, indicating under-allocation, while positive scores reflect greater foreign market investments, suggesting lower degrees of foreign bias. A score of zero indicates an optimal portfolio allocation. To assess the foreign portfolio weights of the home investor i (i.e., W_{ij}^*), we assume that the total stock holdings for country i equal its stock market capitalization plus the total foreign equities it allocates across all destination countries from CPIS, minus the foreign liabilities associated with those countries. Consequently, the weight of foreign equities j in the portfolio of investor i is expressed as the absolute value of the allocation relative to the total investments made by country j .

3.2 Independent variables

3.2.1 Cultural tightness-looseness measure

In our study, we utilized the combined CTL (Cultural Tightness-Looseness) index developed by Uz (2015). Derived from the 2000 survey wave conducted by the European Values Study Group and World Values Survey Association (EWVS), Uz (2015) constructed three CTL indices based on the dispersion of cultural levels: the domain-specific index, the domain-general index, and the combined index. The combined index was created by categorizing survey questions by relevant domains, then calculating the mean standard deviation of these variables. This calculation was

further adjusted with emic weights, representing the importance of each domain as indicated by respondents from each country.

After rigorous filtering to ensure question reliability, Uz found that the weighted averages of the SDs in the domains of work, family, and religion most accurately reflected cultural tightness-looseness, as these domains captured 54.4% of the variance in CTL. Among the three indices, we chose to use the combined CTL index, as it is considered superior to the other two measures (Uz, 2015). Within our sample, the most "tight" nation is Indonesia, with a CTL index of 3.1, while Belgium stands as the most "loose" nation, with a CTL index of 119.8. The variable used in the study is the *Difference in CTL* (Diff_CTL), calculated as the difference between the CTL of the destination country j and the CTL of the investor country i .

3.2.2 Interaction variables

To investigate Hypotheses 2 and 3, we use interaction variables with CTL that capture the informational environment and insider trading laws. The quality of the informational environment is measured by the number of internet users obtained from the World Bank database, as well as by the monetary policy transparency index developed by Dincer et al. (2022). Insider trading laws are measured using two indices constructed by Kwabi et al. (2018) that reflect both *de jure* and *de facto* dimensions: the *Stringent Insider Trading Laws* (Stringent i.t.l.) and *Enforcement Insider Trading Laws* (Enforcement i.t.l.). The *de jure Stringent i.t.l.* variable aggregates four elements: laws preventing insiders from trading based on sensitive private information, regulations prohibiting "tippees" (outsiders) from using such information provided by corporate insiders, financial penalties for violating insider trading laws, and whether insider trading is treated as a criminal offense. The *de facto Enforcement i.t.l.* variable originates from Bhattacharya and Daouk (2002), who report the first prosecutions of insider trading across over 100 countries.

3.2.3 Control variables

The foreign bias measure (FB_{ij}) depends on the inclination towards investing in the home market i (home bias), the attractiveness of the destination market j , and the degree of familiarity of investors from market i with market j . According to prior studies (Beugelsdijk and Frijns, 2010; Todea and Harin, 2023), the home bias variable acts as a general proxy for control variables related to the characteristics of the investor country i . Similar to Todea and Harin (2023), we apply the measure proposed by Cooper et al. (2013), which, compared to other home bias measures, has several superior mathematical properties. In our models, we anticipate a negative

association between FB_{ij} and home bias, indicating stronger foreign bias among investors who primarily prefer their domestic market.

To capture the attractiveness of the destination market, we include a series of variables that have been shown in the literature to be important determinants of foreign bias and that may potentially correlate with our variable of interest, $Diff_CTL$. First, we introduce a size variable, the logarithm of GDP (log GDP), measured in U.S. dollars, as it is highly likely that investors are drawn to larger economies. We also include the ratio of stock market capitalization to GDP (*Capitalization/GDP*) to reflect the importance of the capital market within the economy. Data for both variables were extracted from the World Bank Database. Additionally, we control for exchange rate risk, a known factor impacting foreign investment (Solnik and McLeavey, 2009). To measure exchange rate risk, we use the IMF's Coarse Classification of exchange rate regimes, sourced from Giofré (2017), where higher index values indicate a greater degree of flexibility in the destination country's exchange rate arrangements. Transaction costs and investor protection are crucial factors in making foreign investment decisions. Thus, we have included the *Antidirector Rights Index* from Djankov et al. (2008) and the *transaction cost* as provided by Kwabi and Boateng (2021). Similar to Chan et al. (2005) and Beugelsdijk and Frijns (2010), we included variables to capture the risk-return profile of the destination market. These include the market *volatility* of the destination, the *correlation* coefficient between the investing and destination markets, and the *one-year* and *five-year lagged return* of the destination market's stock index. All of these variables were constructed based on the monthly returns of stock market indices from host markets, with data downloaded from Thomson Reuters Eikon.

Limited familiarity can add to the informational costs that discourage investors from international portfolio diversification (Chan et al., 2005). To control for geographic and cultural distances that contribute to these costs, we include two specific variables: the geographic distance between each origin and destination country, measured by the log of the great-circle distance from CEPII, and linguistic distance based on Spolaore and Wacziarg's (2009) methodology. Compatibility in accounting standards further increases transparency in the destination market, while a high level of bilateral trade enhances investor confidence in its equities. For accounting standards, we utilize GAAP differences as calculated by Bae et al. (2008), comparing 21 accounting items between home and destination countries. Bilateral trade is measured as the ratio of total bilateral trade (imports plus exports) between home and destination countries relative to the total imports and exports of

the home country, with data sourced from the IMF. Cultural distance, which has been shown to play a significant role in foreign bias, may be highly correlated with our variable of interest, Diff_CTL. We included cultural distance, measured as the Euclidean distance across the six cultural dimensions developed by Hofstede and Minkov (2010).

3.3 Research design

To analyze the relationship between CTL (cultural tightness-looseness) and foreign bias, we apply Tobit regression models. Our dataset includes 17,864 observations, out of which 3,336 are zero-valued. These zero entries predominantly represent: (i) instances where investors opted not to allocate funds to specific markets, (ii) investment amounts under \$500,000, which the CPIS database adjusts to zero, and (iii) likely unreported low investments under \$500,000 due to confidentiality, which we also treat as zeros. Given this structure, our dependent variable (FB) follows a censored distribution, with Tobit estimation fitting as the appropriate approach to manage the left-censored FB scores. The Tobit model effectively handles the mixed distribution process, treating both zero and non-zero observations as outcomes of the same investment behavior. We adjust standard errors for intra-cluster correlation to ensure robust results, applying clustering at the level of 812 (29 home countries \times 28 destination countries) country pairs. All models include time-fixed effects to control for temporal influences on foreign bias patterns. For clarity, intercepts are incorporated in the models but omitted in table presentations.

4. EMPIRICAL RESULTS

Table 1 displays the results of testing Hypothesis 1. In the Base model (Column [1]), the coefficient of our variable of interest, Diff_CTL, is negative and statistically significant at the 1% level. This finding indicates that as the destination market becomes relatively looser compared to the investor's home market, investors tend to diversify their portfolios less, resulting in a higher foreign bias. Thus, Hypothesis 1 is supported.

Column [2] in Table 1 reports the results of estimating beta regressions via OLS to gauge the economic significance of Diff_CTL. Here, a one standard deviation increase in Diff_CTL is associated with a 22.49% decrease in portfolio diversification. The marginal effect of CTL differences is comparable to some of the most influential determinants of foreign bias, such as home bias and geographic distance.

The result in Column [1] may be impacted by potential endogeneity issues. Endogeneity could arise due to measurement error in the CTL variable as constructed by Uz (2015), given it is survey-based, and from possible omitted variables. Reverse causality is less likely in this context. To address endogeneity, we employed an IV Tobit model, instrumenting CTL with kinship structure from Enke (2019). Kinship can be a powerful instrument for measuring cultural tightness-looseness as it reflects many of the cultural and social norms that define levels of conformity and social control. Observing kinship structures and practices can provide important insights into how strict or flexible the normative framework of a society is and the extent of individual freedom to deviate from these norms. The instrumental variable is defined as the difference between the kinship structure of the destination country and that of the investor's home country, as it is strongly correlated with Diff_CTL. Column [3] in Table 1 shows the results of the second stage estimation, where the negative and statistically significant coefficient of Diff_CTL provides further support for Hypothesis 1.

Developed markets are generally looser (with an average score of 78.10 in our sample), whereas emerging markets tend to be tighter (average score of 49.55). Developed markets are known to attract more portfolio investments than emerging ones for various reasons that cannot all be captured through control variables. Therefore, in Columns [4] and [5] of Table 1, we re-estimate the model from Column [1] for two subsamples: developed and emerging markets. The negative and significant coefficient of Diff_CTL in both columns confirms that the association between Diff_CTL and foreign bias is not driven by the level of development of the destination market, further supporting Hypothesis 1.

Table 1 Foreign bias and difference in cultural tightness-looseness

	Base model	Standardized beta (%)	IV Tobit approach	Sub-sample: developed market host countries	Sub-sample: emerging market host countries
	[1]	[2]	[3]	[4]	[5]
Difference in CTL (Diff_CTL)	-0.0495*** (-8.41)	-22.49	-0.0698*** (-7.77)	-0.0494*** (-7.82)	-0.0592*** (-5.41)
Home bias	-8.0509*** (-9.96)	-15.85	-7.7599*** (-9.08)	-3.3433*** (-3.48)	-12.1881*** (-9.46)
Log GDP	1.0816*** (5.12)	15.03	1.0180*** (4.70)	0.5368** (2.48)	0.3057 (0.55)
Capitalization/GDP	0.0182*** (4.93)	12.55	0.0203*** (5.38)	0.0063 (1.17)	0.0181*** (3.04)
Exchange rate risk	-0.4781*** (-2.80)	-7.72	-0.6085*** (-3.53)	0.0382 (0.22)	-0.1703 (-0.41)

	[1]	[2]	[3]	[4]	[5]
Transaction costs	-0.0378** (-2.34)	-6.79	-0.0485*** (-2.85)	0.0151 (0.64)	-0.0059 (-0.13)
Investor protection	0.0852 (1.18)	3.23	0.0611 (0.84)	-0.0083 (-0.05)	0.0304 (0.20)
Return correlation	2.8320*** (6.67)	10.36	2.5657*** (5.83)	3.4044*** (6.56)	1.4876** (2.26)
Return volatility	-1.4826 (-0.86)	-2.35	-2.4239 (-1.36)	1.9536 (0.97)	0.1960 (0.09)
1- year Lagged Yearly Return	-0.2759 (-0.99)	-0.91	-0.3200 (-1.15)	-0.3134 (-0.61)	0.0773 (0.24)
5-year Lagged Yearly Return	-0.5369*** (-3.07)	-5.45	-0.5996*** (-3.39)	-0.1781 (-0.73)	-0.6878** (-2.46)
Geographic distance	-2.3969*** (-12.29)	-33.04	-2.3213*** (-11.63)	-1.8525*** (-9.35)	-2.1664*** (-4.73)
Linguistic distance	-1.3853*** (-2.83)	-4.72	-1.3279*** (-2.71)	-0.1914 (-0.38)	-3.7174*** (-3.90)
GAAP differences	-0.1054* (-1.69)	-4.09	-0.1067* (-1.70)	-0.0755 (-1.17)	-0.1591 (-1.51)
Bilateral trade	5.4206** (2.11)	2.74	5.1318* (1.83)	3.5384 (1.58)	52.1193** (2.38)
Cultural distance	-0.0074* (-1.85)	-4.65	-0.0082* (-1.74)	-0.0097*** (-4.59)	-0.0062 (-1.29)
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Log-likelihood/Adj. R2	-52582.55	0.2771	-136309.94	-28592.73	-22740.78
N (left-censored obs.)	17864 (3336)	17864	17864 (3336)	9856 (1132)	8008 (2204)

Note: The equations from Columns [1] and [3] to [5] are Tobit regressions and that for Column [2] is the OLS regression. In Column [3], the instrumental variable is the difference in kinship structure constructed by Enke (2019). The results of the second-stage regression are reported in column [3]. The t-statistics based on robust standard errors clustered by home-destination countries are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

To investigate **Hypotheses 2** and **3**, we included variables capturing the quality of the informational environment and insider trading laws in the base model, as well as their interactions with Diff_CTL. In the first model, displayed in Column [1] of Table 2, where the informational environment quality is measured by the number of internet users, the positive interaction term suggests that as internet penetration rises, the negative effect of greater CTL differences on foreign bias decreases. This implies that increased access to information through internet availability enhances investors' ability to diversify portfolios internationally, even when considerable cultural differences exist between home and destination countries. These results support the idea that a well-developed digital infrastructure

eases access to vital market information, bolstering investor confidence and lessening dependence on cultural familiarity. In the second model from Column [2] of Table 2, where the informational environment quality is measured through the monetary policy transparency index, the findings similarly highlight a positive and statistically significant interaction effect. This indicates that greater transparency in monetary policy also mitigates the negative impact of cultural differences on foreign diversification. Transparent monetary policies reduce uncertainties and improve the predictability of economic conditions, helping foreign investors navigate cultural unfamiliarity more effectively. This increase in transparency boosts investor confidence, potentially leading to a higher level of foreign investments, even in socially and culturally distant markets.

In the models presented in Columns [3] and [4] of Table 2, we examine the interaction between two measures of insider trading laws: one *de jure* and the other *de facto*. Consistent with the results observed in models measuring informational environment quality, the interaction terms between the two insider trading law proxies and Diff_CTL are positive and statistically significant. These findings suggest that robust insider trading regulations, both in terms of strict legal frameworks (*de jure*) and effective enforcement (*de facto*), significantly alleviate the impact of social norms distance on foreign diversification. In other words, as the strength and enforcement of insider trading laws in destination countries increase, the negative influence of cultural differences on investors' willingness to diversify internationally is reduced.

Table 2 The contingent effect of Informational and Insider trading laws variables

	Informational variables		Insider trading laws (i.d.l.)	
	Internet	Macroeconomic transparency	Stringent i.t.l.	Enforcement i.t.l.
	[1]	[2]	[3]	[4]
Difference in CTL (Diff_CTL)	-0.0501*** (-8.61)	-0.0501*** (-8.42)	-0.0502*** (-8.42)	-0.0531*** (-8.87)
Internet	0.0334*** (2.86)			
Macroeconomic transparency		-0.0875 (-0.81)		
Stringent i.t.l.			0.2380 (0.81)	
Enforcement i.t.l.				-0.7659 (-1.53)
Difference in CTL × Internet	0.0004*** (2.76)			

	[1]	[2]	[3]	[4]
Difference in CTL × Macroeconomic transparency		0.0079*** (3.34)		
Difference in CTL × Stringent i.t.l.			0.0150* (1.93)	
Difference in CTL × Enforcement i.t.l.				0.0555*** (2.95)
Control variables	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Log-likelihood	-50765.46	-50776.63	-50805.30	-50766.13
N (left-censored obs.)	17864 (3336)	17864 (3336)	17864 (3336)	17864 (3336)

Note: The equations from Columns [1] to [4] are Tobit regressions. All variables for which interaction effects are investigated are centered. The t-statistics based on robust standard errors clustered by home-destination countries are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

5. ROBUSTNESS TESTS

As a first robustness test for the previous results, we utilized an alternative measure of foreign bias from Bekaert and Wang (2009), which incorporates a home bias component directly in its construction. This measure removes the need to separately control for home bias in the models. To ensure consistent interpretation of the parameters, we multiplied this measure by -1, so that higher values similarly indicate a lower foreign bias (i.e., greater international diversification).

The findings in Table 3 further validate the three hypotheses. In Columns [1] and [2], we estimated both the baseline and IV Tobit models, using the same instrumental variable (kinship difference). The negative and statistically significant coefficients reconfirm Hypothesis 1. In Columns [3] through [6], we examined the interactions between Diff_CTL and the four variables used previously: two capturing the quality of the informational environment and two related to insider trading laws. In all cases, the interaction effects are positive and statistically significant, reinforcing Hypotheses 2 and 3.

Table 3 Robustness tests – alternative foreign bias measure

	Base model	IV Tobit approach	Internet	Macroec. transparency	Stringent i.d.l.	Enforcement i.d.l.
	[1]	[2]	[3]	[4]	[5]	[6]
Diff_CTL	-0.0013*** (-4.09)	-0.0023*** (-4.06)	-0.0014*** (-4.45)	-0.0014*** (-4.27)	-0.0014*** (-4.24)	-0.0014*** (-4.33)
Internet			0.0026*** (3.75)			

	[1]	[2]	[3]	[4]	[5]	[6]
Macroec. transparency				0.0044 (0.77)		
Stringent i.t.l					0.0272* (1.73)	
Enforcement i.t.l						0.0016 (0.16)
Diff_CTL × Internet			0.0001*** (3.20)			
Diff_CTL × Macroec. transparency				0.0002** (2.20)		
Diff_CTL × Stringent i.t.l					0.0005* (1.68)	
Diff_CTL × Enforcement i.t.l						0.0018** (2.03)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Log-likelihood	-9855.22	-93611.79	-9307.33	-9396.40	-9393.71	-9396.43
N (left-censored obs.)	17864 (3336)	17864 (3336)	17864 (3336)	17864 (3336)	17864 (3336)	17864 (3336)

Note: The equations from Columns [1] to [6] are Tobit regressions. All variables for which interaction effects are investigated are centered. The t-statistics based on robust standard errors clustered by home-destination countries are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

The findings in Table 3 further validate the three hypotheses. In Columns [1] and [2], we estimated both the baseline and IV Tobit models, using the same instrumental variable (kinship difference). The positive and statistically significant coefficients of Diff_CTL reconfirm Hypothesis 1. In Columns [3] through [6], we examined the interactions between Diff_CTL and the four variables used previously: two capturing the quality of the informational environment and two related to insider trading laws. In all cases, the interaction effects are positive and statistically significant, reinforcing Hypotheses 2 and 3.

The Tobit model, though widely used for censored data, has several limitations that make alternative methods preferable in some cases. First, Tobit models assume homoscedasticity (constant variance) and normally distributed errors, and any violations here lead to biased estimates. They also confound the probability of observing a non-zero outcome with the effect of the predictor on the outcome level, making it challenging to interpret results straightforwardly. This

model is also less flexible with datasets that have a high proportion of zero values because it assumes these zeros arise solely from censoring.

Table 4 Robustness tests – alternative estimation methods

	Tobit with random effects	OLS with zeros investments excluded	OLS with zeros investments included	Random effects with zeros investments excluded	Random effects with zeros investments included	Probit
	[1]	[2]	[3]	[4]	[5]	[6]
Diff_CTL	-0.0513*** (-7.86)	-0.0193*** (-8.78)	-0.0414*** (-8.93)	-0.0235*** (-8.77)	-0.0418*** (-8.14)	-0.0072*** (-6.41)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Log-likelihood/Adj. R2	-45965.87	0.345	0.278	0.271	0.206	0.194
N (left-censored obs.)	17864 (3336)	14528	17864	14528	17864	17864

Note: The t-statistic for model [1] is based on the standard error derived from asymptotic theory. For models [2] to [6], the t-statistics are based on robust standard errors clustered by home-destination countries. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Despite the inclusion of numerous control variables for destination markets, it is highly likely that certain influential variables remain omitted. For example, factors such as societal trust (Drobetz et al., 2023), levels of corruption, and the extent of free float represent just a few potentially relevant omitted variables. To address this potential heterogeneity, we estimated the baseline model using a Tobit approach with random effects, as shown in Column [1] of Table 4. In Columns [2]–[5], we specifically examined the impact of zero-investment instances, estimating the baseline model with and without zero-investment data using OLS and random effects. Finally, in Column [6], we employed a Probit model, where the endogenous variable equals 1 if there were any CPIS-reported investment flows and 0 otherwise. Summarizing the findings in Table 4, the Diff_CTL parameter is consistently negative and statistically significant across all estimation methods, reinforcing the primary results that support Hypothesis 1.

6. CONCLUSIONS

This study examines how differences in cultural tightness-looseness (CTL) impact foreign bias in international portfolio diversification, particularly highlighting how cultural norms shape investment decisions. We find that foreign

bias—investors' preference for familiar or culturally similar markets—is strongly influenced by the CTL of both investors' home countries and potential target markets. Investors from "tight" cultures, where social norms are strict and deviation is less tolerated, are more likely to perceive "looser" cultures as risky or unpredictable. This perception heightens foreign bias, leading to reduced investment in culturally distant markets, as investors view them as volatile or misaligned with their values and expectations. It is thus demonstrated that the difference in CTL could represent a new variable explaining foreign bias, one that has been omitted in previous studies.

Our findings also indicate that a stronger informational environment and stricter enforcement of insider trading laws in destination countries can mitigate the effects of CTL differences. High-quality information flows, as indicated by internet usage and transparency, help reduce the perceived risks of investing in culturally distant markets. Similarly, robust insider trading laws build investor confidence by aligning foreign markets with the investors' expectations for regulatory rigor and reliability. These structural factors suggest potential policy interventions to foster greater international investment flows and enhance global financial integration by addressing not only economic barriers but also cultural and informational gaps.

Overall, this study contributes to a growing body of literature that underscores the importance of non-economic factors in international finance. By bridging cultural psychology and investment theory, we provide a more nuanced understanding of how cultural norms influence market behaviors, offering new insights for policymakers and investors interested in improving market integration and international diversification strategies.

REFERENCES

1. Aggarwal, R., z 916–934. <https://doi.org/10.1016/j.jbankfin.2010.09.006>.
2. Bae, K., Tan, H., & Welker, M. 2008. “International GAAP differences: The impact on foreign analysts.” *Accounting Review* 83(3): 593–628. <http://dx.doi.org/10.2139/ssrn.3144137>.
3. Bekaert, G., & Wang, X. 2009. “Home bias revisited.” Working paper, Columbia Business School. <http://dx.doi.org/10.2139/ssrn.1344880>.
4. Bhattacharya, U., & Daouk, H. 2002. “The world price of insider trading.” *Journal of Finance* 57: 75–108.
5. Beugelsdijk, S., & Frijns, B. 2010. “A cultural explanation of the foreign bias in international asset allocation.” *Journal of Banking & Finance* 34(9): 2121–2131. <https://doi.org/10.1016/j.jbankfin.2010.01.020>.
6. Bottazzi, L., Da Rin, M., & Hellmann, T. 2016. “The importance of trust for investment: Evidence from venture capital.” *Review of Financial Studies* 29(9): 2283–2318.
7. Campbell, J. Y., Lo, A. W., & MacKinlay, A. C. 1997. *The econometrics of financial markets*. Princeton University Press.
8. Chan, K., Covrig, V., & Ng, L. 2005. “What determines the domestic bias and foreign bias? Evidence from mutual fund equity allocations worldwide.” *Journal of Finance* 60(3): 1495–1534. <https://doi.org/10.1111/j.1540-6261.2005.768.1.x>.
9. Cooper, I. A., Sercu, P., & Vanpée, R. 2013. “The equity home bias puzzle: A survey.” *Foundations and Trends in Finance* 7(4): 289–416. <http://dx.doi.org/10.1561/05000000039>.
10. Dincer, N., Eichengreen, N. B., & Geraats, P. 2022. “Trends in Monetary Policy Transparency: Further Updates.” *International Journal of Central Banking* 18(1): 331–348.
11. Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. 2008. “The law and economics of self-dealing.” *Journal of Financial Economics* 88(3): 430–465. <https://doi.org/10.1016/j.jfineco.2007.02.007>.
12. Chui, A. C., Titman, S., & Wei, K. C. 2010. “Individualism and momentum around the world.” *Journal of Finance* 65(1): 361–392.
13. Enke, B. 2019. “Kinship, Cooperation, and the Evolution of Moral Systems.” *The Quarterly Journal of Economics* 134(2): 953–1019. <https://doi.org/10.1093/qje/qjz001>.
14. Eun, C. S., Wang, L., & Xiao, S. C. 2015. “Culture and R2.” *Journal of Financial Economics* 115(2): 283–303. <https://doi.org/10.1016/j.jfineco.2014.09.003>.
15. French, K. R., & Poterba, J. M. 1991. “Investor diversification and international equity markets.” *American Economic Review* 81(2): 222–226.
16. Gelfand, M. J., Nishii, L. H., & Raver, J. L. 2006. “On the nature and importance of cultural tightness-looseness.” *Journal of Applied Psychology* 91(6): 1225–1244.
17. Gelfand, M. J., Raver, J. L., Nishii, L., Leslie, L. M., Lun, J., et al. 2011. “Differences between tight and loose cultures: A 33-nation study.” *Science* 332(6033): 1100–1104.

18. Giofré, M. 2017. "Financial education, investor protection, and international portfolio diversification." *Journal of International Money and Finance* 71(C): 111–139. <https://doi.org/10.1016/j.jimonfin.2016.11.004>.
19. Guiso, L., Sapienza, P., & Zingales, L. 2009. "Cultural biases in economic exchange?" *Quarterly Journal of Economics* 124(3): 1095–1131.
20. Hofstede, G. H., Hofstede, G. J., & Minkov, M. 2010. *Cultures and Organizations: Software of the Mind*. McGraw-Hill, New York.
21. Hofstede, G. 2001. *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. Sage Publications.
22. Kwabi, F. O., & Boateng, A. 2021. "The effect of insider trading laws and enforcement on stock market transaction cost." *Review of Quantitative Finance and Accounting* 56(3): 939–964. <https://doi.org/10.1007/s11156-020-00914-9>.
23. La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. 1998. "Law and finance." *Journal of Political Economy* 106(6): 1113–1155.
24. Li, C., & Gelfand, M. J. 2022. "The influence of cultural tightness-looseness on cross-border acquisition performance." *Journal of Economic Behavior and Organization* 195: 1–15. <https://doi.org/10.1016/j.jebo.2022.01.004>.
25. Noh, M., & Cho, M. K. 2022. "Cultural tightness and accounting conservatism." *Journal of Contemporary Accounting and Economics* 18: 100305. <https://doi.org/10.1016/j.jcae.2021.100305>.
26. Portes, R., & Rey, H. 2005. "The determinants of cross-border equity flows." *Journal of International Economics* 65(2): 269–296.
27. Siegel, J. I., Licht, A. N., & Schwartz, S. 2011. "Egalitarianism and international investment." *Journal of Financial Economics* 102(3): 621–642. <https://doi.org/10.1016/j.jfineco.2011.05.010>.
28. Solnik, B., & McLeavey, D. 2009. *International Investments*. 6th ed. Pearson Addison Wesley, New York.
29. Spolaore, E., & Wacziarg, R. 2009. "The diffusion of development." *Quarterly Journal of Economics* 124(2): 469–529. <https://doi.org/10.1162/qjec.2009.124.2.469>.
30. Stulz, R. M. 2005. "The limits of financial globalization." *Journal of Finance* 60(4): 1595–1638.
31. Tesar, L. L., & Werner, I. M. 1995. "Home bias and high turnover." *Journal of International Money and Finance* 14(4): 467–492.
32. Todea, A., & Harin, C. 2024. "The influence of cultural norms on international equity allocation." *The European Journal of Finance* 30(12): 1362–1385. <https://doi.org/10.1080/1351847X.2023.2291124>.
33. Triandis, H. C. 1995. *Individualism and Collectivism*. Westview Press.
34. Uz, I. 2015. "The index of cultural tightness and looseness among 68 countries." *Journal of Cross-Cultural Psychology* 46(3): 319–335. <https://doi.org/10.1177/0022022114563611>.



THE IMPACT OF GLASS CEILING DETERMINANTS ON ORGANIZATIONAL JUSTICE IN THE PUBLIC SECTOR

A CASE STUDY OF SEVERAL PUBLIC INSTITUTIONS IN THE WILAYA OF GHARDAIA IN ALGERIA

NOUR EL HOUDA BOUGUERRAⁱ

Abstract: *This scientific paper aims to highlight the impact of the determinants of the glass ceiling on organizational justice in several public institutions in the Wilaya of Ghardaia in Algeria. To achieve this goal, the questionnaire tool was relied on distributed on a random cluster sample of five public institutions, and to estimate the size of the impact we used the method of description, correlation and regression, we observed the existence of a large glass ceiling at the level of the economic institutions under study compared to service institutions, where the percentage of women in senior positions Between 3.2% and 9.7%, the results of the questionnaire showed that the determinants of the glass ceiling significantly affect organizational justice in the institution, where there are significant effects between independent variables and organizational justice, while organizational determinants did not show a significant impact on organizational justice.*

Keywords: *Glass Ceiling Determinants, organizational justice, Algeria*

JEL Classification: *J16, J71, M12, D63*

1. INTRODUCTION

The argument is clear for increasing the number of women in leadership positions and supporting women entrepreneurs in launching and expanding their businesses, it's good for societies and economies. Yet, women continue to face numerous challenges, from legal hurdles to lack of childcare infrastructure, from entrenched societal norms and barriers to accessing finance to discriminatory employer policies. (worldbank, 2023)

In another IMF staff study which looked at two million firms in 34 countries in Europe greater gender diversity in senior positions was associated with higher profitability of firms. More precisely, it found that one more woman in senior

ⁱ Faculty of Economics, Commerce, and Management Sciences, Administrative Development Laboratory for the Advancement of Economic Institutions in Ghardaia Province, University of Ghardaia, Algeria, bouguerra.nourelhouda@univ-ghardaia.edu.dz



management or on a corporate board is associated with 8–13 basis points higher return on assets. These findings demonstrate the beneficial effects of greater diversity of views on boards, as it broadens the range of perspectives and improves the quality of decision making and discussion leading to better outcomes for businesses (Georgieva & Levonian, 2020)

Two-thirds of companies surveyed by the ILO agreed that diversity initiatives improved their business outcomes. When enterprises have an inclusive business culture and inclusive policies, the predicted probability of achieving: enhanced ability to attract and retain talent is 60%, enhanced company reputation is 58%, better ability to gauge consumer interest and demand is 38%, when boards are gender-balanced, companies are almost 20% more likely to have enhanced business outcomes (ILO, 2019)

Studying the glass ceiling phenomenon at the international or local level is important to understand the challenges of equality and justice in different regulatory systems.

The concept of the glass ceiling originated during the middle 1980s to describe the invisible and artificial barriers that have kept women from promotion to upper management and other higher leadership positions in the business world. This definition originally addressed the difficulties of women to advance but soon evolved to include both male and female racial/ethnic minorities (executive, 2014)

In Algeria, Algerian legislation aims to protect the rights of working women and ensure their equality with men in the areas of pay and promotion. This includes providing protection in the workplace and ensuring equal pay for both genders when the same work is performed with the same quality and efficiency. The legislation also seeks to protect women from sexual harassment and ensure appropriate maternity leave and periodic leave to care for the family, which reflects the Algerian government's commitment to enhancing women's role in economic and social development.

The World Bank indicated that the percentage of women working in Algeria compared to the number of working men is within 25 percent in 2023 (world bank, 2024) , and it is known that this percentage may vary depending on age, educational level, and geographical region, and the largest percentage of women, according to data from the National Center for Statistics, indicates that most women work in the service sector and decreases significantly in the industrial sector and more than in the agricultural sector... But the question here is the proportion of women working in leadership positions and in senior management compared to the number of men, and this is the subject of our study.

The study of the phenomenon of the glass ceiling in Algerian public institutions is necessary to understand and identify the obstacles facing the advancement of women in the fields of leadership and management to determine the status of women working in Algeria and the conditions that prevent women from advancing in the career ladder despite the legal and legitimate protection of their rights.

Linking the glass ceiling to the organizational justice variable promotes a comprehensive understanding of the impact of social and cultural factors on the distribution of opportunity and progress within organizations. Understanding how this phenomenon affects elements of organizational justice helps identify obstacles to gender balance and equality in the workplace. Focusing on this link can drive the development of policies and procedures that promote diversity and ensure equal opportunities, ultimately improving organizational performance and strengthening the organization's position as an inclusive and innovative work environment. In studying the phenomenon of the glass ceiling, we relied on several public economic and service institutions from the Wilaya of Ghardaia, a desert province in Algeria, in order to observe the differences in the level of the glass ceiling according to the activity of the institution.

1.1.Problematic: Through the above, we are trying through this research paper to answer the following question:

- Do the determinants of the glass ceiling affect the level of organizational justice in the public institutions under study?
- How do glass ceiling determinants affect the level of organizational justice in the public institutions under study?

1.2. Sub-questions

- Several sub-questions emerge from this question, as follows:
- Is there an impact of gender discrimination on organizational justice within the institutions studied?
- Do the personal determinants of the glass ceiling affect the achievement of organizational justice in the public institutions under study?
- Do the regulatory determinants of the glass ceiling affect the achievement of organizational justice in the public institutions under study?
- Do local laws and regulations affect the achievement of organizational justice in the public institutions under study?

- Are there statistically significant differences in the determinants of the glass ceiling and organizational justice due to the gender variable?

1.3. Hypotheses: To answer these questions, we have formulated the following hypotheses:

Hypothesis 1: There is a statistically significant effect of the determinants of the glass ceiling on the level of organizational justice in the public institutions under study, and the following sub-hypotheses are branched from them:

Hypothesis 2: There is a statistically significant effect of gender discrimination on the level of organizational justice in the public institutions under study.

Hypothesis 3: There is a statistically significant effect of regulatory determinants on the level of organizational justice in the public institutions under study.

Hypothesis 4: There is a statistically significant effect of personal and family determinants on the level of organizational justice in the public institutions under study.

Hypothesis 5: There is a statistically significant impact of legal and legislative determinants on the level of organizational justice in the public institutions under study.

Hypothesis 6: There are statistically significant differences at a significant level of 5% for the determinants of the glass ceiling to enhance organizational justice in the institutions under study due to the gender variable.

2. METHODOLOGY

To answer the problem of this research, the descriptive approach was relied upon because it allows collecting data and facts about the phenomenon under study, In addition to the case study approach by distributing a questionnaire to a sample of individuals, and analyzing it statistically using the SPSS program.

The current study was quantitative. The main objective of the research was to predict the impact of the factors determining the glass ceiling phenomenon on career advancement among a sample of male and female employees in Algerian public institutions, and to reach the impact of these determinants on organizational justice in the institutions under study. It relied on four public institutions: Naftal Company, Ghardaia Branch, which is a public Algerian company operating in the oil and energy sector. Sonelgaz Company, which is a public Algerian company specializing in the natural gas sector. Algeria Telecom Company is the company National Telecommunications in Algeria, and the Vocational Training Center in Ghardaia Province, which is an educational institution... As a note, these institutions are located in southern Algeria, in the state of Ghardaia.

In selecting the study sample, we relied on the cluster sample with multiple layers consisting of five public institutions: Naftal Company, Ghardaia branch, which is an Algerian public company operating in the oil and energy sector., Sonelgaz is an Algerian public company specialized in the natural gas sector, Algeria Telecom Company is the national telecommunications company in Algeria, and the Vocational Training Center in the Wilaya of Ghardaia, which is an educational institution, and the Land Survey Institution in the Wilaya of Ghardaia, which is also a public institution, then a sample of individuals was selected from Each institution randomly which enhances the representativeness of the sample in general. This approach allows accurate and reliable data for analysis, which can contribute to better highlighting trends and results of interest in the study. The number of respondents was 178 people from the five institutions under study.

In selecting the study sample, we relied on a "Multi-stage Cluster Sample" consisting of four public institutions. Then, a sample of individuals from each institution was randomly selected, which enhances the representativeness of the sample in general. This approach allows obtaining accurate and reliable data for analysis, which can contribute to better highlighting trends and findings of interest in the study.

The questionnaire model was based on 3 axes: the first axis is related to the personal data of employees (gender, age group, educational level, seniority in the institution and job title), while the second axis consisted of a set of questions about the determinants of the glass ceiling divided into four dimensions (gender discrimination, organizational determinants, personal and family determinants, and legal and legislative determinants) with reference to the determination of the dimensions was based on the study of Nargis Mirza Abbas, Uzma Ashiq, and Nour Mohamad Boubes, Samar Marouf Kabalan (Abbas & Ashiq, 2021) and (Boubes & Marouf Kabalan, 2022)

The last axis of the questionnaire included a set of questions related to the extent to which organizational justice is achieved in the institutions under study. We also relied on the Lycart triple scale, and Cronbach's alpha value, 0.813, indicated thirty statements in the questionnaire, indicating a high level of internal reliability.

Before starting the statistical processing of the questionnaire, we will try to display data for the analysis of the reality of the glass ceiling in the institutions under study as follows:

2.1. The reality of the phenomenon of the glass ceiling in the institutions under study

Table 1: Data showing the distribution of employees and senior positions in the institutions under study

Organization Name	Total number of employees	Number of working women	Number of men in senior positions	Number of women in senior positions
Naftal Company	396	20	102	11
Sonelgaz Company	587	37	153	5
Algeria Telecom Company	185	19	25	8
Vocational Training Center	47	21	6	2
Land Survey Corporation	62	23	8	7

Source: SPSS output.

We note in all institutions that the number of male workers is greater than that of working women, while the ratio of women to men working in the institutions under study was 5% in Naftal Corporation, 6.3% in Sonelgaz, 10.3% in Telecom Algeria, 44.7% in the Vocational Training Center, and 37.1% in the Land Survey Corporation. The representation of women in enterprises compared to the number of men shows that the number of men working in institutions exceeds the number of women working in all the institutions mentioned. This may reflect a general pattern in the labor market where there are more job opportunities for men than women in certain industries or sectors. For example, Sonelgaz, Naftal and Telecom Algeria show that the field of work is highly male, which poses a challenge and difficulty for minority women working in these institutions to reach senior positions. While the Vocational Training Center and the Land Survey Institution were more attractive to women because this type of institution has low wages and financial privileges compared to economic institutions such as Naftal and Sonelgaz, so low wages compared to economic institutions may make these jobs less attractive to men looking for opportunities with higher salaries and privileges. As a result, women find greater opportunities to work in this institution.

On the other hand, we note that the percentage of women in senior positions compared to the total number of women working in the institution is as follows: Naftal Foundation, Algeria Telecommunications Corporation and Land Survey Corporation: The percentage of women in senior positions compared to the total number of working women was 55%, 42% and 30.4% respectively, which means

that there is a large percentage of women in the institution who are well represented in senior positions compared to the total number of working women. Good efforts have been made to achieve better representation of women in senior positions in these institutions.

As for Sonelgaz and the Vocational Training Corporation, the proportion of women in senior positions compared to the total number of working women was 13.51% and 9.52% respectively. This suggests that there are greater challenges regarding the representation of women in senior positions in these two institutions.

The ratio of women in senior positions to the total number of senior positions in the institutions studied was 9.7% and 3.2% in Naftal and Sonelgaz respectively, indicating significant sexual gaps in these institutions. While at the level of the Algeria Telecommunications Corporation, the Vocational Training Center and the Land Survey Institution, this percentage was 24.2%, 25% and 46.7% respectively. Hence, it is clear that there is a significant gap in female representation in senior positions, especially in Sonelgaz and Naftal. The Algeria Communications Corporation, the Vocational Training Center, and the Land Survey Corporation show better percentages, reflecting more supportive policies for women in reaching senior positions in these institutions.

3. RESULTS

To analyze the data, frequencies and percentages were used to study the demographic information of the respondents of the study. The distribution of respondents concerning gender showed that out of a total of 178 participants, there were 84 females (47.2%) and 94 males (52.8%). This distribution reflects a relatively balanced representation between genders in the sample collected from five public institutions in the state of Ghardaia.

The distribution of the study sample by age groups shows that 9.0% of individuals are under 30 years old (16 individuals), 37.6% are between the ages of 30 and 39 years (67 individuals), 44.4% are between the ages of 40 and 49 years (79 individuals), and 9.0% are 50 years old and above (16 individuals). This reflects a varied distribution of ages in the sample.

The distribution of the sample by educational level shows that 34.3% of individuals have a secondary level of education or less (61 individuals), while 55.1% have a university degree (98 individuals), and 10.7% have graduate studies (19 individuals). This distribution reflects diversity in the levels of education of individuals in the sample collected from public institutions in the Wilaya of Ghardaia.

The distribution of the study sample by seniority in the institution shows that 11.8% of them are less than 5 years of service (21 individuals), 28.7% are between 5 to 10 years (51 individuals), 20.2% are between 10 and 15 years old (36 individuals), and 39.3% have worked 15 years and above (70 individuals). Individuals with long seniority may have a different perspective than those with lower seniority regarding justice and opportunities within the organization, which can contribute to a deeper understanding of the impact of the glass ceiling on organizational justice.

The distribution of the sample by function shows that 12.4% of individuals hold the position of senior officer (22 individuals), 48.9% work as a cadre (87 individuals), 21.3% occupy the position of control assistant (38 individuals), and 17.4% occupy the position of executive assistant (31 individuals). This distribution reflects diversity in job levels among individuals in the sample collected from public institutions in the Wilaya of Ghardaia.

To understand the views and attitudes of the study sample about the determinants of the glass ceiling in their organizations and the level of organizational justice, we used arithmetic averages and standard deviations for interpretation.

Table 2: Results of arithmetic averages and standard deviations

	Materiality	Standard deviation	Arithmetic mean
Gender discrimination	Neutral	0,91	1,77
Regulatory determinants	Neutral	0,86	2,02
Personal and family determinants	Neutral- Agree	0,78	2,31
Legal and legislative determinants	Agree	0,75	2,36
Organizational Justice	Neutral- Agree	0,84	2,25

Source: SPSS output.

With regard to the element of gender discrimination in the public institutions under study, we found that there was no clear discrimination, as the averages were neutral for opinions on discrimination in employment (1.81 and standard deviation, 912) and benefits and rewards (1.83 and standard deviation, 910). The chances of promotion are equal: the mean was low (1.74 and a standard deviation, 932) indicating that participants did not see much difficulty for women in obtaining promotions compared to men. Equality in assessments were neutral (1.74 and standard deviation, 898) and professional development and training opportunities (1.75, standard deviation, 893) and indicated a lack of clear preferences for men or significant

difficulties faced by women. In general, the results indicate that there is no clear gender discrimination in the public institutions studied in the Wilaya of Ghardaia.

The mean of the study sample on organizational determinants was estimated at 2.02 and a standard deviation of 0.86 with a neutral tendency to agree (note that we used the triple Likert scale), where the neutral mean of statements about organizational barriers and institutional policies (1.79 with a standard deviation ,868) indicated that employees do not have strong agreement that there are barriers to the implementation of diversity and equality policies, and reflects the varying circumstances that affect the ability of the women working late hours and assuming leadership positions with an average of 2.08 and a standard deviation of 911. There is relative agreement that women do not prefer to work in distant areas, affecting their chances of senior positions with an average of 2.34 and a standard deviation.861, while differing opinions about the physiological requirements of leadership emerge with an average of 2.06 and a standard deviation of 900. In the same context, respondents do not agree that women have difficulty following developments in their field of work with an average of 1.81 and a standard deviation of 808. This indicates a good perception of women's ability to adapt and develop in the work environment.

The results of the study on the determinants of the glass ceiling (the third dimension: personal and family determinants) indicate that the balance between personal and work life is a major challenge for women in the organization, as respondents agree on this matter with an arithmetic mean: 2.70 and a standard deviation,561 . Participants also believe that family obligations affect women's ability to commit to overtime and devote themselves to leadership projects with an arithmetic mean of 2.46 and a standard deviation ,774. In contrast, opinions about the gender gap in the sacrifices required for career advancement vary with an arithmetic mean of 2.22 and a standard deviation of 863. The neutral approach to the impact of social expectations on women's personal and professional ambitions is also shown with an average of 2.17 and a standard deviation of 862, reflecting the diversity of individual and personal experiences in this context.

The arithmetic mean of the study sample's opinions on the legal and legislative determinants was estimated at 2.36 and a standard deviation of 0.75, whose direction tends to agree, as the members of the study sample agree that women enjoy legal protection against discrimination and harassment in the workplace with an arithmetic mean of 2.71 and a standard deviation ,667, while their opinions were neutral about the existence of laws imposing certain percentages of women in senior positions with an arithmetic mean 1.87 and a standard deviation of 817, while respondents agree

that there is legislation that supports maternity rights and paid leave, which helps create a more supportive work environment for working mothers. With an average of 2.57 and a standard deviation, 704, respondents also agree that there is legislation aimed at reducing gender salary discrimination and imposing equal pay with an average of 2.35 and a standard deviation.811 This reflects the existence of legal policies that support equal pay in the public sector in Algeria, and respondents also agree that there is legislation that promotes equal opportunities for promotion between the sexes with an average of 2.34 and a standard deviation, 790 . This suggests that there are legal policies aimed at achieving gender justice and equality in professional promotion.

As for the variable of organizational justice, the views of the study sample were neutral and tend largely to agree with an arithmetic mean of 2.25 and a standard deviation of 0.84, where they agree that opportunities for promotion and professional development are available based on merit and competence without discrimination, and that the evaluation of employee performance is fair and objective, and that administrative decisions and processes apply to all employees without exception, and about the existence of procedures to provide training to all employees regardless of their gender or race. Their opinions differ on the following points: there is a disparity in the application of justice in the distribution of tasks, the appropriateness of the timing of work to their particular circumstances, about the treatment of employees by superiors, about encouraging a culture of transparency and open communication within the organization, as well as regarding the discussion by superiors of decisions that affect their jobs.

To test the hypotheses of the study, Pearson's correlation coefficients between the independent variables and the dependent variable will first be calculated to study the interrelationship between the variables, and this is what is clear to us through the following table:

Table 3: Pearson correlation coefficient test between glass ceiling determinants and organizational fairness among the study sample members

		Correlations	
		Organizational Justice	Glass ceiling determinants
Pearson correlation	Glass ceiling determinants	,436**	1
Sig. (bilateral)		,000	
N		178	178
Pearson correlation	Organizational justice	1	,436**
Sig. (bilateral)		,000	
N		178	178

**The correlation is significant at the 0.01 (bilateral) level.

Source: SPSS output.

The table shows the results of the Pearson correlation coefficient "R" between the determinants of the glass ceiling and organizational justice among the study sample members. It is 0.436, which is a positive, average and statistically significant correlation coefficient, while the level of statistical significance (Sig.) for this correlation is 0.000, which is less than the level of significance adopted in the study of 0.05, and this means that there is a statistically significant relationship between the determinants of the glass ceiling and organizational justice in the study sample. For more details on this correlation, we refer to the following table:

Table 4: Correlation coefficient between glass ceiling determinants and regulatory justice

		Organizational justice	Legal determinants	Personal determinants	Organizational determinants	Gender discrimination
Pearson correlation			,413**	,211**	,031	-,307**
Sig. (bilateral)	Organizational justice	1	,000	,005	,682	,000
N	Organizational justice	178	178	178	178	178

****The correlation is significant at the 0.01 (bilateral) level.**

Source: SPSS output.

The table shows us that there is an inverse, moderate, and statistically significant correlation between the gender dimension and the level of organizational justice. As for the regulatory determinants and their relationship to organizational justice, the results of the above table showed that there is no statistically significant correlation between organizational determinants and the level of organizational justice. (Sig = 0.682), and for personal determinants we observe a weak and statistically significant positive correlation between personality determinants and the level of organizational justice. As for the legal determinants, there is a strong and statistically significant positive correlation between the legal determinants and the level of organizational justice, which indicates that compliance with laws and regulations plays a major role in enhancing the sense of organizational justice among employees.

To test the hypotheses of the study related to the impact of glass ceiling determinants on organizational justice, we use simple linear regression as shown in the following table:

Table 5: Multiple linear regression test to determine the impact of glass ceiling determinants on organizational justice

Significant relationship between variables		Significant effect of regression coefficients between variables					
The overall morale of the ANOVA regression model		Correlation Coefficient of coefficient determination					
Calculated (SIG) F value	R	R ²	Regression model coefficients	<i>B</i>	<i>T</i>	(SIG)	
17.959	0.000	0.542	0.293	Constant	<i>B₀</i> ,964	3,560	,000
				Gender discrimination	<i>B₁</i> -,261	-4,385	,000
				Organizational determinants	<i>B₂</i> ,028	,320	,749
				Personal determinants	<i>B₃</i> ,232	2,646	,009
				Legal determinants	<i>B₄</i> ,489	5,795	,000

Source: Author's own calculations based on SPSS output.

It is clear from the above table:

- The significance of the relationship between the variables through the result of Fisher's test, where we find the calculated F value of 17.959, which is statistically significant, as the value of Sig= 0.000, which is less than the significance level (0.05), and this indicates the significance of the multiple regression model representing the studied relationship.

Therefore, we accept the alternative hypothesis H1: There is an impact of the glass ceiling determinants (gender discrimination, organizational determinants, personal and family determinants, legal and legislative determinants) on enhancing organizational justice in the institutions under study at the significance level ($\alpha \leq 0.05$).

Pearson's correlation coefficient (r): The value of 0.542 is positive, which indicates that the trend of the relationship between the variables is positive, i.e. increasing the levels of glass ceiling determinants, leads to an increase in the level of organizational justice.

- Coefficient of determination (R²): through the value of the coefficient of determination estimated at 0.293, that is, the four determinants of the glass ceiling in the public institutions under study explain 29.3% in the changes that occur in organizational justice, and the remaining 70.7% due to other factors.

The multiple linear regression models representing the relationship between the determinants of the glass ceiling and organizational justice in the institutions under study according to the following equation:

$$y = B_0 + B_1(X_1) + B_2(X_2) + B_3(X_3) + B_4(X_4) + B_5(X_5) + \epsilon_i$$

- **y** : Organizational Justice
- **B₀**: constant regression coefficient
- **B₁**: regression coefficient of the independent variable (gender discrimination) (X₁)
- **B₂** : regression coefficient of the independent variable (regulatory determinants) (X₂)
- **B₃**: Regression coefficient of the independent variable (personal and family determinants) (X₃)
- **B₄**: Regression coefficient of the independent variable (legal and legislative determinants) (X₄)
- **ε_i**: random error value
- Interpretation of the value of the regression coefficient B:
 - The value of the regression coefficient for gender discrimination reached B1 = -261), which is statistically significant because the value of the significance level (Sig=,000) of the test value (t = 4,385) is greater than the level of significance (0.05) and therefore we accept the alternative hypothesis H1, which states that there is a statistically significant effect between gender discrimination and organizational justice at the level of the institutions under study, which is an inverse relationship, i.e. the higher the level of gender discrimination, the lower the level of organizational justice.
 - The value of the regression coefficient for regulatory determinants reached B2 (= 0.028) is statistically significant because the value of the significance level (Sig=,749) of the test value (t =,320) is greater than the level of significance (0.05) and therefore we reject the alternative hypothesis H1 and accept the null hypothesis that states that there is no statistically significant effect between organizational determinants and organizational justice at the level of the institutions under study.
 - The value of the regression coefficient for personal and family determinants reached B3 (= 0.232), which is statistically significant because the value of the significance level (Sig=,009) of the test value (t = 2,646) is greater than the level of significance (0.05) and therefore we accept the alternative

hypothesis H1, which states that there is a statistically significant effect between personal determinants and organizational justice at the level of the institutions under study.

- The value of the regression coefficient for legal and legislative determinants reached B4 (= 0.489), which is statistically significant because the value of the significance level (Sig=,000) of the test value ($t = 5,795$) is greater than the significance level (0.05) and therefore we accept the alternative hypothesis H1, which states that there is a statistically significant impact between the legal and legislative determinants and organizational justice at the level of the institutions under study.

Therefore, we conclude that although there is a relationship between the determinants of the glass ceiling and the axis of organizational justice, there are significant effects between the independent variables (gender discrimination, personal and family determinants, legal and legislative determinants) and organizational justice, while the organizational determinants did not show a significant impact on organizational justice. Overall, the model is statistically significant, suggesting its effectiveness in explaining variation in organizational justice. Finally, the multiple linear regression model is represented by the following equation:

$$y=0,964+0,261(X1))+ 0,232(X3)+ 0,489(X4) + \epsilon$$

To test the hypothesis that there are statistically significant differences at a significant level of 5% for the glass ceiling determinants to promote organizational justice in the institutions under study due to the gender variable, we use the Independent Samples T-Test.

Table 06: Differences in the level of glass ceiling determinants and organizational justice in the institutions under study by gender variable

	Sex	Iteration	Arithmetic mean	Standard deviation	T	Significance level Sig	Morale level	Result
Glass ceiling limiters	male	94	2,16	0,318	0,838	0,407	0,05	Not significant
	female	84	2,12	0,338				
Organizational Justice	male	94	2,33	0,615	1,916	0,050	0,05	Statistically significant
	female	84	2,15	0,602				

Source: Author's own calculations based on SPSS output.

The table shows the analysis number of T-test results for the differences of the glass ceiling determinants and organizational justice attributed to the gender variable among the study sample members, it shows that there are statistically significant

differences between males and females in these two variables, for work pressures, the arithmetic mean in males was 2.16 compared to 2.12 in females, and the calculated T value of 0.838 was statistically significant at a significant level of 0.05, while the probability of significance SIG was 0.407 at the significance level. The statistic is 0.05, and this indicates that there are no statistically significant differences for the determinants of the glass ceiling from the point of view of the study sample members attributed to the gender variable.

For the organizational justice variable, the arithmetic mean was 2.33 in males and 2.15 in females, and the Levene test showed homogeneity of variance between the two groups, and the calculated T value of 1,916, and the significance probability value was 0.050, which is statistically significant at a significant level of 0.05, and accordingly, it is clear that there are statistically significant differences for the organizational justice variable from the point of view of the study sample members attributed to the gender variable.

4. DISCUSSION

We have noticed from the above that there is a large glass ceiling in Naftal and Sonelgaz, where the percentage of women in senior positions reached 9.7% and 3.2%, respectively, which are low compared to the general average representation of women in senior positions in the Algeria, which was estimated in 2023 at 10.41% and much lower than the global average of 24 Algeria% (Hanna Taylor, 2023) .

External training, long working hours and many other professional requirements can be difficult for women in the Wilaya of Ghardaia due to the nature of the Sahrawi Wilaya and the social responsibilities faced by women there. When we looked at the legal aspect of Algeria, we found that there are no specific laws that oblige economic institutions to reserve a certain percentage of senior positions to women. Although Algeria's constitution provides for gender equality and encourages women's empowerment, there is no explicit legislation imposing a quota for women in leadership positions in the economic sector.

While the Algeria Telecommunications Corporation, the Vocational Training Center, and the Land Survey Foundation, the proportion of women in senior positions: 24.2%, 25% and 46.7%, respectively, may be less demanding professionally compared to economic institutions, making it a more suitable work environment for women in the Wilaya of Ghardaia. This gender gap can be the result of many factors including economic factors (wages and financial privileges), the

nature of the enterprise's activity, and social constraints that limit women's participation in the labor market.

At the level of the five institutions under study, when analyzing the results of the questionnaire, we obtained a diverse sample in terms of gender, age, seniority in work, career level and educational level. This means that the results we obtain will be more representative and objective of the society we are studying.

The results of the arithmetic averages and standard deviations of the views of the study sample members on the determinants of the glass ceiling showed that there is no clear gender discrimination in recruitment, promotion, evaluation, and professional development opportunities in the public institutions under study in the Wilaya of Ghardaia, and we can explain this through the fourth determinant of the glass ceiling, which is the legal and legislative determinants. Where the members of the study sample agreed that women enjoy legal protection against discrimination and harassment in the workplace, and there is also legislation that supports maternity rights and paid leave, which helps in creating a more supportive work environment for working mothers. Respondents also agree that there is legislation aimed at reducing gender pay discrimination and enforcing equal pay, such as Law No. 90-11 of April 21, 1990, and Ordinance No. 06-03 of July 15, 2006, containing the General Organic Law of the Civil Service: which includes provisions aimed at ensuring gender equality in employment and wages in the public sector. This suggests that there are legal policies aimed at achieving justice and gender equality in professional promotion.

As for the organizational determinants, the respondents' opinions agreed that there is a disparity in the circumstances that affect women's ability to work late hours and assume leadership positions, and there is relative agreement that women do not prefer to work in distant areas, which affects their chances in senior positions, and this is what we can explain by the results of the third determinant, which is personal and family determinants, where the respondents agreed that the balance between personal and work life is a major challenge for women in the institution, and that family obligations affect the ability of women to commit to overtime and work full-time significantly.

With regard to the relationship of the determinants of the glass ceiling with organizational justice at the level of the institutions under study, we found through our field study that there is a statistically significant relationship between the determinants of the glass ceiling and organizational justice in the study sample, where there is an inverse correlation between the dimension of gender discrimination and the level of organizational justice. As for the organizational determinants and

their relationship to organizational justice, the results of the study showed that there is no statistically significant correlation between the organizational determinants and the level of organizational justice, and for the personal determinants, the results of the study showed a positive correlation between the personal determinants and the level of organizational justice. There is also a strong and statistically significant positive correlation between legal determinants and the level of organizational justice, the latter playing a major role in enhancing the sense of organizational justice among employees.

Overall, the model turned out to be statistically significant, suggesting its effectiveness in explaining variation in organizational justice. We found that there are significant effects between independent variables (gender discrimination, personal and family determinants, legal and legislative determinants) and organizational justice, while organizational determinants did not show a significant impact on organizational justice.

The legal determinants were the most influential on organizational justice, and this indicates that laws impose uniform standards and limit discriminatory practices, which contributes to strengthening the concept of organizational justice among employees, and the second determinant that affected organizational justice was gender discrimination, which had a negative impact on organizational justice, and this is logical as discrimination reflects unequal treatment, which harms the concept of justice within the organization, then personal and family determinants with less morale, Regulatory determinants had no impact on organizational fairness, perhaps because regulatory policies in this case are limited or ineffective enough to have a clear impact.

The results of the study also showed us that there are no statistically significant differences for the determinants of the glass ceiling from the point of view of the study sample members due to the gender variable, but with regard to organizational justice, there are statistically significant differences from the point of view of the study sample members due to the gender variable.

5. CONCLUSION

Through the previously presented results, we have found that the glass ceiling is a phenomenon that exists at the level of all institutions in varying proportions, and appears more in economic institutions compared to service institutions, and its presence violates the principle of achieving organizational justice in the institution. The presence of this phenomenon in institutions is the result of many reasons, including social restrictions that limit women's participation in the labor market, given that Sahrawi

society is still very conservative in its customs, traditions, and way of thinking, in addition to economic factors: wages and financial benefits are greater in economic institutions, so men are attracted to them. More compared to women who prefer to work in a service organization, but through which they can create a relative balance between their personal and professional lives. We conclude that the existence of this barrier is not only due to the culture of institutions and their view of women, but due to society as a whole and women in themselves. Therefore, regardless of gender discrimination, women in the Algerian desert must break the social and cultural barriers and even the barrier of their thinking, and this is largely consistent with the results of the LekshmiPriya, J. study, as this researcher concluded in her study on working women in India that they must fight social and cultural barriers because There is a deep-rooted internal belief system that prevents most female employees from exploring their potential and that organizations need to accept the fact that diversity at the top leads to better decision making and better business results (LekshmiPriya.J, 2019).

In order to talk about the gender gap in economic institutions, we must first talk about the gap in professional sacrifices and vacations and the imbalance between women's policies and vacations for family reasons, these leaves delay women compared to men to reach leadership positions. To solve this dilemma, it is necessary to promote social awareness of the importance of supporting women's professional ambitions and respecting and encouraging their goals by society in general and their families in particular. Economic institutions, for their part, must also create flexible policies to support women's work-life balance, such as remote work or flexible working hours.

One of the positive points drawn from this study is the strong legal protection of women against discrimination and harassment and the support of maternity rights and paid leave, but despite this, legislation and laws that impose certain percentages of women in senior positions must be strengthened to ensure that institutions adhere to them. Increase awareness of female employees of their legal rights and benefits, including maternity rights, equal pay and opportunities for promotion and professional development.

Achieving full organizational justice can only be achieved through achieving gender justice in organizations at the level of all their activities related to promotion, professional development, performance evaluation, remuneration, privileges and fair distribution of tasks, and this is consistent with the study of Watanabe, K. S., & Kwarteng, A. H (watanabe & Kwarteng, 2024).

It calls for the management of organizations to focus on the dimensions of organizational justice as this can ensure that women are supported and provided with the resources to advance to senior management positions just like their male counterparts.

Therefore, internal studies at the level of institutions, especially economic ones, will be necessary to analyze the impact of wages, financial privileges, and promotion to senior and leadership positions on the gender distribution of the workforce, which can help us better understand the gender gaps that cause the hardening of the glass ceiling.

REFERENCES

1. Abbas Farhat, Nargis Mirza Abbas., & Ashiq Uzma. (2021), "Glass ceiling effect and women career: Determining factors in higher education institutions". *Sir Syed Journal of Education & social Research (SJESR)*, Vol 4, No 1, pp.1-8.
2. World Bank (2023), "empowering women as entrepreneurs and leaders , engaging women as leaders :innovation, financing, and collective action", Marrakech, <https://live.worldbank.org/en/event/2023/spring-meetings-2023-empowering-women-entrepreneurs-leaders> [Accessed 22.7.2024] .
3. Boubes Nour Mohamad, & Marouf Kabalan Samar (2022), "The impact of glass ceiling factors on job performance of women employee- a field study on the employees of Damascus University", *Journal of Economic, Administrative and Legal Science* , Vol 6, No10, pp.1-34
4. Executive Latina. (2014). Glass ceiling, *Encyclopedia of Race, Ethnicity and Society*, SAGE Publications,inc, pp.1-4.
5. Georgieva, Kristalina & Levonian Louise. (2020, Mars 4). On Board with More Women in leadership. <https://www.imf.org/ar/Blogs/Articles/2020/03/03/blog030320-on-board-with-more-women-in-leadership> [Accessed 8.3.2024]
6. Hanna Taylor, Collin Meisel & Jonathan Moyer (2024). " Forecasting Women in leadership positions: Technical Brief", *Frederick S. Pardee Center for International Futures and UN women. Learneo, Inc.* <https://wilanglobal.org/wp-content/uploads/2024/06/forecasting-women-in-leadership-positions.pdf> [Accessed 24.8.2024].
7. International Labour Organization , Info stories (2019), Beyond the glass ceiling: Why businesses need women at the top, <https://webapps.ilo.org/infostories/en-GB/Stories/Employment/beyond-the-glass-ceiling#introduction> [Accessed 25.8.2024].
8. Lekshmipriya. J (2019), "An investigative study of the glass ceiling effect in relation with gender bias on the career development of women in organizations", *International Journal of Business and Manangement Invention (IJBMI)* , Vol8, No8, pp.19-24.
9. Watanabe Keiko Sweetie, Kwarteng Abdul hamid (2024), "Unveiling the glass ceiling phenomenon and mitigating strategies through organizational justice: A conceptual paper". *Cogent Business & Management* , Vol11, No1.
10. World Bank (2024). *Data, Labor force participation rate, female*, <https://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS> [Accessed 8.11.2024]



WHAT INCREASES MORE SYSTEMIC RISK: PANIC OR STRINGENCY?

ALEXANDRA MARIA CHIPERⁱ

Abstract: *During the COVID-19 epidemic, systemic risk increased significantly due to financial instability and vulnerability in various sectors of the economy. When the coronavirus disease (COVID-19) was declared a pandemic, the panic level of individuals increased due to the severity of the disease, the novelty of the situation, the degree of uncertainty and unknowns, and the stringency of the measures taken by the authorities. Our work wants to cover the part of the literature that aims at the beginning of the event and the effect produced on the systemic risk the reaction of those involved – investors, financial institutions and national decision and regulatory bodies. This paper examines whether the systemic risk in the COVID-19 period was a consequence of the stringent measures taken by the authorities or whether it was the result of the panic reaction of market participants.*

Keywords: *COVID-19, Panic, Stringency Measures, Systemic Risk*

JEL Classification:

1. INTRODUCTION

The end of 2019 introduced a paradigm shift in the global perspective of the economic and financial system's vulnerability to an exogenous and unanticipated event, exemplified by the COVID-19 pandemic. The emergence of the SARS-CoV-2 virus in Wuhan, China, has led to significant and swift choices at national and global levels, affecting individuals, corporations, and both national and international institutions.

The necessity to identify certain patterns at the historical level has led to a comparison between the crisis caused by the virus and other events at the sanitary level, including the Spanish Flu of 1918-1920 and other infections with different viruses at the country or continent level. Similarly, at the level of economic impact, comparisons have been drawn with other significant events, including the Great Depression and the Global Financial Crisis of 2007-2009.

ⁱ Alexandru Ioan Cuza University of Iași, E-mail: chiper.alexandra11@yahoo.com



The advent of the Coronavirus Disease 2019 (COVID-19) pandemic was not merely an unanticipated occurrence, as some scholars have termed it a ‘black swan’ event (Pentro, 2020), precipitating decisions with ramifications for each nation-state at the local and global levels. Additionally, the pandemic presented a unique opportunity to examine the influence of unforeseen circumstances on the daily lives of individuals and on the operations of economic and financial systems (Goodell, 2020).

At the economic level, the COVID-19 shock caused share prices of most companies to fall faster than during the 2007-2009 Global Financial Crisis (GFC) and systemic risk to rise to high levels. The significance is that "this time was different": we were close to a financial crisis and financial institutions seem to have successfully weathered the storm. This has depended to a large extent on the supportive measures taken globally by the various regulators and supervisors, as well as by national governments. But who determines the most systematic risk – the panic caused by the uncertainty of a pandemic or the stringent measures taken by governments?

When the coronavirus disease (COVID-19) was declared a pandemic by the World Health Organization (WHO) (11 March 2020), panic levels among individuals increased due to the severity of the disease, the novelty of the situation, the degree of uncertainty and unknowns, and the stringency of the measures taken by the authorities. Panic was also fueled by the media and the daily news of the number of deaths and dwindling supplies. As expected, the media coverage of the pandemic affected investors' decisions. The difficulty in assessing the significance and impact of the news led to increased volatility in equity markets. The article by (Haroon & Rizvi, 2020) shows that the ongoing COVID-19 outbreak created a media frenzy and competition for "breaking" news, and therefore there appears to be a link between coronavirus-related news and volatility in various industrial sectors of the US stock markets.

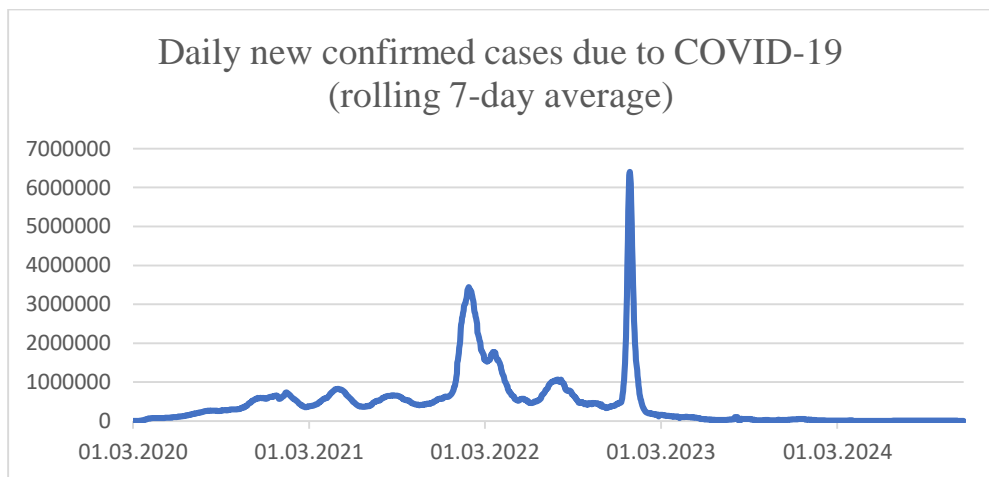
The aim of this paper is to investigate whether the systemic risk in the COVID-19 period was a consequence of the stringent measures taken by the authorities or whether it was the result of the panic reaction of market participants. Our work aims to cover the part of the literature that focuses on the beginning of the event and the effect on the systemic risk produced by the reaction of those involved – investors, financial institutions and national decision-making and regulatory bodies. In this regard, this paper wants to analyze the impact of the panic caused by both the uncertainty of the pandemic and the amount of news on the subject, as well as the measures taken by various institutions to minimize the impact of the events.

Our work is related to (Aggarwal, Nawn, & Dugar, 2021) who investigate the negative impact of COVID-19 on stock market returns. They find that the panic surrounding the pandemic affected overall returns by increasing the market risk premium and decreasing the equity risk premium.

2. BASIC FACTS

Five years after the first COVID-19 case in Wuhan, China, the global scenario suggests that we have largely moved on from this event in our lives. It is necessary to examine the factors that contribute to the significant systemic risk associated with it. The motivation stems from the fact that many specialized studies compare the impact of the COVID-19 pandemic with the Global Financial Crisis (GFC) in terms of financial impact.

The COVID-19 pandemic was unfortunately a global phenomenon. According to the Johns Hopkins University (CSSE), by December 2024 there were more than 676 million confirmed cases worldwide. This immense number of cases necessitated rapid and effective decisions by both the public and the private sector.



Source: World Health Organization (2024)

The report published by the International Monetary Fund (IMF, 2020) in April 2020 estimated that the global economy would contract sharply by 3%, significantly higher than during the 2007-2009 crisis. Against this backdrop, most governments responded immediately to minimize the impact of the shock through fiscal, monetary and macro-financial stimulus. On 20 March 2020, the Basel Committee on Banking Supervision coordinated the supervisory policies and responses of COVID-19, which

provided members of the jurisdictions with a set of regulatory and supervisory measures (BIS, 2020). Four years on, these measures have succeeded in mitigating the economic and financial consequences of the pandemic and in preventing a financial crisis of greater magnitude than the previous one.

The global pandemic has been identified as the catalyst for what is commonly designated as the 'Covid-19 recession', representing one of the most significant global economic downturns in recent history. In 2020, the global economy experienced a sharp contraction, with G20 economies exhibiting a year-on-year decline of approximately 3.4% in the first quarter. By mid-2020, it was estimated that approximately 400 million full-time jobs had been lost globally, with workers' income declining by approximately 10%, representing a loss of over \$3.5 trillion (Martin, Sacher, & Wilkinson, 2023).

According to (Baldwin & Weder di Mauro, 2020), the COVID-19 pandemic is both a demand and a supply shock that is likely to significantly slow aggregate trade flows. Focusing on the financial and banking risks posed by the pandemic, (Beck, 2020) argues that the impact would depend on three factors – the global economic impact of the pandemic, how fiscal and monetary policies are handled and the regulatory responses to potential bank fragility. Among financial institutions, (Cecchetti & Schoenholtz, 2020) argue that banks are very vulnerable to potential economic shocks, comparing the challenges to the collapse of a bank. According to (Mann, 2020), the linkages between global commodity markets, financial markets, public sentiment and the economy are likely to exacerbate the situation and make policy responses difficult.

At an economic level, the COVID-19 pandemic has had different effects across different industries, with some sectors experiencing significant disruptions while others have adapted to new consumer behavior. The travel and tourism industry were one of the hardest hits, with severe travel restrictions and global lockdowns. This led to a drastic reduction in flights, hotel stays and other tourism-related activities. International travel came to a virtual standstill as countries imposed strict entry requirements, significantly affecting airlines, travel agencies and related businessesⁱⁱ. The retail sector showed a mixed performance during the pandemicⁱⁱⁱ. Physical retail outlets suffered significant losses due to closures and reduced consumer activity. Conversely, e-commerce experienced an unprecedented surge as consumers shifted their shopping habits online^{iv}. This shift highlighted the growing

ⁱⁱ <https://www.unwto.org/impact-assessment-of-the-covid-19-outbreak-on-international-tourism>

ⁱⁱⁱ <https://hortoninternational.com/how-covid-19-is-impacting-the-retail-industry/>

^{iv} <https://www.statista.com/topics/6139/covid-19-impact-on-the-global-economy/#statisticChapter>

importance of digital infrastructure in retail. Manufacturing and global supply chains were severely disrupted, leading to delays and shortages in the delivery of goods and raw materials. The pandemic highlighted the vulnerability of just-in-time inventory systems and over-reliance on single-source suppliers. Several industries, such as automotive and electronics, experienced production slowdowns due to limited access to key components. The service sector, particularly businesses that rely on face-to-face interaction, faced severe challenges^v. The hospitality and entertainment sectors suffered prolonged closures, while those that reopened operated at reduced capacity and under strict health regulations. Many service-oriented businesses reported sharp declines in sales as consumer demand for dining out, attending events and other leisure activities remained subdued even after restrictions eased (Naseer, et al., 2023).

At the financial level, the COVID-19 pandemic had a significant impact on the stock market and financial stability, leading to unprecedented volatility, sharp declines and subsequent recoveries.

In March 2020, global stock markets experienced a historic downturn as investors reacted to the uncertainty and economic disruption caused by the pandemic. For example, the S&P 500 Index fell approximately 34% from its mid-February peak in just over a month, one of the fastest declines in market history. Other major indices, including the Dow Jones Industrial Average and the NASDAQ Composite, also suffered significant losses during this period (Tobias, Natalucci, & Qureshi, 2022).

Studies suggest that the pandemic led to a significant increase in market volatility. The conditional volatility of stock returns spiked in several global markets, with negative news related to COVID-19 affecting investor sentiment more than positive news about recovery ((Khan, Fifield, & Power, 2024), (Basouny, Bouaddi, Ali, & R., 2021)).

After the initial shock, stock markets began to recover rapidly. By mid-August 2020, the S&P 500 had returned to its pre-pandemic level, reflecting a remarkable rebound driven by several factors. The rapid recovery was facilitated by increased investor risk appetite as central bank intervention provided reassurance about economic stability. This led to a surge in equity prices across many sectors (Tobias, Natalucci, & Qureshi, 2022).

Despite the initial turmoil, the global financial system proved resilient throughout the pandemic thanks to proactive policy measures. However, concerns

^v <https://www.bls.gov/opub/ted/2022/u-s-manufacturing-output-hours-worked-and-productivity-recover-from-covid-19.htm>

remain about the potential overvaluation of equity markets and the long-term impact of persistently low interest rates. The pandemic highlighted the importance of managing volatility in times of crisis. Regulatory measures, such as short-selling bans, were introduced in some regions to stabilize markets and restore investor confidence (Jan, Li, Xiyu, Farhan Basheer, & Tongkachok).

Central banks responded aggressively to the crisis with measures such as interest rate cuts and quantitative easing. While these measures aimed to stabilize financial markets, they also introduced complexity. The expansionary monetary policies encouraged investors to take on greater risks, resulting in the inflation of asset valuations prior to the advent of the pandemic. When the crisis materialized, this overvaluation contributed to precipitous declines in stock prices as investors rapidly adjusted their expectations (Tobias, Natalucci, & Qureshi, 2022).

The global nature of the pandemic meant that there was a high degree of interconnectedness between financial markets, with shocks in one region having a rapid and significant impact on others. It was observed that increased volatility was not exclusive to developed markets, but also manifested in emerging economies. This was attributed to heightened correlations among global indices. The interconnectedness of global markets amplified the effects of negative news and market reactions across borders ((Basouny, Bouaddi, Ali, & R., 2021), (Khan, Fifield, & Power, 2024)).

The long-term consequences of these policies are yet to be fully realized. Although some recovery has been observed, with GDP growth returning in numerous regions by late 2021 and into 2022, challenges such as rising inflation have emerged as a consequence of an increased money supply and disrupted supply chains. Inflation rates increased significantly globally in 2021 and 2022 due to the combination of pent-up demand and constrained supply. The global economic and financial systems have been significantly impacted by the ongoing pandemic. While the immediate consequences were severe, the longer-term implications will continue to evolve as economies adapt to the new realities of the post-pandemic era ((Buch, 2021), (Martin, Sanchez, & Wilkinson, 2023)).

3. SYSTEMIC RISK DURING COVID-19 PANDEMIC

The Global Financial Crisis (GFC) or the European Debt Crisis was directly related to economic activity, and the impact was felt in terms of systemic risk. In the case of the COVID-19 pandemic and later the military conflicts (the Ukrainian war

and the Israel-Hamas conflict), the effect was exogenous and felt at several levels. As the contemporary world has never faced such a challenge, which has had a significant impact on all activities and sectors, it has prompted both government institutions and central bodies to respond loudly. All these events have once again focused on understanding how systemic risk spreads.

The COVID-19 pandemic introduced a different type of systemic risk, originating from the real economy rather than a specific sector, as was the case during the GFC when the source of the crisis was the financial system. Studies have found that the level of systemic risk during the pandemic was higher than during the GFC ((Rizwan, Ahmad, & Ashraf, 2020), (Baumöhl, Bouri, Hoang, Shahzad, & VÝrost, 2020)). The pandemic was also the first major event since the GFC that provided an opportunity to assess the effectiveness of the measures taken to mitigate the shock and impact of the 2007-2009 crisis (Dodd-Frank Act, Basel III, and national macroprudential policies).

The spread of the virus forced governments to impose containment measures, including social isolation, lockdowns and business closures. These decisions resulted in significant reductions in revenues and costs for businesses, as well as job losses and reduced incomes for households.

During the COVID-19 epidemic, systemic risk increased significantly due to financial instability and vulnerability in various sectors. Studies have shown that the epidemic has a significant impact on systemic risks, especially in the financial sector. (Duan, Ghoul, Gurdhami, Li, & Li, 2021) analyzed the impact of COVID-19 on international systemic risk and found that the growth rate of confirmed COVID-19 cases had a positive and significant effect on systemic risk.

Institutions and companies took swift action to try to mitigate the impact on the population. Despite the shock to households and firms, these fiscal and monetary policy responses have helped to protect the financial system from a major crisis.

The results obtained by (Duan, Ghoul, Gurdhami, Li, & Li, 2021) indicate that the growth rate of confirmed cases is associated with an increase in systemic risk through two channels: the rigor with which governments responded to the impact of the pandemic and the risk of bank failure. The authors also expect the fragility of the banking system to increase as a result of the pandemic shock. However, (Carletti, Claessens, Fatas, & Vives, 2020) note that banks have a higher resilience capacity due to the implementation of reforms after the 2007-2009 global financial crisis, and that firms, households and banks have received government support, reducing the potential negative impact.

Government measures included: encouraging increases in capital levels by issuing directives requiring banks not to pay dividends, to reduce or waive capital requirements for some risk-weighted assets, and to release some capital buffers, such as absorptive countercyclical capital, which is designed to be used during recessions (International Monetary Fund, 2020). These policies have allowed banks to release capital to provide liquidity and to continue lending to riskier sectors. (International Monetary Fund, 2020) notes that the regulatory relief provided by these policies reduced the requirements of the Basel Accord to a minimum in some jurisdictions. Most regulatory responses have been consistent with the core standards implemented after the global financial crisis, focusing on the individual soundness of institutions. For the CoVaR assessment of European banks, (Borri & Di Giorgio, 2021) note that the new regulatory decisions implemented after the 2007-2009 global financial crisis, which imposed higher capital requirements on banks and stricter stress tests, proved successful in avoiding another financial crisis. However, (Didier, Huneus, Larrain, & Schmulker, 2021) warn that the current regulatory infrastructure was not designed to deal with an exogenous systemic shock such as the COVID-19 pandemic.

The implementation of government support programs with the objective of stabilizing economies has resulted in the reduction of immediate risks, achieved through the provision of liquidity and the prevention of widespread defaults among businesses and households^{vi}. Nevertheless, the reliance on these measures gave rise to concerns regarding the long-term financial stability and the potential moral hazard.

The efficacy of regulatory reforms introduced in the wake of the global financial crisis was evaluated during the pandemic. As (Duan, Ghoul, Gurdhami, Li, & Li, 2021) mentions, while certain reforms improved resilience, they proved inadequate in fully protecting banks from the detrimental consequences of the pandemic.

4. PANIC INDEX DURING COVID-19

As classical financial theory does not leave out the role of investor sentiment, its impact appears to be significant, as some patterns influence the evolution of different parts of the markets. Consequently, (Baker & Wurgler, 2006) developed a measure of market changes influenced by investor sentiment in the form of an index called the Investor Sentiment Index (ISI). Investor sentiment refers to the general attitude of investors towards a particular event or piece of information. It affects

^{vi} <https://www.esrb.europa.eu/mppa/covid-19-policy-measures/html/index.en.html>

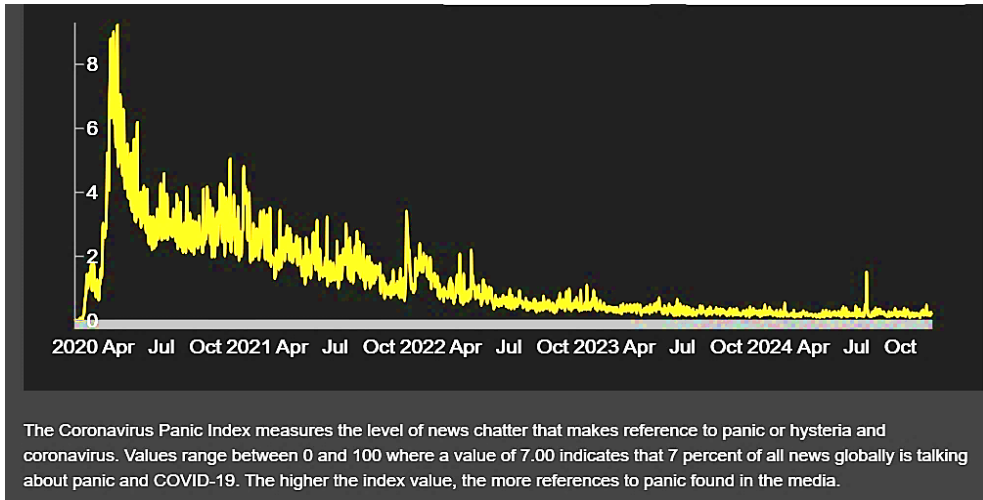
market activity and prices. In general, a rise in prices is considered bullish sentiment and a fall in prices is considered bearish sentiment. Also, in terms of sentiment, low sentiment refers to when prices are falling, and high sentiment refers to when prices are rising. Investor sentiment can both influence and be influenced by financial stability. (Gaies, Sahbi Nakhli, Ayadi, & Sahut, 2022) mention in their paper that during the significant events affecting the financial system, investor sentiment is related to financial stability. A similar conclusion is also reached by (Nițoi & Pochea, 2022), who mention that "markets are more sentiment driven in turbulent times" and propose a measure for quantifying systemic risk based on sentiment.

Over time, various indexes and measurement tools have been developed for sentiment analysis, ranging from the best-known Volatility Index (VIX) or Fear Index to the American Association of Individual Investors (AAII) Sentiment Survey, TRMI – Thomson Reuters Market Psych Index, Google Trends, Global Fear Index or Media Coverage Indices.

The global health issues that emerged at the end of 2019 led to the development of literature on market reactions and research on the topic. Raven Pack developed the Coronavirus Media Monitor^{vii}, which includes various indicators related to panic, fake news, media hype and global sentiment.

When the World Health Organization (WHO) declared the novel coronavirus disease (COVID-19) a pandemic many individuals experienced a sense of heightened concern. This was due to several factors, including the severity of the disease, the novelty of the situation, the degree of uncertainty and unknowns, and the stringency of the measures taken by the authorities. It is also worth noting that the media and the daily news of the number of deaths and dwindling supplies may have contributed to the atmosphere of panic. As anticipated, the media coverage of the pandemic influenced investors' decisions. The challenge in gauging the importance and impact of the news resulted in heightened volatility in equity markets. The article by (Haroon & Rizvi, 2020) indicates that the ongoing COVID-19 outbreak led to a media frenzy and competition for "breaking" news, suggesting a potential correlation between coronavirus-related news and volatility in various industrial sectors of the US stock markets.

^{vii} More information at <https://www.ravenpack.com/solutions/research/coronavirus-media-monitor?>.



Source: <https://coronavirus.ravenpack.com/>

Furthermore, when COVID-19 was declared a pandemic, little was known about the virus and the market reaction was characterized by uncertainty about the future. Economic relations between countries were affected. In their article (Narayan & Kumar, 2023), they mention that in the case of Asian countries, the US is their main importer. During the COVID-19 period, trade restrictions and lower global demand led to supply chain disruptions, resulting in a decline in trade volumes and production, causing massive losses to businesses and making the trading system fragile.

Negative news related to COVID-19, such as rising infection rates and government lockdowns, had a more pronounced effect on market volatility than positive news. Studies have shown that bad news significantly affects the conditional variance of stock returns, leading to asymmetric volatility behavior (Khan, Fifield, & Power, 2024).

5. STRINGENCY MEASURES DURING COVID-19

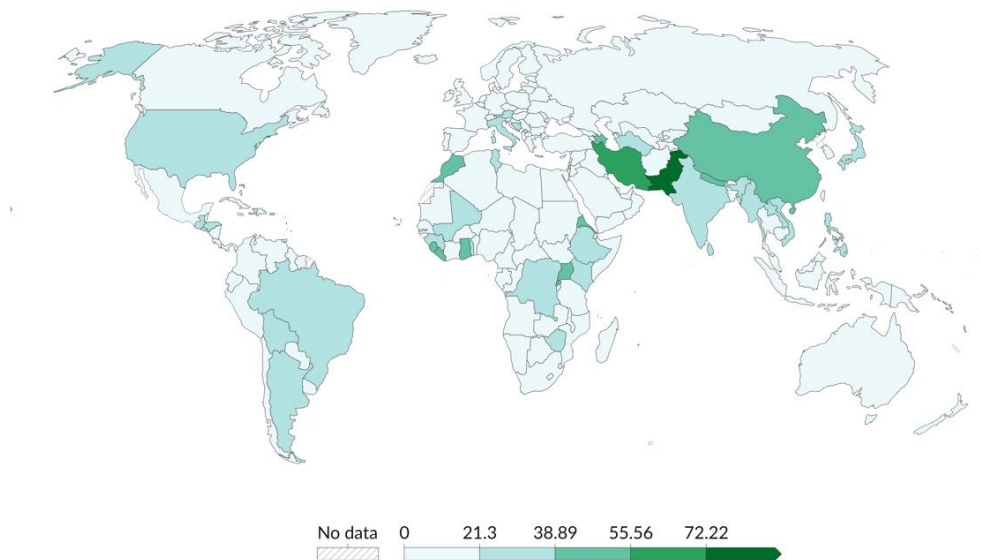
In the context of the COVID-19 pandemic, stringency refers to a set of government policies aimed at controlling the spread of the virus through various containment and closure strategies. The most widely recognized metric for assessing these policies is the stringency index developed by the Oxford COVID-19 Government Response Tracker (OxCGRT) (Hale, et al., 2021).

The Stringency Index is a composite measure that aggregates the stringency of government responses across countries. It is calculated based on 9 key indicators

reflecting different containment and closure measures: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closure of public transport, home confinement orders, public information campaigns, restrictions on internal movement and controls on international travel. It should be noted that the Index does not assess the appropriateness or effectiveness of these measures, only their level of severity.

COVID-19: Stringency Index, Dec 31, 2022

The stringency index is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest).



Source: Blavatnik School of Government, University of Oxford (2023)

Although the primary objective of measures to reduce the impact of the pandemic is public health, there are implications for several sectors, including the economy. Stringent measures have an impact on economic performance and can lead to economic downturns due to reduced consumer activity and business closures. (Giofre, 2021) analyses the index with foreign investment trends and found that increased stringency can discourage investment during a pandemic. Also, the study by (Aggarwal, Nawn, & Dugar, 2021) states that the stringency measures affect profitability by updating growth forecasts and updating the market risk premium.

Considering the decisions taken after the global financial crisis of 2007-2009 and the increased resilience of the financial system compared to that period, the expectations for the shock absorption capacity of the COVID-19 pandemic by the

banking system were higher. This is why, as mentioned by (Demirguc-Kunt, Pedraza, & Ruiz-Ortega, 2021), the impact of the pandemic was greater at the level of bank securities. Furthermore, the need to quickly implement measures to reduce the impact of the pandemic shock, both at the level of central banks and governments, has led to a decrease in bank profitability and solvency, an increase in government costs and an increase in economic risks (Demirguc-Kunt, Pedraza, & Ruiz-Ortega, 2021)).

The COVID-19 pandemic had a significant impact on the economy and bank lending through fiscal measures. The economy has regained momentum thanks to unprecedented support and the introduction of containment measures in response to the reduction in the number of infections. Despite the benefits of these measures, the economic outlook remains subdued and debt levels – both private and public – increased during the pandemic.

According to a study by (Demirguc-Kunt, Pedraza, & Ruiz-Ortega, 2021), the negative impact of the crisis was mitigated by liquidity support, debt relief programs and monetary easing, but this differed across banks and countries. Bank stocks experienced abnormally negative returns due to countercyclical prudential measures. The authors also examined the impact of different measures and classified them into four categories: (i) liquidity support, (ii) prudential measures, (iii) debt relief, and (iv) monetary policy. The positive impact on profitability was attributed to measures related to liquidity and debtor support.

Relevant in this case of adopted measures to mitigate the effects of the pandemic is the survey of (Brodeur, Gray, Islam, & Bhuiyan, 2021), which examines the literature related to COVID-19 and government responses, synthesizing the results of a large number of studies.

6. PANIC OR STRINGENCY DURING COVID-19?

The literature on pandemic panic and its impact on systemic risk is limited, focusing on the study of the impact on financial or oil markets. However, the article by (Haroon & Rizvi, 2020) can be considered relevant to the sentiment side generated by coronavirus news. They empirically show that an increase in stock market volatility is associated with the overwhelming panic generated by news and media. The impact is particularly significant for sectors directly affected by the pandemic.

A similar result is obtained by (Aggarwal, Nawn, & Dugar, 2021), who show that the panic caused by the COVID-19 virus negatively affects stock returns by updating the market risk premium.

The research suggests that both panic and stringency measures have an impact on systemic risk, but in different ways.

Increased panic, as measured by the Ravenpack Panic Index, leads to higher stock return volatility in both US and global markets (Szczygielski, Charteris, Bwanya, & Brzezczynski, 2023). This suggests that panic has the potential to contribute to systemic risk by destabilizing financial markets.

As shown in (Aggarwal, Nawn, & Dugar, 2021) tighter lockdowns in the Oxford COVID-19 Government Response Tracker have a negative and significant impact on stock returns through the growth expectations channel. Tighter lockdowns may affect economic growth prospects, leading to systemic risk.

The same study finds that after controlling for the stringency of lockdowns, COVID-19 panic does not lead rational investors to drive down stock prices, implying that panic alone is not a major driver of systemic risk. Surprisingly, after controlling for panic, increased stringency has a positive impact on returns through the market risk premium channel. This unexpected finding suggests that stringency may also have a stabilizing effect on markets by making investors feel safer.

The pandemic led to a notable increase in the frequency of abrupt price movements, or "jumps," in financial markets. These jumps were frequently prompted by updates regarding pandemic developments and government measures. Investors exhibited a pronounced response to the announcement of prospective new restrictions or alterations to public health policy, which gave rise to abrupt market fluctuations. The character of these fluctuations differed across countries, contingent on their distinctive pandemic management strategies (Zhu, Wen, & Song, 2024).

The interconnectedness of global financial markets means that shocks from one market will quickly propagate to others. There is no doubt that during periods of panic, these network effects can and will amplify systemic risks, as was demonstrated when developed economies experienced significant market disruptions that affected emerging markets.

Panic has a more immediate and acute impact on market stability than stringency measures. Panic triggers rapid sell-offs and volatility that can destabilize financial systems almost instantaneously. In contrast, stringency measures often have a delayed effect, influencing economic fundamentals over time. While they may stabilize situations in the long run, their initial implementation can lead to increased uncertainty and risk.

7. CONCLUSIONS

In summary, panic and stringency affect systemic risk, but the research (Aggarwal, Nawn, & Dugar, 2021) suggests that stringency measures have a more significant negative effect, mainly by undermining economic growth expectations.

The influence of panic and stringency measures on financial systemic risk are still a subject of investigation, particularly in the context of crises such as the global pandemic caused by the SARS-CoV-2 virus. Both factors have a significant impact on the stability of the financial system. However, their effects differ in nature and magnitude.

A state of financial market panic is characterized by a rapid loss of confidence among investors, which in turn gives rise to a widespread sell-off and heightened volatility. The recent pandemic caused by the SARS-CoV-2 virus is an example of a case where a significant degree of panic was observed, with a notable impact on systemic risk. Panic can lead to heightened market volatility, as evidenced by the rapid declines in stock prices during the early days of the pandemic. Studies have confirmed that such panic-induced volatility can spill over across global markets, exacerbating systemic risk.

In conclusion, while both panic and stringency measures contribute to systemic risk, panic exerts a more pronounced immediate effect on financial stability due to its capacity to rapidly alter market dynamics. In contrast, stringency measures influence systemic risk through longer-term economic adjustments and shifts in investor behavior.

REFERENCES

1. Aggarwal, S., Nawn, S., & Dugar, A. (2021). What Caused Global Stock Market Meltdown During the COVID Pandemic – Lockdown Stringency or Investor Panic? *Finance Research Letters* 38.
2. Baker, M., & Wurgler, J. (2006). Investor Sentiment and the Cross-Section of Stock Returns. *The Journal of Finance*, Vol. LXI, no. 4.
3. Baldwin, R., & Weder di Mauro, B. (2020). *Economics in the time of COVID-19*. A VoxEU.org Book. London: Centre for Economic Policy Research.
4. Barberis, N., Shleifer, A., & Vishny, R. (1998). A Model of Investor Sentiment. *Journal of Financial Economics* 49, 307-343.
5. Basouny, M. A., Bouaddi, M., Ali, H., & R., E. (2021). The effect of COVID-19 pandemic on global stock markets: Return, volatility, and bad state probability dynamics. *J Public Aff*.
6. Baumöhl, E., Bouri, E., Hoang, T.-H.-V., Shahzad, S. J., & Výrost, T. (2020). Increasing Systemic Risk during the Covid-19 Pandemic: A Cross-Quantilegram Analysis of the Banking Sector. *EconStor*.
7. Beck, T. (2020). *Finance in the times of coronavirus*. In Baldwin, R. and di Mauro, B.W. VoxEU.org Book. London: Centre for Economic Policy Research.
8. BIS. (2020, March 20). *Basel Committee Coordinates Policy and Supervisory Response to Covid-19*. Retrieved from Basel Committee on Banking Supervision: <https://www.bis.org/press/p200320.htm>
9. Borio, C. (2020, June 30). *BIS management speeches*. Retrieved from [www.bis.org](https://www.bis.org/speeches/sp200630a.pdf): <https://www.bis.org/speeches/sp200630a.pdf>
10. Borri, N., & Di Giorgio, G. (2021). Systemic Risk and the COVID Challenge in the European Banking Sector. *Working Papers CASMEF 2005*.
11. Brodeur, A., Gray, D., Islam, A., & Bhuiyan, S. (2021). A Literature Review of the Economics of COVID-19. *Journal of Economic Surveys*, 1-38.
12. Buch, C. M. (2021, March 23). *Monitoring the financial stability implications of COVID-19 support measures*. Retrieved from ESRB General Board Meeting: https://www.esrb.europa.eu/pub/pdf/reports/esrb.20210908.monitoring_the_financial_stability_implications_of_COVID-19_support_measures~3b86797376.en.pdf
13. Carletti, E., Claessens, S., Fatas, A., & Vives, X. (2020, June 18). *The Bank Business Model in the post COVID-19 World*. Retrieved from VOX EU CEPR: <https://voxeu.org/article/bank-business-model-post-covid-19-world>
14. Cecchetti, S. G., & Schoenholtz, K. L. (2020). *Contagion: Bank runs and COVID-19*. In Baldwin, R. and di Mauro, B.W. (eds). *Economics in the Time of COVID-19*. A VoxEU.org Book. London: Centre for Economic Policy Research.

15. Demircuc-Kunt, A., Pedraza, A., & Ruiz-Ortega, C. (2021). Banking Sector Performance during the COVID-19 Crisis. *Journal of Banking and Finance* 133.
16. Dhaene, J., Laeven, R. J., & Zhang, Y. (2022). Systemic Risk: Conditional Distortion Risk Measures. *Insurance: Mathematics and Economics*, 102, 126-145.
17. Didier, T., Huneus, F., Larrain, M., & Schmulker, S. L. (2021). Financing Firms in Hibernation during the COVID-19 Pandemic. *Journal of Financial Stability* 53.
18. Duan, Y., Ghoul, S. E., Gurdhami, O., Li, H., & Li, X. (2021). Bank Systemic Risk around COVID-19: A Cross-Country Analysis. *Journal of Banking and Finance*.
19. ESRB. (2021, March 31). *Monitoring the Financial Stability Implications of COVID-19 Support Measures*. Retrieved from European Systemic Risk Board: www.esrb.europa.eu
20. Feyen, E., Alonso Gispert, T., Kliatskova, T., & Mare, D. S. (2021). Financial Sector Policy Response to COVID-19 in Emerging Markets and Developing Economies. *Journal of Banking and Finance* 133.
21. Gaies, B., Sahbi Nakhli, M., Ayadi, R., & Sahut, J.-M. (2022). Exploring the causal links between investor sentiment and financial instability: A dynamic macro-financial analysis. *Journal of Economic Behaviour and Organization* 204, 290-303.
22. Giofre, M. (2021). The North American Journal of Economics and Finance. *COVID-19 stringency measures and foreign investment: An early assessment*.
23. Goodell, J. W. (2020). COVID-19 and finance: Agendas for future research. *Finance Research Letters* 35.
24. Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., . . . Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour* 5, 529-538.
25. Haroon, O., & Rizvi, S. A. (2020). COVID-19: Media Coverage and Financial Markets Behaviour – A Sectoral Inquiry. *Journal of Behavioral and Experimental Finance* 27.
26. IMF. (2020). *World Economic Outlook: The Great Lockdown*. Washington DC: IMF.
27. International Monetary Fund. (2020). *Global Financial Stability Report: Bridge to Recovery*. Washington, D.C.: IMF.
28. Jan, N., Li, Z., Xiyu, L., Farhan Basheer, M., & Tongkachok, K. (n.d.). Pre- and post- COVID-19: The impact of the pandemic and stock market psychology on the growth and sustainability of consumer goods industries. *Frontiers in Psychology* 13.
29. Khan, M. N., Fifield, S. G., & Power, D. M. (2024). The impact of the COVID 19 pandemic on stock market volatility: evidence from a selection of developed and emerging stock markets. *SN Business & Economics* 4.

30. Mann, C. L. (2020). *Real and financial lenses to assess the economic consequences of COVID-19*. In Baldwin, R. and di Mauro, B.W. (eds). *Economics in the Time of COVID-19. A VoxEU.org Book*. London: Centre for Economic Policy Research.
31. Martin, F. F., Saez, J. M., & Wilkinson, O. (2023, Second Quarter). The Economic Impact of COVID-19 around the World. *Federal Reserve Bank of St. Louis Review*, pp. 74-88.
32. Martin, F. M., Sanchez, J. M., & Wilkinson, O. (2023). The Economic Impact of COVID-19 around the World. *Federal Reserve Bank of St. Louis Review*, pp. 74-88.
33. Narayan, S., & Kumar, D. (2023). Systemic Risk Transmission from the United States to Asian Economies During the COVID-19 Period. *Journal of Emerging Market Finance* 22 (1), 57-84.
34. Naseer, S., Khalid, S., Parveen, S., Abbass, K., Song, H., & Achim, M. V. (2023). COVID-19 Outbreak: Impact on Global Economy. *Frontiers in Public Health*.
35. Nițoi, M., & Pochea, M. M. (2022). The nexus between bank connectedness and investors' sentiment. *Finance Research Letters* 44.
36. Pentro, G. (2020, March 20). *The Coronavirus Tsunami: What's To Come For U.S. Retail*. Retrieved from Forbes: <https://www.forbes.com/sites/gregpetro/2020/03/20/the-coronavirus-tsunami-whats-to-come-for-us-retail/>
37. Rizwan, M. S., Ahmad, G., & Ashraf, D. (2020). Systemic Risk: The Impact of COVID-19. *Finance Research Letter* 36.
38. Szczygielski, J. J., Charteris, A., Bwanya, P. R., & Brzezczynski, J. (2023). Which COVID-19 information really impacts stock markets? *Journal of International Financial Markets, Institutions & Money* 84.
39. Tobias, A., Natalucci, F. M., & Qureshi, M. S. (2022). Macro-Financial Stability in the Covid-19 Crisis: Some Reflections. *IMF Working Papers*.
40. Toronto Centre. (2021). *Integrating Microprudential Supervision with Macroprudential Policy*. Toronto: TC Notes. Practical Leadership and Guidance from Toronto Centre.
41. Zhu, M., Wen, S., & Song, Y. (2024). Impact of COVID-19 on Jump Occurrence in Capital Markets. *Humanities & Social Sciences Communications*.



THE EU MEMBERSHIP EFFECT ON RULE OF LAW DYNAMICS AND THE RELATIONSHIP BETWEEN RULE OF LAW AND CONTROL OF CORRUPTION

ION MUȘCHEIⁱ, IONUȚ-ANDREI PRICOPⁱⁱ

Abstract: *It is well known that in terms of economic development theories, most studies in literature revolve around assessing the role that the rule of law or the free market plays in generating development. However, when it comes to analyzing the economic development of the EU, most of the approaches have a clear focus on the rule of law, since every European treaty regards it as a fundamental value. Moreover, the institutionalist approaches in the literature highlight the major role that key institutions, such as the rule of law and control of corruption, play in economic development. In this regard, the current paper aims to analyze the impact of EU membership on the rule of law dynamics, by also paying specific attention to the relationship between the rule of law and control of corruption. The analysis focuses on two groups of Eastern European countries, thirteen EU members and eleven non-EU countries, over a twenty-two year timeframe, from 2000 to 2022. The result shows that the membership of the EU plays a significant role in improving the quality of the rule of law. Moreover, the quality of the rule of law has increased more during the pre-accession period. Notwithstanding, the development of institutions requires more time to see the real effect on economics, this is why we can't see a strong correlation between the rule of law and control of corruption.*

Keywords: *EU membership, rule of law, control of corruption, governance*

JEL Classification: *E02, F02, F55, O43*

1. INTRODUCTION

The European Union (EU), despite its vulnerabilities, remains today one of the most significant actors on the international stage, based on one of the highest models and levels of development in the world. However, EU membership does not always guarantee success and progress. Moreover, the European path is often difficult, demanding states wishing to join this "club" to undergo painful reforms that

ⁱ Associate professor Phd. at „Alexandru Ioan Cuza University” of Iași, Romania e-mail: i.muschei@yahoo.com

ⁱⁱ Phd candidate at „Alexandru Ioan Cuza University” of Iași, Romania e-mail: ap.pricop@gmail.com



require significant costs and time. Nevertheless, many Central and Eastern European countries (including Romania) have embraced this challenging process, and other countries under the European Neighbourhood Policy (ENP) have expressed their desire to pursue the European path, as it is well-known that the advantages of EU membership outweigh the disadvantages. The concept of Europeanization, understood as the adoption and implementation of EU norms in transitioning states, represents the most significant and substantial transfer of rules in recent history. The EU has achieved notable success in promoting democracy, good governance, and economic development through institutional transfer and construction, especially in Central and Eastern European countries. Thus, if a state wishes to become a full-fledged member of the EU, adopting the EU's institutional development model becomes a "mandatory condition." This model is enshrined both in the founding treaties of the EEC and the Treaty on the Functioning of the European Union, which stipulates that, above all, the Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law, and respect for human rights, including the rights of persons belonging to minorities (Art. 2 of the Treaty of Lisbon). These values are the cornerstone of the EU; they are non-negotiable, and the EU cannot compromise on them. There is no hierarchy among these values, as they are all considered equally important and must be respected without exception. While candidate states must implicitly respect these values, EU member states that violate them may face penalties. Among all these values, one, in particular, receives special attention from the EU: the rule of law. Considered a fundamental value at the heart of democracy itself, it is the EU's top priority, with a motto that reflects this concern: "The rule of law first, and everything else follows".

From an economic perspective, the EU's premise is that without the rule of law, sound financial management of the EU budget is impossible, effective use of EU funds is unachievable, and therefore, economic development cannot occur. Moreover, the EU has adopted a legally binding act across all member states, titled the "Regulation on a Rule of Law Conditionality Mechanism," which came into effect in January 2021. This regulation differs from the Rule of Law Mechanism, which is a preventive, reporting, monitoring, and assessment mechanism aimed at preventing deviations from the rule of law. The new regulation allows the EU to suspend European funds for states that violate the rule of law. Of course, some states (those with rule of law issues) challenged this decision in the European Court of Justice, but on February 16, 2022, the Court ruled that the EU can suspend the allocation of European funds if states do not respect the rule of law, particularly judicial independence. This decision is considered one of the most significant in the

history of European integration. It is important to highlight the context that led to this situation. As we know, in 2019, the world experienced a health crisis triggered by the emergence of the SARS-COV-2 virus, which eventually led to an "economic crisis." The fact is that the entire European economy suffered immensely, and thus, in the new Multiannual Financial Framework, the European Union borrowed from international markets and added €750 billion to the traditional budget, making the 2021-2027 budget the largest in EU history. In addition to the traditional EU budget of €1.2 trillion for the 2021-2027 period, the EU added another €750 billion in grants and loans through the Next Generation EU program, a recovery and resilience plan for national economies. In this context, the EU uses the Rule of Law Conditionality Mechanism to safeguard its investments, ensuring that European funds are directed where they are intended and do not fall into the hands of oligarchs or autocratic governments. For this reason, European funds are conditioned on respect for the rule of law. Therefore, the rule of law is a necessary condition for economic development, aligning well with Karl Popper's assertion that judicial independence is more important than the free market because, without a functional judiciary, economic activity cannot thrive. Therefore, this paper analyzes the institution of the rule of law, which is present in all fundamental EU treaties, including the founding treaties such as the Treaty of Paris (1951), the Treaty of Rome (1957), the Treaty on the European Union (Treaty of Maastricht, 1992), and the most recent major EU reform, the Treaty of Lisbon (2007). Thus, this paper focuses particularly on institutional transfer, specifically the institution of the rule of law, to the national legislations of both EU member states and states covered by the ENP. A second major objective, derived from the first, is the relationship between the rule of law and anti-control of corruption, as a necessary premise for economic growth and development. The predominant hypothesis is that a state with better rule of law and control of corruption will experience more pronounced economic growth and development. In this context, several questions arise, which this research seeks to answer:

1. What has been the dynamic of the rule of law institution in Central and Eastern European countries?
2. What has been the dynamic of the rule of law institution in the European Neighbourhood Policy states?
3. To what extent has EU membership influenced the rule of law?
4. To what extent has the rule of law influenced control of corruption?

Based on the transposition of the EU acquis into the national legislations of EU member states, the main goal of this paper is to analyze the effect that EU

membership has on the evolution and dynamics of the rule of law in Union states that joined after 2004 and the relationship between the rule of law and control of corruption.

This article hypothesizes that Central and Eastern European countries that became EU member states have experienced significant improvements in the rule of law. Secondly, an improvement in the rule of law has led to better control of corruption. Once these two institutions reach a higher quality, they provide an optimal framework for economic growth and development. The article does not analyze the effects of the rule of law and the control of corruption on development in a general sense but rather examines whether EU membership has improved the rule of law in national states. To achieve this goal, the article has set out the following objectives:

- O1. To analyze the evolution of the rule of law institution in Central and Eastern European countries.
- O2. To analyze the evolution of the rule of law institution in countries under the European Neighbourhood Policy.
- O3. To analyze the effect of EU membership on the rule of law.
- O4. To conduct a statistical analysis of the influence of the rule of law on control of corruption.

The article is structured into four parts. The first part offers a brief theoretical introduction to the European development model, which revolves around the rule of law. This section also describes the importance of institutionalist theory, focusing on the rule of law and control of corruption in creating a conducive development framework. The second part covers the methodological approach, the database used, and the analytical tools. In the third part, we will interpret the results obtained, and the final part will be dedicated to conclusions. Given the current international context, characterized by an armed conflict on the Eastern border of the European Union, the aspirations of Western Balkan countries to become full members, as well as the steps taken by Ukraine, Moldova, and Georgia in their desire to join the EU, the relevance of this article becomes even more significant. The article is also relevant for EU member states, considering that, over the past decade, the EU has faced a lack of trust from its citizens and skepticism from certain states regarding the future of the Union, culminating in the first exit from the EU in history, namely BREXIT.

2. LITERATURE REVIEW

The transition of Central and Eastern European states from a planned economy to a market economy represents a phase that highlights the role of institutions in the reform process. This article falls within the fields of economic sciences, European integration studies, and international relations. The basis of this analysis lies in economic institutionalism theory, which emphasizes the role institutions can play in economic development and state progress in general. The European Union is an organization founded and functioning based on the Treaty on the Functioning of the European Union (Treaty of Lisbon – 2009), and the treaty represents a set of institutions that frame the Union's activities. In the view of specialists, institutions represent "formal or informal constraints created by people to shape interpersonal relationships" (North, 1991), as well as behavioral regularities accepted by all members of a society (Schotter, 1981). Institutions are the laws and rules that reflect codes of conduct imposed by the majority of individuals through their own will (Sugden, 1986). They are formal rules, compliance procedures, and standard operating methods that structure relationships among individuals politically and economically (Hall, 1986). Institutions are a set of persistent and interconnected rules (both formal and informal) that prescribe behavioral roles, constrain statuses, and shape expectations (Keohane, 1989). Contemporary scholars, such as Daron Acemoglu and James Robinson, define institutions as a broad set of arrangements that influence various economic interactions between individuals, including economic, political, and social relations between households, individuals, and firms. Institutions are also the rules, regulations, laws, and policies that shape economic incentives, thereby influencing incentives to invest in technology, physical capital, and human capital (Acemoglu & Robinson, 2012). Common to all definitions and interpretations, which define the concept of institutions, are laws, rules, behaviors, constraints, and cooperation.

Moreover, representatives of institutionalism believe that a market economy and capitalism cannot evolve without consolidated and efficient institutions, such as the rule of law. According to Weiler, Delhousse, and Pierson, the merits of institutionalism lie, on the one hand, in explaining the involvement of institutions and key actors in transferring competences in specific circumstances or conjunctures of the integration process, and, on the other hand, in explaining systemic changes between critical periods of integration, with changes being evolutionary and having a legal-normative form. Community institutions do not only play the role of arbitrator or mediator but are also key actors, providing solutions, setting the agenda,

and outlining strategic guidelines. The national state is not excluded from this equation; rather, it is the key actor, acting as a negotiator, co-regulator, implementer, and financier. Its merit lies in successfully mobilizing the necessary resources, especially financial ones, to fulfill these functions (Prisecaru, 2008). Thus, at the institutional level, the implementation of the EU *acquis* involves building, disseminating, and institutionalizing rules, norms, procedures, styles, methods, or values, all created at the community level and later incorporated into national structures and policies. Neo-institutionalism theorists emphasize the role of institutions in governance, a term that is widely used and refers to a complex process that impacts the economy and policies at both macro and microeconomic levels. The relationship between institutions and economic development is a major subject of interest for economists. Numerous empirical studies have demonstrated a positive relationship between institutional quality and economic development. The research approach is based on the hypothesis that responsible governance, with good institutions, leads to good economic performance. The presence of appropriate formal institutions is a necessary condition for economic growth, though not determinant, as individual values and preferences also play a role in this equation. Economic growth is stimulated by the entrepreneurial activity of individuals, which is possible only within an appropriate framework of rules governing interactions between individuals, guaranteeing private property, contracts, and, most importantly, the benefits entrepreneurs can enjoy. Institutions create the incentives for profit, which in turn shape entrepreneurial nature. The allocation of entrepreneurial resources must reward productive activity and penalize unproductive or destructive activity (Bruno & Dallago, 2005).

From the perspective of neo-institutionalist theory, the type of institutional arrangement is of utmost importance for economic outcomes, particularly economic growth. In this context, Douglass North argues that the answer sought by all economists regarding growth and development lies in the basic institutional arrangement (regulations as the rules of the game) and, more importantly, in how these regulations are applied. Many empirical studies on governance quality have demonstrated a direct correlation between the institutional factor and economic growth as measured by GDP per capita. A study conducted by experts at the International Monetary Fund (Kaufmann, Kraay, & Mastruzzi, 2010) clearly establishes that each institution analyzed has a statistically significant impact on GDP, with some institutions capable of explaining up to 75% of the variations in GDP per capita (IMF, 2003). Thus, for stable and sustainable economic growth, we need more efficient institutions that encourage people to discover their own

advantages and use their knowledge, information, and limited resources effectively (Heyne, Boetke, & Prychitko, 2011). In other words, the quality of institutions provides answers to many political, economic, and social questions. Since institutions represent the totality of the EU *acquis*, it would be impossible to analyze the influence of all institutions on development, even though each institution may play a decisive role in the evolution of a society. Therefore, this article considers the analysis of two institutions: the rule of law and control of corruption. The reasons for selecting these two institutions are numerous and diverse. Firstly, the European Union adopts and imposes a development model that begins with the construction of a rule of law. Starting from the hypothesis that the market is a highly complex system that cannot be created or controlled, the EU adopts this top-down strategy, so that the success of improving the rule of law will lead inevitably and irreversibly to economic and social development. Secondly, the improvement and observance of the rule of law encourage and stimulate the business environment and all economic activity. Investors, entrepreneurs, and society, in general, are more likely to engage in economic activity in countries where the rule of law is respected. Thirdly, the respect for the rule of law creates a sense of capital security, which is very important for investors. However, the existence and respect of the rule of law are not only necessary for creating a conducive development environment, but they are also essential for the development of society itself.

3. METHODOLOGICAL STRATEGY

The rule of law and control of corruption are institutions monitored by many specialized organizations. Even the EU issues an annual report on the rule of law in its member states. However, we have used three highly recognized international databases, widely used by specialists conducting studies in this field. The databases we have used are: the Global Competitiveness Index conducted by the World Bank – this database measures both the rule of law and control of corruption, The Heritage Foundation – which analyzes the rule of law, and Transparency International – which measures and monitors the level of corruption. Each database has a different methodology, and thus we will analyze the evolution of these two indicators, as well as the relationship between the rule of law and control of corruption using two different databases. Moreover, we adopted this strategy to correlate and validate the model. The methodology for measuring the rule of law developed by The Heritage Foundation, also known as the Index of Economic Freedom, is based on the measurement of four key aspects of the economic and entrepreneurial environment

over which governments typically exercise policy control: rule of law, government size, regulatory efficiency, and market openness. Each component is scored on a scale from 0 to 100, with 0 representing the worst institutional quality and 100 representing the best institutional quality. In this case, the rule of law is an aggregate indicator comprising private property, government integrity, and judicial effectiveness. Property rights evaluate the extent to which a country's legal framework allows individuals to acquire, hold, and use private property, and the extent to which these rights are protected by clear laws applied impartially by the government. The assumption here is that the protection of private property stimulates economic activity. Therefore, the indicator measures the degree to which a country's property laws exist, are enforced, and are respected. Additionally, this indicator measures the level of state expropriation of private property. Property rights, in this context, consist of risks of expropriation, respect for intellectual property rights, and, above all, the quality of contract enforcement and property rights, which are considered the most important economic institutions.

Government integrity – one of society's biggest concerns is systemic corruption within government institutions, through well-known methods and practices such as bribery, extortion, nepotism, patronage, and embezzlement. The lack of integrity within public administration caused by such practices reduces societal trust, especially in investments, and consequently decreases economic vitality. The score obtained for this indicator is a weighted average comprising perceptions of corruption, the risk of bribery, and control of corruption (understood as the risk of state capture by political elites). Judicial effectiveness refers to efficient and fair judicial systems that ensure that laws are fully respected and appropriate legal measures are taken against violations. The judicial effectiveness score is an average of three equally weighted factors: judicial independence, the quality of judicial processes, and perceptions of the quality of public services and the independence of public office. Regarding corruption, it has been the focus of a significant group of scholars who have concentrated their efforts on developing theories on one of the most pressing issues. As a result, the concept has undergone a period of refinement, with the literature offering several definitions. The term generally refers to "a behavior that deviates from the formal norms of conduct governing the actions of a person in a position of public authority due to motives of private interest, such as wealth, power, or status." In our review of the specialized literature, we found that corruption is predominantly considered the domain of the public sector. Limiting the phenomenon to the public sphere arises from the assumption that private sector corruption can be treated as a matter of conduct within

the enterprise and, therefore, the negative effect it produces is confined to the property where it occurs. However, Transparency International abandons this separation and perceives corruption as "the abuse of entrusted power for private gain" (Transparency International 2022), a scourge that deepens development gaps, promoting inequality and poverty. For the World Bank, corruption represents "the misuse or abuse of public office (by public officials or elected officials) for private gain" (World Bank Group 2017). On the one hand, public office is considered to be abused for private gain when a government official either accepts or solicits bribes to perform the duties they are charged with. On the other hand, abuse of public office occurs when private enterprises seek to facilitate public processes by offering bribes (World Bank Group 2017).

Control of corruption, therefore, represents the absence of law and unfair behavior in public-private relations, which garners special attention from the European Union due to the pronounced and devastating effects it has in member states. This aspect is reflected in the Treaty on the Functioning of the European Union, which includes corruption in the realm of cross-border crime, where the EU may need to intervene to combat it based on a common framework. Economically, corruption acts as a barrier to growth and institutional and economic convergence. If major corporations believe that corruption is widespread in a country, it can be a hindrance to attracting foreign investment, as the country becomes an unattractive environment for conducting or starting business operations. In such states, politicians are tempted to redirect public funds towards sectors where offering monetary incentives is common practice, rather than towards sectors that would bring greater societal benefits. In this context, Robert Klitgaard's definition becomes relevant, as he equates corruption with "monopoly plus discretion minus accountability" (Klitgaard, 2017). Moreover, if investments involve, *volens nolens*, an additional cost called "bribery," then corruption can be perceived as a tax on investments. However, the only investments likely to increase are public ones, as they lend themselves easily to the manipulations of officials seeking to obtain bribes (Tanzi, 1998). The inefficient allocation of production factors reduces productivity, lowers competitiveness, and consequently, the economy cannot reach its full potential. Furthermore, corruption increases public expenditure and decreases revenues, deepening fiscal deficits. This practice exacerbates income inequality because it allows individuals in key positions to exploit their status at the expense of others. Moreover, a society governed by fraud, extortion, favoritism, and where blood ties determine interpersonal interactions over competence, can only perpetuate this evil. The lack of jobs (generated by the suppression of meritocracy) comes with a low

quality of life, poverty, and increasing social inequality. Corruption undermines some of the fundamental roles of the state in society, which include guaranteeing private property against various types of intrusion and enforcing contracts. When an individual can buy their way out of a contractual obligation or is prevented from exercising their property rights due to corruption, the government loses credibility. At a social level, corruption infringes on human rights, one of the values that the European Union strongly seeks to promote and protect through the Charter of Fundamental Rights. Corruption leads to slavery, coercion, persecution, and the restriction of individual freedoms – including belief, freedom of expression, and press freedom – and encourages migration as a means of escaping the system. Although corruption is present in all EU member states, the levels at which the phenomenon manifests itself vary in intensity. The idea that the variety of institutional types and qualities differs from country to country may serve as an explanation, especially since scholars perceive corruption as a result of the institutional framework (Petre Prisecaru et al., 2009). This institutionalist approach is supported by Daron Acemoglu and James Robinson, who argue that the origins of power, prosperity, and poverty are found in the inclusive or extractive institutions on which a state relies. On the other hand, corruption is a social institution, so differences in corruption levels are closely related to a nation's history, values, traditions, and norms that are perpetuated. The Corruption Perceptions Index (CPI) is a composite indicator created in 1995 to measure perceptions of corruption in the public sector in 180 countries worldwide. The CPI is based on perception because corruption involves illicit activities conducted in secret and deliberately concealed, visible only in the context of scandals, investigations, or criminal prosecutions. Despite progress in objectively measuring corruption, no indicator currently allows for comprehensive and objective measurement of corruption levels. The sources that make up the CPI indicator are based on meticulously crafted and calibrated questionnaires. We chose this database because its methodology includes 13 data collection sources from 12 renowned institutions specializing in governance and business environment analysis (Transparency International 2024). The calculation of the CPI is based on data sources evaluated according to the following criteria: (1) methodological reliability and institutional reputation, requiring that the source originates from a prestigious organization using appropriate methodology; (2) conceptual alignment of the data, which involves directly connecting the data to public corruption or associated risks; (3) quantitative granularity; (4) country comparability, meaning that the source data is measured on the same scale to allow

comparative analysis; and (5) the availability of data over several years, which requires the existence of a historical database.

The data contain experts' opinions regarding the following corrupt practices: bribery, the use of public office for private gain, embezzlement of public funds, nepotism in public service, and state capture. Some sources also analyze mechanisms aimed at preventing corruption, such as the government's capacity to enforce integrity mechanisms, bureaucracy and excessive bureaucratic burden, the existence of adequate financial disclosure laws, the effective prosecution of corrupt officials, conflicts of interest, and access to information on government activities. The CPI score is on a scale from 0, which represents the lowest value and indicates the highest level of corruption, to 100, which represents the highest value, associated with a clean system. Its utility lies in the fact that Transparency International's flagship product is the most widely used indicator in global corruption rankings, offering an annual report on corruption in various countries since 1995. Regarding the Worldwide Governance Indicators formulated by Daniel Kaufmann, Aart Kraay, and Massimo Mastruzzi, the methodology used by these theorists defines governance as a set of institutions through which the state exercises its authority. This includes (a) the process by which governments are selected, monitored, and replaced; (b) the capacity of the government to formulate and implement policies; and (c) the respect that citizens and the state have for the institutions that govern economic and social interactions (Kaufmann, Kraay și Mastruzzi 2010). This results in a series of institutions comprising six indicators: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, and "the respect that citizens and the state have for the institutions that govern economic and social interactions." Rule of Law refers to the quality and independence of the judicial system and encompasses perceptions related to the extent to which state agents respect societal norms, particularly regarding contract enforcement, property rights, the police, and courts, as well as the likelihood of crime and violence. Control of Corruption represents the absence of lawlessness and unfair behavior in public-private relationships. It focuses on indicators related to regulatory quality and the rule of law, with reference to the impact of poor governance on the economy. Corruption is seen as a regulatory intrusion, involving a third actor, typically the state, which increases transaction costs. Selective justice refers to the perception of the extent to which public power is exercised for personal gain (including both petty and grand corruption) and the "capture" of the state by elites and private interests. We chose these indicators because their methodology involves a solid database composed of 31 sources. Data collection is conducted both

nationally and internationally for more than 200 countries, starting in 1996. The two institutional indicators are aggregate indicators, each with a numerical value ranging from -2.5, representing the lowest value and the poorest quality of the institution, to +2.5, the highest value associated with the best institutional quality. These indicators have become increasingly used in recent years by both decision-makers and researchers in the field. Their utility comes from the fact that they provide broader coverage of the governance process in a state, far more than any other existing database, as other databases focus only on analyzing one institution or process. Secondly, the richness of the information sources represents another strength of these indicators, as it minimizes errors by averaging the 31 sources to represent the most accurate value. Thirdly, the methodology used to calculate these indicators allows for a very small margin of error (Kaufmann, Kraay și Mastruzzi 2007).

4. RESULTS AND INTERPRETATION

Chart No. 1 analyzes the evolution and dynamics of two institutions, the rule of law and control of corruption, based on the Global Governance Indicators database. The values range between (-2.5, representing the worst quality, and +2.5, representing the best quality), and the analysis covers a period of 22 years, from 2000 to 2022. According to Chart No. 1, several conclusions can be drawn regarding the evolution and dynamics of the rule of law and control of corruption in EU member states as well as in the countries within the European Neighbourhood Policy (ENP).

First, it is clear that the institutional quality of both the rule of law and control of corruption shows positive values in EU member states (+0.5 to +0.75 for the rule of law, +0.3 to +0.5 for control of corruption), whereas in ENP countries, these institutions show negative values (-0.78 to -0.29 for the rule of law, and -0.71 to -0.3 for control of corruption).

Second, we observe an improvement trend for both institutions, in both EU and ENP countries, with the note that ENP countries recorded a greater amplitude in the development of these institutions.

Third, it can be observed that in both EU member states and ENP countries, the rule of law has a higher quality than control of corruption. In EU member states, control of corruption consistently lags behind the rule of law by a similar margin, while in ENP countries, control of corruption closely follows the trajectory and evolution of the rule of law, reaching the same coefficient by 2022.

Fourth, we must mention the stable and consistent nature of institutional evolution and dynamics for both EU member states and ENP countries, further evidence that institutions have a long-term horizon for change.

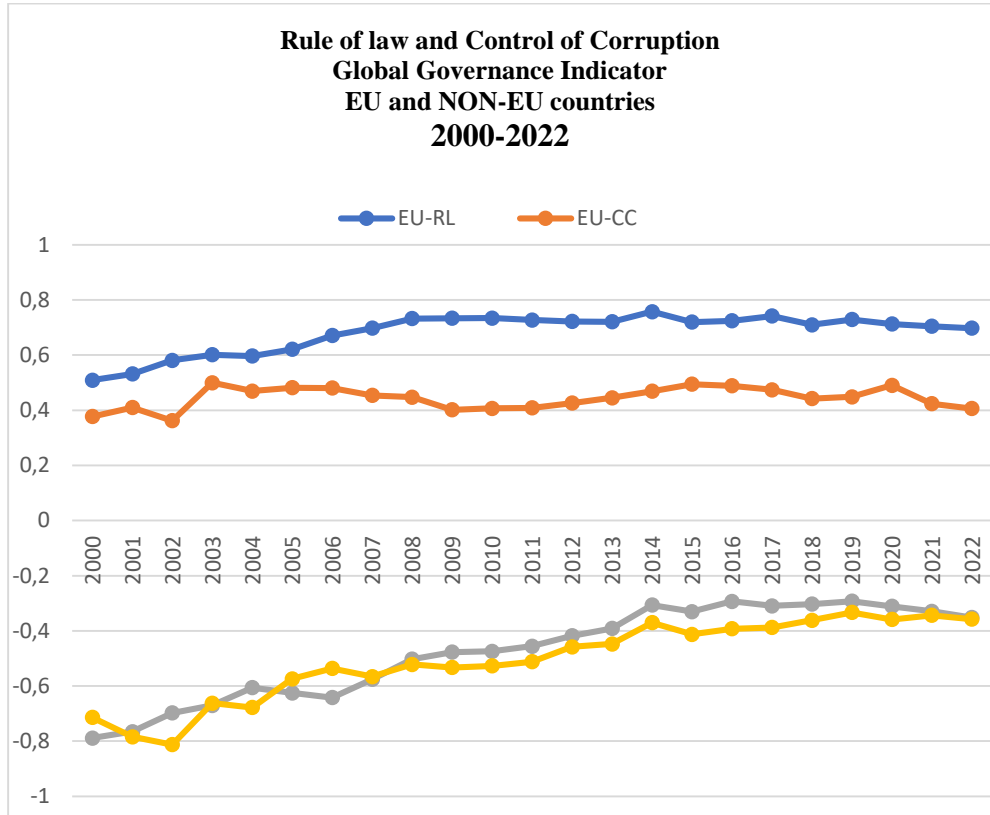


Chart no. 1

Chart No. 2 analyzes the evolution and dynamics of the same indicators, but using different databases. This chart examines the institutional quality of the rule of law in EU member states and ENP countries, using the Heritage Foundation's Index of Economic Freedom database, while control of corruption is measured for the same states, using the Transparency International database. The timeframe is the same, 2000-2022. Chart No. 2 largely confirms the findings of Chart No. 1. In both cases, there is a much better institutional quality in EU states, and in both cases, the rule of law has higher values than control of corruption. Additionally, in both instances, there is a tendency for control of corruption to follow the rule of law. A slight difference appears during the 2014-2016 period, when there is a sudden improvement in the rule of law in ENP countries. This can be explained by the fact

that during this period, many ENP countries signed Association Agreements with the European Union, which led these states to implement the reforms stipulated in the agreements. Another difference lies in the large gap between the rule of law and control of corruption, both in EU and ENP countries.

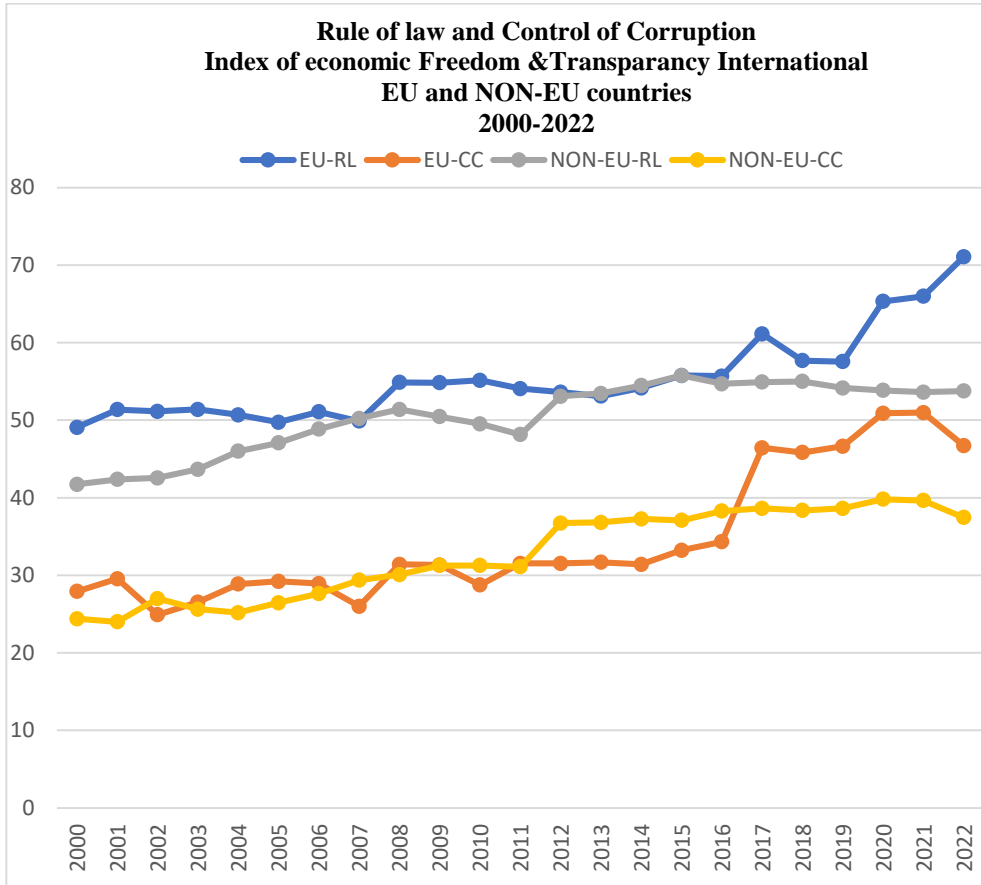


Chart no. 2

Statistical Analysis:

To analyze the relationship between the rule of law and control of corruption from a statistical perspective, we employed the following empirical strategy. First, to achieve the objective and considering the nature of the data used (time series and panel data), we proceeded through the following steps:

1. Checking the stationarity of the data series and transforming them when necessary;
2. Estimating panel regression models;
3. Interpreting the results obtained.

An essential step in the econometric modeling process for panel data is verifying the stationarity of the data series. Stationarity is crucial for better understanding the behavior of the data in time series analysis. Therefore, for all tested variables (both for EU and non-EU countries), the time series were not stationary at their original level, as the p-values of the ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron) t tests were greater than 0.05. However, after applying first-order differencing (ADF – Fisher 1st difference applied), all variables became stationary (p-value = 0.0000). This means that, after transformation, the time series has a constant mean, constant variance, and constant autocovariance. The PP – Fisher tests largely confirmed the same results as the ADF tests, indicating that the series were non-stationary before differencing. The stationarity test (ADF – Fisher) is valid only after applying the first difference.

Table 1. Stationarity Test

Variable	ADF - Fisher	ADF – Fisher 1st difference applied	PP - Fisher
Rule of Law (EU)	1.0000	0.0000	0.9992
Control of Corruption (EU)	0.5517	0.0000	0.6090
Rule of Law (Non-EU)	0.9998	0.0000	0.9982
Control of Corruption (EU)	0.8426	0.0000	0.5777

Regarding the regression analysis, we employed both fixed-effects models and random-effects models. The equation for this model is:

$$Y = \beta_0 + \beta_1 * X_1 + \varepsilon$$

where:

- Y is the dependent variable (control of corruption),
- X_1 is the independent variable (Rule of Law),
- β_0 is the intercept (constant),
- β_1 is the coefficient for the Rule of Law,
- ε is the error term.

The regression equations are as follows:

1. Fixed Effects (EU countries):

$$Y_{EU} = 2.519 + 0.045 * \text{Rule of Law}$$

2. Fixed Effects (Non-EU countries):

$$Y_{Non-EU} = 1.583 + 0.048 * \text{Rule of Law}$$

3. Random Effects (Non-EU countries):

$$Y_{Random} = 1.591 + 0.048 * \text{Rule of Law}$$

The independent variable, Rule of Law, has a coefficient of 0.045 for EU countries and 0.048 for non-EU countries (in both fixed and random effects models), indicating that the results are statistically significant. The Rule of Law has a positive and significant effect on the dependent variable (control of corruption). This is true for 73.7% of EU countries and to a lesser extent for non-EU countries, where the effect is 57.2%.

Table 2. Regression results

	Fixed Effects (EU countries)	Fixed Effects (Non-EU countries)	Random Effects (Non-EU countries)
Rule of Law	0.045 (0.003) ***	0.048 (0.003) ***	0.048 (0.003) ***
Constant	2.519 ***	1.583 ***	1.591 ***
Adjusted R ²	0.737	0.572	0.451

The models for both series are significant (both for EU and non-EU countries), but the Hausman test shows that the fixed-effects model is recommended only for the EU model, as the Hausman test for non-EU countries is not significant. Therefore, the regression is more significant for EU countries (the random-effects model for non-EU countries is less statistically significant).

5. CONCLUSIONS

Based on the proposed methodology (the analyzed countries and the 22-year period from 2000 to 2022), we demonstrated that the rule of law plays an essential role in improving control of corruption, both in EU and non-EU countries, although the relationship between the rule of law and control of corruption is stronger in EU countries, as indicated by the coefficient values and adjustments in the statistical model used.

Perhaps the most important aspect to highlight is that institutionalizing the rule of law creates a more favorable economic framework, leading to greater economic development and growth. From this perspective, the EU has better-developed legislation, which is better reflected in the European economy compared to non-EU states. Even though the link between the rule of law and control of corruption is not as strong in non-EU countries, there is still an improvement in the rule of law (often explained by EU pressure on these countries) that will likely result in better control of corruption in the future.

To maximize the impact on economic and social development, the study suggests that non-EU governments should pay greater attention to strengthening the rule of law. Investments in independent institutions and transparent monitoring

mechanisms could reduce corruption and, consequently, create a favorable economic climate for development.

A particularly important aspect is the role of EU accession in strengthening democratic institutions and the rule of law. Central and Eastern European countries that became EU members after 2004 have seen significant improvements in the quality of the rule of law, leading to more effective control of corruption. This observation highlights the positive impact of EU accession pressure and the adoption of the EU *acquis* on the institutional framework in these countries.

To summarize, the study demonstrates that the rule of law is a crucial foundation for improving control of corruption and, implicitly, for supporting sustainable economic development. Furthermore, European integration has played an essential role in strengthening these institutions in member states, while significant improvements remain possible in non-EU countries.

REFERENCES

1. Acemoglu, D., & Robinson, J. A. (2012). *De ce eşuează națiunile. Originile puterii, ale prosperității și ale sărăciei*. București: Editura Litera.
2. Bruno, & Dallago. (2005). Institutions and Entrepreneurship: A comparative Evaluation of South-Eastern Europe., *Working Paper 01, University of Trento, School of international studies*.
3. Groot, H. L., Linders, G.-J., Rietveld, P., & Subramanian, U. (2003). *The Institutional Determinants of*. Amsterdam: Tinbergen Institute.
4. Hall, P. (1986). *GoverninŃ the Economy: The Politics of State Intervention in Britain and France*. New York: Oxford University Press.
5. Heyne, P., Boetke, P., & Prychitko, D. (2011). *Modul de gândire economic*. București: Editura Bizkit.
6. IMF. (2003). *Growth and Institutions*. Washington: International Monetary Fund.
7. Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The Worldwide Governance Indicators Methodology and Analytical Issues*. The World Bank, Development Research Group Macroeconomics and Growth Team.
8. Keohane, R. (1989). *Neoliberal Institutionalism: A Perspective on World Politics*, . Westview Press.
9. Klitgaard, R. (2017). Corruption across countries and cultures. *Lee Kuan Yew School of Public Policy Research Paper*, pg. 17-23.
10. North, D. (1991). Institutions. *The Journal of Economic Perspectives*, vol 5, Number 1, 97-112.
11. Prisecaru, P. (2008). *Procesul de convergență instituțională, Volumul I*. București: Editura Economică.
12. Roland, G. (2004). After enlargement: institutional achievements and prospects in the new Member States. În V. G. Carsten Detken, *THE NEW EU MEMBER STATES* (pg. 35-58). Frankfurt am Main: European Central Bank.

13. Schimmelfennig, F., & Sedelmeier, U. (2005). *The Europeanization of Central and Eastern Europe*. Ithaca New York: Cornell University Press.
14. Schotter, A. (1981). *The Economic Theory of Social Institutions*. Cambridge: Cambridge University Press.
15. Sugden, R. (1986). *The Economics of Rights, Co-operation and Welfare*. Oxford: Basil Blackwell.
16. Tanzi, V. (1998). Corruption around the world: Causes, consequences, scope, and cures. *Staff papers*, pg. 559-594.

CASE STUDY



This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



ENTREPRENEURIAL INTENTION OF BUSINESS GRADUATE STUDENTS: THE ROLE OF SOCIAL ENTREPRENEURIAL SUPPORT (ALGERIAN CASE STUDY)

AYOUB MESSIKHⁱ, HANANE OMEIRIⁱⁱ

Abstract: *This paper's primary goal is to investigate how the Entrepreneurial Intention (EI) of business graduates Students in Algeria, is affected by social Entrepreneurial support (SES), one of the key determinants of entrepreneurial intention. A self-administered survey questionnaire was used to gather information from 240 business graduate Students in the Faculty of Economics, Commerce, and Management Sciences from Skikda University who were randomly chosen. Both descriptive and regression analyses were used in the study to calculate the effect of social Entrepreneurial support. The Statistical Package for Social Sciences (SPSS 23) was used to analyze the collected data. The results show that social Entrepreneurial support changes account for 32.0% of the entrepreneurial intention of business students at Skikda University. This considerable percentage illustrates the extent to which social pressure contributes to the creation of entrepreneurial intention among business students.*

Keywords: *social Entrepreneurial support, Entrepreneurial Intention, business graduate Students, Algeria*

JEL Classification: A23; I23; M13

1. INTRODUCTION

Entrepreneurship presently has a substantial amount of space due to its beneficial consequences (Messikh, A. 2021). Entrepreneurship is the driving force behind comprehensive development and progress (Messikh, A. 2023). Due to its beneficial effects on the economic, social, and even environmental levels, entrepreneurship is currently a phenomenon of great and growing importance for

ⁱ Faculty of Economics, Commerce, and Management Sciences, Laboratory of Economic, Finance & Management (ECOFIMA), University of 20 Août 1955-Skikda, Algeria, a.messikh@univ-skikda.dz

ⁱⁱ Institute of Applied Sciences and Techniques (ISTA), LAS Laboratory, University of 20 Août 1955, h.omeiri@univ-skikda.dz



both developed and developing economies. It is regarded as a significant source of wealth, creativity, and employment opportunities. (Messikh, A. 2022).

The vitality of entrepreneurship is ultimately, what drives the growth of most economies. It has been discovered that entrepreneurship generates jobs and gives individuals access to countless opportunities. Chen, Tzeng, Ou, and Change (2007) claim that entrepreneurs constructed the majority of industrialized nations. (Oyeniyi, O. J., & Adeniji, A. 2010). In particular, entrepreneurial initiatives have been seen as a vital solution to economic and social crises and problems like graduate unemployment, in addition to being the drivers of technical advancement and transformation.

The first stage of the entrepreneurial process, known as entrepreneurial intention, is the deliberate decision of an individual to take part in activities that would lead to the establishment of a new company. As a result, in recent years, several governments, planners, and legislators have worked harder to encourage an entrepreneurial culture in their communities. However, a crucial query in this context concerns what drives people to seek careers in entrepreneurship. Because entrepreneurial intention is one of the greatest indicators of actual behavior and because intention often differs among individuals and may be learned, an increasing number of research have tried to determine the characteristics that might predict entrepreneurial intention both directly and indirectly. (Murad, M., et al. 2024)

Numerous scholarly investigations and studies have emphasized that the majority of entrepreneurial firms always begin with the entrepreneurial intention to embark on personal work by attempting to embody creative ideas. This is because entrepreneurial intention is the primary indicator of subsequent entrepreneurial behavior and is one of the prerequisites for an individual to establish an entrepreneurial project. For the person in the form of independent establishments. (Ayoub, M. 2017)

The feeling that one is loved, cared for by others, respected, appreciated, and a part of a helpful social network is known as social support. According to important studies, social support has a causal role in general health and well-being. The buffering hypothesis and the direct effects hypothesis are the two main theories in the social support literature. According to the buffering theory, social support shields people from the potentially harmful consequences of stressful situations. According to the direct effects theory, social support is advantageous regardless of an individual's degree of stress. (Edelman, L. F., et al; 2016)

According to scholarly studies, young people's display of entrepreneurial intention is significantly influenced by cultural, social, and religious elements. (Popescu, C., Maxim, A., & Diaconu, L. 2019)

Researchers purport that the intersection of social and institutional support systems are contributing factors in an individual's entrepreneurial intention. (Fox, C. 2023)

Family and friend members' emotional support may provide business owners the fortitude and drive they need to keep going after obstacles. (Dewi, L. 2024)

Due to the strong correlations between family embeddedness in a company and actions or results, family is crucial to the entrepreneurial process. However, decades of study show that some family-embeddedness practices, such as providing family assistance, have a variety of effects on businesses and entrepreneurs. For example, research indicates that family members' financial contributions or support reduce the entrepreneurs' risk of jeopardizing the company's success. (Xu, F., et al. 2020)

This paper investigates the influence of entrepreneurial social support (ESS) on the entrepreneurial intention (EI) of business graduate students in Algeria (Faculty of Economics, Commerce, and Management Sciences in Skikda University).

This research's unique contribution is its emphasis on social entrepreneurship support. This is based on a survey that was given to Algerian business graduates and how the results were interpreted about those found in other studies and research.

The rest of the paper is organized in the following. Initially, a Theoretical background and Research Framework included the literature review for both entrepreneurial social support and entrepreneurial intention. Secondly, the empirical analysis, which includes the methodology and tools of the study, in addition to the results, hypothesis testing, and discussions. In addition to the conclusion and the references list at the end of the search.

2. THEORETICAL BACKGROUND AND RESEARCH FRAMEWORK

2.1. Social Entrepreneurial support

A person is encouraged to start a business or to begin the entrepreneurial process by a number of factors. One of these is social engagement, which may have an impact on bolstering the desire to launch a new company. The contribution of family and friends and the other parts of society to entrepreneurial outcomes was the subject of several studies on entrepreneurship. (Chauhan, S., et al. 2024)

The level of engagement that people have with their loved ones and friends, to whom they feel a strong bond, is known as social support. In essence, social support refers to an individual's expectations and perceived views about the help, direction, and counsel they will get from their social networks. Social Entrepreneurial support can be given in a variety of ways, including financial assistance, emotional support, and appraisal/informational help. For instance, the family creates an environment where students may flourish. Families, and parents in particular, are crucial in helping young people become ready and make decisions about their careers. Parents may also serve as consultants to their children by giving them job guidance, which can subtly affect their propensity for and interest in particular business options like entrepreneurship. (Fallah, N., et al, 2023)

In addition to some personal inclination toward this work, the individual's positive outlook, desire for entrepreneurial work, and the expected outcomes from taking advantage of opportunities, as well as certain standards and factors—the most significant of which are social that result from social pressure to adopt a particular behavior are the main reasons why he chooses an entrepreneurial career path. Kolvereid's research on a group of Norwegian students demonstrated a strong correlation between entrepreneurial purpose and social standards, the most significant of which is the impact of friends and family. (TOUNÉS; et al. 2014)

Entrepreneurial social networks are vital for creating opportunities and developing business ventures. Numerous researchers have acknowledged the positive influence of entrepreneurial social networks on entrepreneurial intentions, which subsequently lead to entrepreneurial behaviors. Social networking among individuals with entrepreneurs tends to be more entrepreneurial-centric, as entrepreneurs operate in constantly changing business environments (Murad, M., et al. 2024).

Research indicates that although social support is generally significant, task-related social support from family members is essential for the perseverance of entrepreneurs in start-ups. Family member societal support is particularly crucial for young aspiring entrepreneurs. Young entrepreneurs are distinct from more seasoned entrepreneurs. They have little, if any, commercial expertise, limited social contacts, and little experience in how to make sense of the entrepreneurial process. (Edelman, L. F., et al; 2016)

Family and friend members' emotional support has been found to play a significant role in influencing the conduct and results of entrepreneurs. According to studies, family members' emotional support and affirmation may increase entrepreneurs' self-esteem, fortitude, and drive, helping them to face the difficulties

and unknowns of launching and operating a business. Additionally, the emotional ties that bind family members together can provide entrepreneurs with a feeling of identity and belonging that helps them get through challenging times (Dewi, L. 2024)

2.2. Entrepreneurial Intention

Before talking about the idea of entrepreneurial intention, it is important to understand the idea of intention. According to Ajzen, intention is a sign of a readiness to try something new and put out effort, which indicates a willingness to agree to behave in a particular way. However, just because people are in circumstances that promote particular behaviors does not imply that their actions are mostly determined by their past intentions; rather, it indicates that their desire to engage in the activity is the primary determinant. (Ayoub, M; 2017)

People do not choose to become entrepreneurs by accident; rather, they do it consciously and with preexisting drive. The first step in the entrepreneurial process is the entrepreneurial intention, which encapsulates the person's motivation and orientation towards starting his own business. This can be primarily explained by the potential entrepreneur's traits, as well as by the surrounding environment and even some cultural traits. In this sense, Ajzen believes that the desire to engage in the behavior under study may predict all of the acts that have been investigated. (MESSIKH, A. 2017)

The first step in the entrepreneurship process is entrepreneurial intention, which is the desire to start small projects and entrepreneurial activities. This intention is thought to be the primary determinant that comes before engaging in entrepreneurial behavior. The sum of the driving forces behind people's pursuit of entrepreneurial outcomes in order to start a private initiative or organization is known as entrepreneurial intention. (Messikh, A. 2021).

Additionally, according to Bird, it is a mindset that helps people create and carry out innovative company ideas. Personal interest, experience, and individual conduct are all guided toward planned entrepreneurial action by the conscious state of mind. (Hattab, 2014)

Since the primary predictor of later entrepreneurial behavior is entrepreneurial intention, which is also one of the prerequisites for starting an entrepreneurial activity, a large portion of entrepreneurial actions are purposefully planned behaviors. (MESSIKH, A. 2021). In several studies, empirical data has made it possible to examine how TPB-based models account for the fact that many entrepreneurs choose to start a firm even before an opportunity presents itself. Based on the findings of studies conducted within the domain of social psychology, there

is currently agreement that entrepreneurial intention is a reliable indicator of future entrepreneurial behavior. Many experts in the area believe that the entrepreneurial purpose is the greatest antecedent for forecasting the development of enterprises since it is a conscious, intentional, and planned activity. (Acuña-Duran, E. Et al; 2021)

Therefore, it is essential to comprehend how people decide to launch a new company to foster entrepreneurship. A growing amount of research indicates that the choice to launch a new business is heavily influenced by entrepreneurial intentions (EI). (Fallah, N., et al, 2023)

1.1. Research Framework

Based on previous studies that examined the key determinants of entrepreneurial intention, the model for this study model is shown in the following figure:

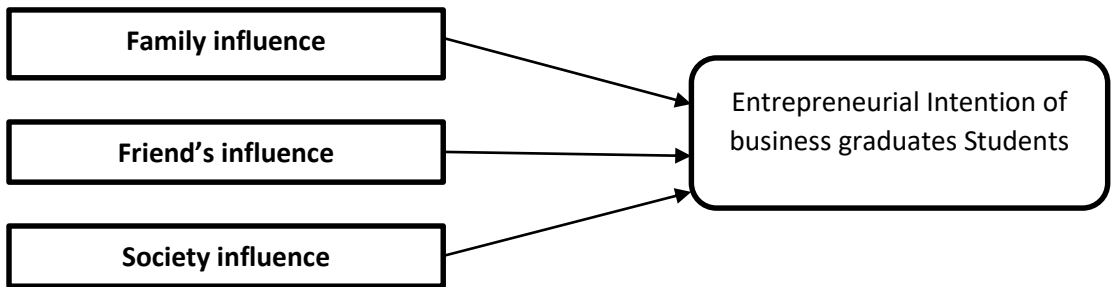


Figure 1. Research framework

3. METHODOLOGY

In order to address the research problem and accomplish the study's objective, a haphazard sample of business graduate students from the Faculty of Economics, Commerce, and Management Sciences from the University of 20 AOUT 1955 in Algeria was examined during the last hexagram of 2023.

3.1. Research questions

The goal of the research is to ascertain the extent to which social Entrepreneurial support influences Entrepreneurial Intention of business graduates Students in the studied university.

Based on the primary research question, the following specific questions were also investigated to determine the effect of family influence, friend’s influence, and societal influence as aspects of social entrepreneurial support upon the Entrepreneurial Intention of business graduates Students at Skikda University:

- How much effect does family influence have on the Entrepreneurial Intention of business graduate Students?
- How much effect does a friend’s influence have on the Entrepreneurial Intention of business graduate Students?
- How much effect does society's influence have on the Entrepreneurial Intention of business graduate Students?

3.2. Research population and sample

According to data from the Statistical Office of the Faculty of Economics, Commerce, and Management Sciences in Université 20 Août 1955 for the university year 2023/2024, the population of this research covers all business graduates Students (M2) in the faculty, totaling 554 students.

To provide every community unit an equal chance of being chosen as an assortment for this research, the inquiries were chosen at random.

Applying Krejcie & Morgan's equation as explained below, a sample of 230 business graduates Students was determined (Krejcie & Morgan, 1970):

$$n = \frac{X^2 Np(1-p)}{e^2 (N-1)+X^2 p(1-p)} \tag{1}$$

n: sample volume; X²: chi-square of the level with freedom 1 and trust 95%; N: population size; e: tolerable sampling error.

There was a questionnaire handed out. 228 of the answers from the surveys that were received could be analyzed, for an answer rate equal to 99.13%. With the aid of SPSS version 23, descriptive statistics, the coefficient of Pearson correlation, and regression testing were employed for statistical analysis.

3.3. Internal consistency reliability and of the questionnaire

To verify the long-term viability of the measurement apparatus, a reliability study was conducted using the Cronbach's alpha technique outlined below:

Table 1. Coefficient of Cronbach’s alpha

Axes	Items	Cronbach’s alpha coefficient
All axes	17	0.868

Source: Author’s calculations based on SPSS.

The total coefficient of Cronbach's alpha value surpassed 0.6, meanwhile, is 0.868, which is also a valid range. This suggests that the instrument has an acceptable level of stability, giving the author confidence that it can be used by all participants in the research's individuals.

As a second step to verify the reliability of the design within the averages of the variables and the overall mean of the tool was evaluated using the Pearson correlation coefficient approach, as shown in the accompanying table:

Table 2. Pearson correlation coefficient

variables	Correlation coefficient	Significance level
social Entrepreneurial support	0.883**	0.000
Entrepreneurial Intention of business graduates Students	0.881**	0.000

Source: Author's calculations based on SPSS.

From the preceding table, we can see that the correlation coefficients are adequate for both variables and the instrument as an entirety. Additionally, the coefficients of correlation are significant, positive, and high at the 1% level, wherein the significance reached $p \leq 0.05$. As a result, the assertions are accurate about what they are intended to assess.

4. RESULTS AND DISCUSSION

4.1. Axes' Descriptive Statistics

By the outcome of the SPSS, which determined the mean and the standard deviation of the survey statements to look at the responses provided by the participants, the findings, that demonstrate the views of those who participated, are presented in the next table based on every axis of the research:

Table 3. Axes' Descriptive Statistics

Axes	Mean	Std. Deviation	Rank	Arrangement
Family influence	4.1199	0.69910	1	high
Friend's influence	3.9123	0.76838	4	high
Society influence	4.0643	0.67306	2	high
Entrepreneurial Intention	4.0411	0.50754	3	high

Source: Author's calculations based on SPSS.

The student participants in the analyzed sample exhibit a high level of Family influence, as seen in the preceding table, wherein the average value was 4.1199 and the standard deviation was 0.69910. With a mean value of 4.0643 and a variance of

0.67306, Society (community) influence ranked second, demonstrating the importance placed on this element, especially when it comes to the successful experiences of the surrounding community parties. Considering a mean value of 4.0411 and a variance of 0.50754, the Entrepreneurial Intention of business students took third place in terms of the degree of approbation. Additionally, Friend's influence came in last with a mean value of 3.9123 and a standard deviation of 0.76838, indicating a high level of acceptance by the investigation's sample participants.

4.2. Test of Hypothesis

The research's hypothesis was tested using regression analysis. The following tables display the analysis's findings:

Hypothesis 1

H1: There is a statistically significant effect at the 0.05 level of significance for family influence on the Entrepreneurial Intention of business graduate Students.

Table 4. The result of a simple regression analysis to test the effect of family influence on the Entrepreneurial Intention of business graduate Students

Axis	B value	T value	R	R2	Sig
family influence	0.177	3.786	0.244	0.060	0.000

Source: Author's calculations based on SPSS.

Table No. 4 shows the effect of family influence on the Entrepreneurial Intention of business graduates Students in Skikda. The correlation coefficient reached (0.244) at the level of significance of 0.000 which is less than 0.05, and the determination coefficient (0.060) means that (6.00%) of changes in the level of Entrepreneurial Intention in SKIKDA resulting from the change in the level of family influence, The value of the effect degree was (0.244), this reflects that the increase in the entrepreneurial family influence leads to an increase in the level of Entrepreneurial Intention, which shows the significance of this relationship is the value of T (4.625), This confirms the validity of the first sub-hypothesis (H1).

Hypothesis 2

H2: There is a statistically significant effect at the 0.05 level of significance for friend's influence on the Entrepreneurial Intention of business graduate Students.

Table 5. The result of a simple regression analysis to test the effect of friend's influence on the Entrepreneurial Intention of business graduates Students

Axis	B value	T value	R	R2	Sig
friend's influence	0.321	8.351	0.486	0.232	0.000

Source: Author's calculations based on SPSS.

Table No. 5 shows the effect of the friend's influence on the Entrepreneurial Intention of business graduates Students in skikda. The correlation coefficient reached (0.486) at the level of significance of 0.000 which is less than 0.05, and the determination coefficient (0.232) means that (23.2.00%) of changes in the level of Entrepreneurial Intention in the university of SKIKDA resulting from the change in the level of friend's influence, The value of the effect degree was (0.486), this reflects that the increase in the entrepreneurial friend's influence leads to an increase in the level of Entrepreneurial Intention, which shows the significance of this relationship is the value of T (8.351), This confirms the validity of the second sub-hypothesis (H2).

Hypothesis 3

H1: There is a statistically significant effect at the 0.05 level of significance for the society influence on Entrepreneurial Intention of business graduate Students.

Table 6. The result of a simple regression analysis to test the effect of the society influence on Entrepreneurial Intention of business graduates Students.

Axis	B value	T value	R	R2	Sig
society influence	0.337	7.508	0.447	0.200	0.000

Source: Author's calculations based on SPSS.

Table No. 6 shows the effect of the society's influence on the Entrepreneurial Intention of business graduates Students in skikda. The correlation coefficient reached (0.447) at the level of significance of 0.000 which is less than 0.05, and the determination coefficient (0.200) means that (20. 00%) of changes in the level of Entrepreneurial Intention in the university of SKIKDA resulting from the change in the level of society influence, The value of the effect degree was (0.447), this reflects that the increase in the entrepreneurial community influence leads to an increase in the level of Entrepreneurial Intention, which shows the significance of this relationship is the value of T (7.508), This confirms the validity of the last sub-hypothesis (H3).

Hypothesis 4 (Main hypothesis)

H4: There is a statistically significant effect at the 0.05 level of significance for the effect of the social entrepreneurial support on Entrepreneurial Intention of business graduate Students.

Table 7. The outcome of a multiple regression analysis to investigate how EI of business graduate Students is affected by SES

Social Entrepreneurial support (SES)	B value	Sig	(cons ant)	R	R ²	Fvalue	sig
Family influence	0.024	0.048					
Friend's influence	0.240	0.000	2.077	0.565	0.320	35.086	0.000
society influence	0.228	0.000					

Source: Author's calculations based on SPSS.

Table No. 7 shows that there is a statistically significant and positive effect of social entrepreneurial support on the entrepreneurial intention of business students at the faculty of economic sciences in Skikda university (this result is consistent with the results of (Acuña-Duran, E. Et al; 2021); (Fallah, N., et al, 2023); (Murad, M., et al. 2024)and (Dewi, L. 2024),(Chauhan, S., et al. 2024), as the correlation coefficient reached (0.565), which is equivalent to 56.5%. This percentage is a high degree of correlation degree at a significance level of 0.00, while the coefficient R² reached (0.320), which means its value (32.0%) of the total variance of entrepreneurial intention of business students can be explained by the variability of social entrepreneurial support. The significance of this effect confirms the value of F (35.086), which is a function at a level less than 0.05. This thus, confirms the validity of the main hypothesis: there is a statistically significant effect at a 0.05 level of significance for social entrepreneurial support on the entrepreneurial intention of business students at the University of Skikda.

Through the collected values, the regression equation can be written in terms of the elements of entrepreneurial self-efficacy and improving performance levels in small enterprises in Skikda as follows:

$$\text{Entrepreneurial intention} = 2.077 + 0.024 \text{ Family influence} + 0.240 \text{ Friend's influence} + 0.228 \text{ society influence}$$

5. CONCLUSIONS

Understanding what motivates people to pursue entrepreneurial professions is crucial as governments everywhere still rely on entrepreneurship to lower unemployment, boost economic development, and alleviate certain social evils. The development of entrepreneurial intention, which is a strong indicator of future entrepreneurial behavior, is at the forefront of selecting an entrepreneurial profession.

The study investigated the effect that social entrepreneurial support can add to the creation of entrepreneurial intention of business graduate students in Algeria,

by examining the sub-effect of aspects of social entrepreneurial support on the entrepreneurial intention of the researched sample.

As may be observed in the sub-hypothesis, there is a statistically significant effect link between the entrepreneurial intention of business students at the faculty of economic sciences at Skikda University and the social entrepreneurial support.

In summary, empirical findings from this investigation confirm prior research, indicating that social entrepreneurial support has a statistically significant influence on the entrepreneurial intention of business students in SKIKDA (this conclusion coincides with a number of findings, including: (Acuña-Duran, E. Et al; 2021); (Fallah, N., et al, 2023); (Murad, M., et al. 2024); (Dewi, L. 2024) and (Chauhan, S., et al. 2024).

32.0% of the total variance of entrepreneurial intention of business students can be explained by the variability of social entrepreneurial support. The presence of other factors and determinants influencing the entrepreneurial intention of business graduate students, including self-efficacy, governmental support, Student's attitude towards entrepreneurship, and availability of financing, may be used to explain the percentage obtained.

However, the process of examining the sub-dimensions of entrepreneurial social support shows that family support or parental support is the least influential element in forming entrepreneurial intentions of the students surveyed, with a coefficient of determination of 6, while support from friends and colleagues reached 23 and support from the external community reached a coefficient of determination of 20. This necessitates the need to spread and instill the culture of entrepreneurship in the Algerian family, starting with the parents, to be later transferred to their children, in addition to developing educational programs on entrepreneurship from the early stages of children's education, as well as intensifying the process of encouraging university youth entrepreneurship.

REFERENCES

1. Acuña-Duran, E., Pradenas-Wilson, D., Oyanedel, J. C., & Jalon-Gardella, R. (2021). Entrepreneurial intention and perceived social support from academics-scientists at Chilean Universities. *Frontiers in Psychology, 12*, 682632.
1. Ayoub, M. (2017). The Role of Entrepreneurial Orientation in SME Enterprises Success Study of A Sample of Small and Medium Enterprises in Skikda-Algeria. (arabic). *An-Najah University Journal for Research-B (Humanities)*, 31(11).
2. Chauhan, S., Chauhan, K., Singh, S., Mahlawat, S., Kumar, V., & Singh, S. (2024). Analyzing family support mediating role between motivational factors and

- sustainable entrepreneurial intentions: A study on university students. *Sustainable Technology and Entrepreneurship*, 3(3), 100076.
3. Dewi, L. (2024). The Role of Family Support in Entrepreneurial Endeavors: Perspectives from Family-Owned Businesses. *Research Square*.
 4. Edelman, L. F., Manolova, T., Shirokova, G., & Tsukanova, T. (2016). The impact of family support on young entrepreneurs' start-up activities. *Journal of business venturing*, 31(4), 428-448.
 5. Fallah, N., Abdolazadeh, F., & Lotfi, B. (2023). Examining the interconnections among entrepreneurial passion, need for achievement, social support, entrepreneurial self-efficacy, and entrepreneurial intention among foreign language learners: a moderated mediation model. *Entrepreneurship Education*, 6(3), 319-338.
 6. Fox, C. J., Muldoon, J., & Davis, P. E. (2023). Social entrepreneurial intention: Examining the impacts of social and institutional support. *Journal of Business Research*, 164, 114036.
 7. Hattab, H. W. (2014). Impact of entrepreneurship education on entrepreneurial intentions of university students in Egypt. *the Journal of Entrepreneurship*, 23(1), 1-18.
 8. Krejcie, R. V. (1970). Determining sample size for research activities. *Educational Psychol Meas*.
 9. Messikh, A. (2021). The Entrepreneurial Intention of Algerian Women (a Sample Study of Skikda University Female Students). *JWEE*, (3-4), 134-150.
 10. Messikh, A. (2022). does entrepreneurial risk-taking affect the business performance of micro-enterprises? Evidence from Skikda in Algeria. *Naše gospodarstvo/Our economy*, 68(2), 65-77.
 11. MESSIKH, A. (2022). the effect of entrepreneurial self-efficacy on the performance of small businesses in algeria: a case study in skikda. *Modern Management Review*, 27(2), 67-78.
 12. MESSIKH, A. (2023). ENTREPRENEURIAL AUTONOMY AND ALGERIAN FAMILY FIRMS' PERFORMANCE: DOES IT REALLY AFFECT?. *Review of Economic and Business Studies (REBS)*, (32), 55-69.
 13. Murad, M., Wang, M., Shah, S. H. A., & Islam, M. U. (2024). Transitioning from entrepreneurial education to entrepreneurial behavior: The role of opportunity recognition, entrepreneurial social networks, and risk-taking propensity. *The International Journal of Management Education*, 22(3), 101053.
 14. Oyeniyi, O. J., & Adeniji, A. A. (2010). Entrepreneur psychological traits and performance: implications for Nigerian non-oil SMEs exporting companies. *Review of Economic and Business Studies*, 3(2), 211-220.
 15. Popescu, C. C., Maxim, A., & Diaconu, L. (2019). IS THE RELIGIOUS ORIENTATION ADeterminant OF THE ENTREPRENEURIAL INTENTIONS?

- A Study ON THE ROMANIAN STUDENTS. *Review of Economic and Business Studies*, 12(2), 113-130.
16. Tounés, A., Lassas-Clerc, N., & Fayolle, A. (2014). Perceived entrepreneurial competences tested by business plan pedagogies. *International Journal of Entrepreneurship and Small Business*, 21(4), 541-557.
 17. Xu, F., Kellermanns, F. W., Jin, L., & Xi, J. (2020). Family support as social exchange in entrepreneurship: It's moderating impact on entrepreneurial stressors-well-being relationships. *Journal of Business Research*, 120, 59-73.



ICT IN AFFORDABLE HOUSING: HAMBURG'S ROLE IN ADVANCING GERMANY'S SUSTAINABILITY GOALS

BRIGITTE STEINHOFFⁱ

Abstract: *The integration of affordable housing with sustainability principles represents a complex landscape, with global commitments such as the Sustainable Development Goals (SDGs) occupying a central position. The case study of Hamburg serves to illustrate a number of innovative strategies for addressing the issues of affordable housing and sustainability through urban planning, regulatory measures, and the fostering of collaboration with key stakeholders. The initiatives undertaken by Hamburg, including urban conversion, social preservation bylaws and self-build housing communities, serve to illustrate the city's commitment to the provision of inclusive housing and the integration of communities. The incorporation of information and communication technologies (ICT) into the administration of affordable housing has the potential to markedly enhance energy efficiency and resource management. There are still obstacles to be overcome in terms of accessibility and digital engagement. The article proposes that other German cities may adopt analogous strategies by leveraging ICT and sustainable planning to address housing challenges and emphasises the necessity for a collaborative, data-driven approach to the creation of sustainable and affordable housing, with the objective of ensuring long-term urban resilience and equity.*

Keywords: *ICT; sustainable development; affordable housing; energy behaviour*

JEL Classification: *O44; Q56; R11*

1. INTRODUCTION

The issue of affordable housing represents a significant challenge with far-reaching implications for the socio-economic well-being of communities across the globe. As urbanisation accelerates and housing markets become increasingly constrained, the challenge of ensuring access to affordable, high-quality housing becomes increasingly urgent. The concept of affordable housing is complex and

ⁱ Doctoral School of Economics and Business Administration, Alexandru Ioan Cuza University of Iasi, 14th Lăpuşneanu Street, 4th Floor, Room 424, Iaşi 700057, Romania E-Mail: steinhoff.brigitte@feaa.uaic.ro



multifaceted, encompassing a range of definitions and interpretations that vary across different countries and contexts. In essence, the objective of affordable housing is to furnish households with access to suitable accommodation without imposing undue financial burden, particularly on those with low to moderate incomes. In recent years, there has been a notable increase in the integration of sustainability principles into housing policy, reflecting a global commitment to sustainable development. This shift is reflected in SDGs established by the United Nations in 2015, which emphasise the necessity of making cities inclusive, safe, resilient, and sustainable. The city of Hamburg, Germany, represents a compelling case study in the intersection of affordable housing and sustainability. The innovative policies and strategies adopted by Hamburg offer valuable insights into the ways in which urban areas can address the issue of housing affordability while simultaneously promoting sustainable development. The city's comprehensive approach encompasses regulatory measures, collaborative initiatives, and the deployment of ICT services with the objective of enhancing resource efficiency and energy management.

This article examines the multifaceted aspects of affordable housing and sustainability, with a particular emphasis on Hamburg's policies and initiatives. It analyses the definitions and challenges associated with affordable housing, the principles of sustainable architecture and green design, and the role of ICT services in promoting energy efficiency in affordable housing. By analysing Hamburg's strategies and their applicability to other municipalities in Germany, this article aims to provide a nuanced understanding of how cities can effectively address housing affordability while advancing their sustainability goals.

2. SCOPE AND KEY TERMS

2.1 Defining affordable housing

The concept of affordable housing recognises the needs of households whose incomes are insufficient to afford appropriate housing on the open housing market without assistance (Milligan et al,2004). Discussions about the acceptance of affordable *housing* in society are complicated by the ambiguity of the term. The term 'affordable housing' is not clearly defined, and the term encompasses a range of housing types, rents or prices, and resident income limits. Affordable housing is the latest in an extensive list of synonyms for housing for those who cannot afford the price on the open housing market (Koebel et al,2004). The term 'affordable housing' is therefore used to describe housing that helps households on low and middle

incomes to find suitable accommodation without causing them undue financial hardship (Milligan et al,2004). In recent years, the term 'affordable housing' has been used as an alternative to terms such as 'public', 'social' or 'low cost' housing (Gabriel et al,2005).

Many different definitions have a common cause. This is because understanding the causal factors of the housing affordability problem itself is as complex as conceptualising and measuring the income thresholds for those eligible. As the affordability debate discussion shows, many conceptual and measurement issues arise from contested understandings of the problem. Singles, lone parents, and families with children may have to make trade-offs between high housing costs and low or middle incomes and employment, travel, health, and other consumer needs (Gabriel et al,2005). The following definition to assist state and federal government by promoting and monitoring the supply of affordable housing is accepted by the Australian policy. "Affordable housing is housing that is appropriate for the needs of a range of low to moderate income households and priced so that low and moderate incomes are able to meet their other essential basic living costs" (Milligan et al,2007:26).

Another common definition in the United Kingdom is that affordable housing includes both traditional social housing (publicly or privately owned (by housing associations)) and new forms of below and regulated market housing for sale or rent. In the London Plan, for example, affordable housing is defined as "housing designed to meet the needs of households whose incomes are not sufficient to allow them to access decent and appropriate housing in their borough. Affordable housing comprises social housing, intermediate housing and in some cases, low-cost market housing" (MOL,2004:60).

Affordable housing (colloquially known as social housing) in Germany is new housing that is built with direct funding from the federal, state, and local governments. The legal basis for this is the Social Housing Promotion Act (WoFG). In addition to the principles of affordable housing construction, the Act also regulates the target group, for instance households that cannot adequately provide themselves with housing on the open housing market and are therefore dependent on support. The federal states in Germany are responsible for the legislation and financing of affordable housing, which is why the provisions of federal state law must also be considered (BMI,2020). By granting public funds, the newly created dwellings become affordable housing and are subject to the provisions of the Housing Commitment Act (WoBindG). The occupancy commitment ensures that only people in need are granted access to affordable housing based on a housing entitlement

certificate (Wohnberechtigungsschein). The responsible authorities issue a housing entitlement certificate, provided that the relevant income limits are not exceeded. Rent control guarantees that the rents of subsidised dwellings are tied to target rates that vary depending on the size of the municipality, location, and facilities.

In Romania, the government provides and subsidises affordable housing according to the Housing Act No. 114/1996, a form of accommodation designed for those individuals or families whose economic circumstances prevent them from purchasing or leasing homes in the private market. The cost of renting an affordable housing unit is capped at no more than 10 % of the tenant's monthly net income. This rent subsidy is determined by examining the family's income over the previous twelve months. Any gap between the actual rent charged and the subsidy provided is financed by the local budget of the administrative-territorial unit in which the social housing resides (Alpopi, Iacoboaia & Stănescu, 2014). Statutory definitions of affordable housing are only explicitly listed in Estonia, Poland, and Romania. These definitions include municipal housing intended to support the most disadvantaged households. For Croatia and other Eastern European countries, there is no explicit definition of affordable housing (Lux, 2003).

The comparative international perspective and the complexity of the topic highlight the impossibility of a standardised definition of the term 'affordable housing'. The definition is specific and depends on the political and programme context in the individual countries in which it is used. The challenge is therefore to identify policy needs in this area and to develop measures that meet policy requirements, for example to identify the scale and form of the problem, assess trends in the housing market, provide information for policy design or provide guidance to the industry (Gabriel et al., 2005; Steinhoff, 2024).

2.2 Nature and extend of the affordable housing problem

Affordable housing is becoming more important every day. However, there is no consensus in the literature on how to measure affordability, nor is there a standardised definition, as already described in the previous subsection.

The problem of measuring affordable housing can already be seen in studies from the 19th century. Stigler recognised that there was already some knowledge and attempts to define the measure of affordable housing. Conceptually, theoretically, empirically, and methodologically, there had been numerous attempts to analyse household consumption, but the studies were a comedy of errors (Stigler, 1954). The main practical application in housing was 'a week's wages for a month's rent' which was a common way of describing housing costs in the U.S.

Kenngott's 1912 study found that at least twenty percent of the earnings were needed for rent (Kenngott,1912). This late 19th century saying about 'a week's wages...' is like the late 20th century saying that twenty-five or thirty percent of income is the upper limit of housing affordability. Both make only general assumptions about what the average household pays or should pay for housing (the distinction is seldom clarified), with no indication of which household is the average. Over the decades, observations about what some households have been spending have been turned into assumptions about what they 'should' be spending (Hulchanski,1995).

Although there is agreement throughout Europe that affordable housing is under strain, definitions of affordability vary by country. Therefore, it is crucial to consider the social, economic, and ecological factors that affect household well-being when defining affordable housing. It is widely acknowledged that households allocating over 30 % of their gross income towards securing suitable and decent housing are facing affordability issues. Nonetheless, it is important to recognize that this definition does not enjoy universal agreement (Pittini,2012).

It turns out that affordability problems are overly complex. There is no single measure to assess their nature and extent. It is therefore important to identify the policy needs related to these issues and to develop metrics that are tailored to the specific policy needs in the different countries. In this way, developments in the housing market can be assessed and provide essential information for further policy development (Gabriel et al,2005; Steinhoff,2024).

2.3 Sustainable architecture and green design

Since the 1960s, the increasing prevalence of environmental concerns, including resource depletion, pollution, and ecological damage, has prompted the development of green and sustainable design principles. Green design is an approach that seeks to harmonise human activities with nature, with the objective of establishing a symbiotic relationship that supports the continuous utilisation of resources, ecological improvement, and an enhanced quality of life (Yuan & Tang,2021).

The objective of sustainable architecture, frequently designated as 'green architecture', is to reduce the detrimental environmental consequences of edifices through the prudent utilisation of materials, energy, and spatial resources. This approach integrates ecological conservation into the design and construction processes. The concept is founded upon environmentally friendly principles and strives to meet current demands without compromising the potential opportunities and requirements of future generations. It aligns with the tenets of sustainable

development, which encompass economic growth, environmental conservation, and social well-being. The social factor is of significant importance. The concept of sustainability emphasises the importance of justice for both present and future generations, as well as within and between societies. It also encompasses the protection and promotion of cultural and ecological biodiversity, as well as prudent decision-making. Furthermore, it recognises the interdependence of phenomena in social, cultural, economic, and ecological terms (Chansomsak,2008; Throsby,2001).

The principles of sustainable architecture can be classified into five distinct categories:

1. **Energy use efficiency:** Sustainable architecture maximises the use of natural lighting and ventilation to reduce reliance on artificial energy sources. This includes the use of solar energy, natural air conditioning methods, and rainwater harvesting. By harnessing natural resources, energy consumption is minimised, aligning with the specific needs of different climates.

2. **Land use efficiency:** Efficient land use is achieved by maximising the area of green spaces and minimising the footprint of buildings. The incorporation of techniques such as roof gardens, vertical gardens, and the integration of greenery into building design serves to maintain ecological balance. In sustainable architectural design, existing vegetation is respected, and open spaces are incorporated in order to promote biodiversity.

3. **Material use efficiency:** This principle emphasises the use of sustainable, renewable, and recyclable materials in construction. It encourages the use of waste materials and the repurposing of old building components to reduce waste. Materials that are abundant and have minimal environmental impact are preferred.

4. **Utilisation of innovative technologies and materials:** The field of sustainable architecture employs advancements in technology to harness renewable energy sources, including wind and solar power. Furthermore, it investigates innovative sustainable materials, such as bamboo, which are rapidly renewable and environmentally benign.

5. **Waste management:** An effective waste management system is a fundamental aspect of sustainable architecture. This encompasses the treatment and recycling of domestic waste, the utilisation of biodegradable materials, and the implementation of innovative waste decomposition systems with the objective of minimising the environmental impact (Syam et al,2023).

The concept of sustainable architecture places emphasis on the restoration of green spaces, such as farmland and forests, and the creation of comfortable environments. In contrast to past architectural practices, which often demanded

environmental sacrifices, modern sustainable architecture aims to reduce environmental burdens by using natural energy sources and ensuring long-term sustainability. The increasing importance of sustainability is driven by the growing human population and the consequent decline in natural resources (Gissen,2003).

In the process of planning and designing a building, a number of features can be employed as points of reference for the implementation of sustainable architectural design principles. The design should reflect and harmonise with the surrounding context. For instance, edifices situated in proximity to a coastal locale may integrate architectural elements evocative of the surrounding marine environment, such as the undulating motion of waves and the ever-changing patterns of wind. The utilisation of sun-trajectory diagrams is a pivotal element of sustainable building design, as it facilitates the optimisation of the positioning of openings and areas of direct sunlight. This, in turn, enhances natural lighting and energy efficiency. The incorporation of local cultural and environmental features into the design process ensures that the buildings represent the unique characteristics of the region and blend seamlessly into their surroundings (Syam et al,2023).

Green design, otherwise referred to as design for the environment, incorporates an extensive range of methodologies that are intended to reduce the impact of a product on the natural environment while enhancing its overall resource efficiency throughout the entire product life cycle. There has been a transition from the traditional 3R principles (reduce, reuse, recycle) to an expanded 10R framework that includes the following additional principles: reduce, reuse, recycle, renew, refurbish, repair, remanufacture, replace, refine, and remove (Yuan & Tang,2021).

The importance of green design is manifold, centred primarily on its capacity to mitigate environmental impact, promote sustainability, and improve quality of life. The objective of green design is to reduce environmental degradation by minimising waste, conserving natural resources, and reducing pollution. The objective is to use environmentally friendly materials and processes that will result in a reduction of the environmental impact of the products throughout their entire lifecycle. Green design places an emphasis on energy efficiency, achieved through the incorporation of renewable energy sources, optimisation of energy usage, and enhancement of building insulation and ventilation. This has the effect of reducing reliance on fossil fuels, lowering greenhouse gas emissions, and promoting sustainable energy use. The implementation of green design principles has the potential to result in significant cost savings over the lifespan of a building or product. The efficient utilisation of resources, reduction of energy consumption and

minimisation of waste can result in a reduction of operational costs and an increase in the economic viability of sustainable projects. The utilisation of non-toxic materials, adequate ventilation, and the incorporation of natural light are among the methods by which green design can improve internal environmental quality. Such measures enhance the health and well-being of occupants by reducing exposure to harmful substances and creating more comfortable living and working environments. Green design is a key component of sustainable development, as it promotes practices that ensure the long-term availability of resources. Green design is a key component of sustainable development, as it promotes practices that ensure the long-term availability of resources. Green design strives to achieve a balanced approach between economic growth, environmental stewardship, and social equity, thereby contributing to the overall sustainability of communities and economies. It encourages innovation in materials, technologies and processes and drives the development of innovative solutions that can be applied across various industries, setting a standard for sustainable practices, and leading to broader adoption of green principles (Faludi,2017; McMahan & Bhamra,2015).

As awareness of environmental issues increases, there is a corresponding rise in regulatory pressure and market demand for sustainable products and buildings. Green design plays a pivotal role in meeting these requirements, ensuring compliance with environmental regulations, and responding to consumer preferences for eco-friendly solutions (Yuan & Tang,2021).

2.4 SDGs and ICT services

The fundamental principles of sustainable development include meeting the needs of the current generation without compromising the ability of future generations to meet their own needs, limiting the exploitation of natural resources, ensuring the availability of basic necessities for all individuals, supporting the creation of prosperous living conditions, coordinating population growth with the availability of resources, promoting the interconnectedness and versatility of SDGs, fostering partnerships to address issues, and considering individual abilities in labour participation. The implementation of these principles relies on an understanding that humanity's development is constrained not only by energy and mineral resources but also by the overall planetary conditions that affect biological systems (Sulimin et al,2021).

The concept of sustainability has gained significant prominence in recent years, particularly following the establishment of the 17 SDGs by the United Nations in 2015, with the stated objective of achieving these goals by 2030. A variety of

entities, including governments, cities, companies, and individuals, are engaged in efforts to achieve these goals. For instance, organisations are seeking to enhance the sustainability and efficiency of their processes and products. This is being achieved through the utilisation of energy labels to indicate performance and the adoption of digital processes with the objective of reducing paper use and redundancies. An innovation is deemed sustainable if it advances the economic, social, and environmental pillars of sustainability (Schaefer et al,2023). Sustainable innovations are defined as products, services, or processes that assist cities and municipalities in achieving the SDGs, with a particular emphasis on those based on ICT (Baregheh et al,2009).

ICT services comprise a range of technological applications and services designed to facilitate the management and optimisation of information and communication resources. ICT services encompass a broad range of digital tools and platforms, including the Internet, telephones, and other media, which facilitate the dissemination of knowledge and reduce ignorance related to the processes required for achieving sustainable development goals (Asongu & Nwachukwu,2018). The expansion of ICT has considerable economic consequences, impacting economic growth, financial development, educational outcomes and environmental sustainability (Martino et al,2013).

These services are integral to various sectors, including the management of energy consumption in affordable housing. Implemented ITC services have the objective of reducing energy consumption in affordable housing that facilitate the management of resources and promote awareness of resource utilisation among tenants. Such services provide users with real-time feedback on energy and water consumption, thereby enabling informed decision-making that may result in energy savings. The architecture of ICT services typically comprises several layers, including the presentation layer, the services layer, the business layer, the data layer, and the meter data service layer. Each layer is responsible for a specific set of functions, including user interaction management, the provision of services to external applications, the performance of core system functionalities, the management of data in databases, and the handling of data from meters and sensors (Martino et al,2013).

The provision of ICT services facilitates a number of functions, including the automated control of energy consumption, the visualisation of historical and real-time data, and the dissemination of notifications to users regarding consumption patterns. In addition to these functional requirements, the deployment of ICT services in the context of energy management entails the fulfilment of a number of

non-functional requirements, including the assurance of data security, the adaptation to regional differences, and the provision of interfaces for user interaction (Nchofoung et al,2021).

3. SUSTAINABILITY GOALS IN RELATION TO AFFORDABLE HOUSING IN HAMBURG

3.1 Background on Hamburg and its policy on sustainable affordable housing

The federal city-state of Hamburg, situated in the northern region of Germany, has a population of 1.89 million (Statista,2023a). In order to address the issues of a constrained housing market and rising rents, the city has introduced a series of innovative urban policies. Following the expansion of the European Union and German unification in the 1990s, Hamburg was able to consolidate its regional, national, and international standing, despite experiencing a previous decline in population due to migration to the suburbs. As a federal city-state, Hamburg's policies are both urban and state-level, which provides a distinctive opportunity for the funding of large-scale projects such as the HafenCity and Energiebunker (Vogelpohl & Buchholz,2017).

The alterations to local government and the robust local 'Right to the City' network resulted in substantial modifications to urban policy in Hamburg 15 years ago. Although not wholly dismissive of neoliberalism, the re-emergence of housing and planning regulations represents a response to the social tensions that have arisen as a consequence of conventional corporate growth policies. In January 2023, the number of affordable housing apartments in Hamburg was 78,191. The total housing stock amounts to 992,600 apartments. The Hamburg housing market continues to demonstrate an upward trajectory in rental prices. As indicated by the rent index, the average net cold rent for a non-price-controlled flat in the Hanseatic city was approximately EUR 9.83 per square metre in 2023. A decade ago, the average rent was approximately EUR 7.56 per square metre. At the beginning of the 2000s, the average rent was less than EUR 6 per square metre (Statista ,2023b). Given that 76.1 % of apartments are rented out and that rents have risen markedly, housing costs have become a pivotal aspect of Hamburg's urban policy (Statistisches Amt für Hamburg und Schleswig-Holstein,2019). The city has one of the highest rental prices in Germany, with a notable disparity between the cost of renting in the city centre and that of the suburbs.

Hamburg is particularly vulnerable to the effects of climate change due to its geographical location. The city is situated in the North German Plain, with an average elevation of only six meters above sea level. It is located at the estuary of the Elbe River and its tributaries. Despite being situated approximately one hundred kilometres from the North Sea, tidal surges have the potential to affect Hamburg's lower areas, particularly in the vicinity of the harbour between the Norder- and Süderelbe. It is anticipated that climate change will result in an increase in the frequency of heavy rainfall events, which will in turn lead to a greater incidence of flooding. The prospect of rising sea levels represents a considerable risk to the economy and quality of life in Hamburg. Increased upstream sedimentation will have an impact on the harbour and its navigation routes, necessitating additional maintenance efforts (Rose & Benita, 2015).

The city of Hamburg has implemented a series of strategies with the objective of promoting the availability of affordable housing. These strategies are based on a combination of regulatory and cooperative approaches. The city established a programme to support the formation of self-build cohousing groups. The Hamburg Agency provides support for self-build cohousing groups. The programme commenced in 2003 and helps groups in the form of guidance and the allocation of city-owned land. The programme places particular emphasis on ecological and social sustainability, ensuring affordability and community integration. The Hamburg Agency in collaboration with the Hamburgische Investitions- und Förderbank, provides financial assistance for three distinct ownership models: private ownership, small cooperatives, and membership in large cooperatives. The aforementioned support encompasses subsidies and grants for construction costs, as well as financial assistance for monthly rent. The objective is to establish a ratio of 40 % privately owned properties, 30 % small cooperatives, and 30 % large cooperatives. The programme also includes measures to facilitate the inclusion of low-income households. In order to aid low-income households participating in self-build groups, the city has introduced measures such as the provision of special loans to finance the purchase of cooperative shares. This is intended to alleviate financial difficulties and ensure the inclusion of economically weaker sections. The concept of adaptive reuse and urban redevelopment is a key aspect of urban planning and development. The city of Hamburg is engaged in a number of significant urban redevelopment projects, including the transformation of Central Altona. Such projects frequently incorporate self-build cohousing as a means of facilitating the provision of affordable and socially inclusive housing, thereby resisting the effects of gentrification while simultaneously fostering community development. Hamburg employs regulatory

measures such as the Social Preservation Statute (SPS), which restricts physical modernisation that could result in rent increases and gentrification. The objective of this statute is to maintain the demographic composition of residents in designated areas. This is achieved through the implementation of conversion bylaws, which prevent rental buildings from being converted into condominiums. The city engages in collaborative efforts with a diverse array of stakeholders, including private enterprises, municipal housing corporations, and non-profit organisations, with the objective of promoting the availability of affordable housing. This encompasses the integration of housing with commercial enterprises and the assurance of a diverse income demographic within new developments. Hamburg has set itself the ambitious goal of constructing 10,000 new housing units per year by 2030, as part of its "Hamburg 2030" initiative. This commitment to addressing the city's housing shortage and making urban development more inclusive and sustainable reflects Hamburg's dedication to the advancement of its strategic urban development goals (Scheller & Thörn,2018).

3.2 Sustainability and commitments in Hamburg

Sustainable cities have emerged as a key area of interest in the field of sustainability research, offering a potential solution to the contemporary sustainability challenges being faced by modern societies. A multitude of frameworks have been developed, frequently based on the concept of a mutually beneficial "win-win" scenario, whereby the simultaneous attainment of environmental, social, and economic objectives can be achieved (Anderberg & Clark,2013; Gibbs,2000). This perspective is shaped by the definition of sustainable development set forth in the Brundtland report (WCED,1987), which posits the absence of an intrinsic contradiction between sustainability and economic growth (Keil & Desfor,2003). This renders the necessity for radical transformations in this context mood (Haughton,1999).

The concept of sustainable cities has recently been subjected to a more critical analysis, with a number of studies highlighting the ineffectiveness of such initiatives in addressing global environmental issues (Hornborg,2014; Rees,1997). Other critiques focus on the marginalisation of social justice and equity concerns in comparison to environmental ones. This is attributed to the fact that these issues are often "less marketable or politically supported" (Starkey,2010). Nevertheless, there is a paucity of research examining the specific forms these negative social consequences take. The majority of studies on urban sustainability rely on official commitments and indicators (Warner,2002).

The city of Hamburg has been at the fore of efforts to address sustainability issues since the mid-1990s. A notable achievement was the signing of the Aalborg Charter in 1996, which committed the city to comprehensive sustainable urban planning principles (European Commission,1994). The environmental efforts of Hamburg have attracted international recognition, culminating in the city being awarded with the title in 2011 European Green Capital (European Commission,2011). The commitment of Hamburg to sustainability is characterised by a pronounced emphasis on environmental concerns, which are complemented by broader social sustainability objectives that are frequently implicit. A noteworthy illustration of this is the HafenCity project, a significant urban redevelopment initiative that prioritises economic productivity, contemporary technology, and environmental sustainability, thereby exemplifying the city's dedication to sustainable urban regeneration (Landis,2022). The University of Hamburg also plays a pivotal role in the advancement of sustainability through its Centre for a Sustainable University, which cultivates interdisciplinary collaboration for sustainable development (Schmitt & Palm,2018). The Energiebunker in Hamburg-Wilhelmsburg, a repurposed World War II bunker, now generates renewable electricity and heat for over 1,500 households, thereby exemplifying successful adaptive reuse. The transformation, which formed part of the International Building Exhibition (IBA), saw the historic structure conserved while simultaneously making it a tourist attraction and war memorial. This project serves to illustrate the potential for similar initiatives to further highlight the city's commitment to sustainable and innovative urban development through the adaptive reuse of old bunkers for energy production and heat storage (Drewello & Kulawik,2022). Hamburg encounters difficulties in reconciling its environmental initiatives with social equity. The implementation of neoliberal urban planning has resulted in the phenomenon of gentrification, which has led to the exclusion of certain social groups (Wiesemann,2014). Furthermore, the promotion of physical activity in Hamburg reflects the city's broader commitment to public health and community well-being (Steinacker et al,2023).

3.3 ICT services: the affordable housing options

The impact of ICT services on the affordable housing sector is manifold, particularly in terms of energy consumption management and resource efficiency. ICT services can be used to reduce energy consumption. Providing real-time feedback on energy and water consumption through ICT services enables tenants to make informed decisions and reduce consumption. This not only helps tenants

reduce their utility bills, but also contributes to wider environmental sustainability goals. The introduction of smart metering systems and web-based information services enables tenants to monitor their energy consumption, identify areas of high consumption and adopt more efficient practices. Providing comprehensive and regular data on energy consumption allows tenants to develop a deeper understanding of their consumption patterns. This awareness, combined with the provision of incentives and educational resources, encourages tenants to adopt behaviours that lead to a reduction in energy consumption. ICT services enable an initiative-taking approach to energy management, allowing tenants to set consumption targets, receive personalised recommendations for energy savings and even be alerted to unusual consumption patterns. The objective of aiding with those with limited financial resources and who are otherwise vulnerable is of significant importance. It is evident that certain ICT services highlight the necessity for adaptation to the particular requirements of social housing tenants, a considerable proportion of whom are low-income earners or possess limited technical abilities. The design of these services is informed by considerations such as the provision of intuitive interfaces and the dissemination of energy-saving advice in non-technical language. Special provisions will be made to ensure that those who lack complete internet access at home can nevertheless benefit from these services, which may include paper reports and SMS notifications (Martino et al,2013; Welfens & Lutz,2012).

Furthermore, ICT services confer advantages upon housing providers, facilitating more effective administration of energy resources within their properties. Such systems facilitate the monitoring of overall consumption, the identification of inefficiencies, and the implementation of targeted measures to enhance energy efficiency on a larger scale. The data collected by these systems can be employed to inform maintenance schedules, investment decisions regarding energy-saving technologies, and strategic resource allocation planning. A reduction in energy consumption will consequently result in a reduction in greenhouse gas emissions. This is consistent with the overarching environmental objectives and facilitates the attainment of sustainability goals at the urban and regional levels. The integration of renewable energy sources and the optimisation of their utilisation through ICT enables housing providers to further reduce the environmental footprint of their properties (Martino et al,2013; Altmann et al,2012).

3.4 Applications and limitations of ICT services

ICT services facilitate the remote management of energy resources through the utilisation of smart metering systems and internal monitoring systems. Such systems provide comprehensive data on energy consumption, thereby enabling users to identify and reduce unnecessary consumption. This contributes to overall energy savings and cost reduction. ICT tools are being developed with the objective of enhancing users' awareness of their energy consumption patterns. The provision of real-time feedback and personalised savings tips empowers users to make informed decisions about their energy consumption. Such engagement may result in long-term behavioural changes that contribute to more energy-efficient behaviour. ICT services play a pivotal role in integrating renewable energy sources into urban energy grids. By monitoring and managing energy production and consumption, these services ensure the efficient use of renewable energy, thereby reducing dependence on non-renewable sources. The data collected by ICT systems can be subjected to analysis in order to facilitate the development of energy management strategies. This encompasses the optimisation of energy system operations, the forecasting of energy demand, and the formulation of strategies for future energy needs. The implementation of data-driven methods has the potential to enhance the overall efficiency of energy systems in social housing. ICT services provide customisable user interfaces that are tailored to the specific needs of different user groups, including those with limited literacy or internet access. Such interfaces guarantee that all users are able to readily access and comprehend their energy consumption data (Martino et al,2013; Welfens & Lutz, 2012; Altmann et al, 2012).

The implementation of ICT services for energy consumption management in affordable housing is confronted with a multitude of challenges and constraints. A considerable proportion of residents, particularly those residing in affordable housing, are lacking the requisite technical expertise to effectively use the energy-saving recommendations provided by ICT systems. This lack of engagement can have a considerable impact on the efficacy of these systems in achieving energy savings. The issue of internet access represents a significant barrier to the effective implementation of ICT systems. In some regions, particularly in older affordable housing or in areas with a high proportion of low-income or older residents, internet access is not a common occurrence. This consequently restricts the capacity of these tenants to access online energy management tools and services. It is of the utmost importance to ensure that privacy and data protection are upheld. ICT systems must comply with the stringent data protection regulations set forth in Directive 95/46/EC to guarantee the security of tenants' personal data. This encompasses not only the

protection of the data, but also the assurance that it is used solely for its intended purposes and stored securely. It is frequently observed that tenants evince no inclination towards reducing their energy and water consumption. To ensure the efficacious implementation of ICT services, they must be complemented by incentives and empowerment strategies that motivate tenants to alter their behaviour. Frequently, the provision of information alone is insufficient to engender substantial alterations in energy consumption habits. It is of paramount importance to consider the capacity for customisation and scalability when developing any solution. The particular specifications of individual affordable housing projects can vary considerably, thereby necessitating the implementation of bespoke ICT solutions that are capable of managing diverse levels of service complexity and integrating with a multitude of data collection systems. The management and processing of substantial quantities of historical energy consumption data can present considerable technical challenges. It is of the utmost importance that ICT systems are sufficiently robust to process this data efficiently while ensuring compliance with data protection guidelines. It is of profound consequences that ICT services and the underlying infrastructure are dependable. The occurrence of an outage or technical issue has the potential to result in a disruption to the provision of services, which may in turn lead to a reduction in effectiveness and a subsequent weakening of user trust and engagement (Martino et al, 2013; Welfens & Lutz, 2012; Altmann et al, 2012; Jonuschat & Scharp,2005).

4. APPLICABILITY TO OTHER MUNICIPALITIES IN GERMANY

4.1 Research methodology

This article presents a comprehensive overview and synthesis of existing literature, legal and policy frameworks, and programme descriptions, with the aim of discussing the various aspects of sustainable housing policy in the affordable housing segment, as well as the factors influencing ICT services and the energy, economic developments, and behaviour of residents of publicly subsidised housing in Germany. The study's primary objective is to assess the applicability and replicability of the Hamburg case study in other German cities and municipalities. During the documentation phase, a comprehensive review of relevant literature was conducted to gain an understanding of the SDGs and ICT services, and to identify an approach that aligns with the article's objectives. The article draws extensively from previous research studies, academic articles, and publications by various authors to gather background information, theoretical frameworks, and empirical

evidence related to ICT services in affordable housing. A qualitative analysis of policy, various sustainability programmes and housing trends in Hamburg and Germany in general will be conducted. This will entail an examination of the legal framework, monetary requirements, resident will, and the impact on the provision and affordability of ICT services. Quantitative data will be provided in order to facilitate a discussion of the various aspects of the SDGs. In conclusion, the derived methods provide a nuanced comprehension of the intricate sustainability development dynamics at work in the affordable housing market segment in Germany. Such analysis allows for a multifaceted examination of the socio-economic, legal, and market-related factors that exert a long-lasting impact on housing policy and the evolution of the energy sector.

4.2 Municipal housing policy in terms of SDGs

The municipal housing policy in Germany addresses a number of aspects related to the SDGs, with a particular emphasis on ensuring the provision of adequate, affordable, and high-quality housing (Shahab et al, 2020). Housing policies are of importance for the realisation of the SDGs, particularly SDG 11, which strives to make cities and human settlements inclusive, safe, resilient, and sustainable. Target 11.1 underscores the necessity of guaranteeing access to adequate, secure, and economical housing for all by the year 2030. It is imperative that sustainable housing incorporates ecological and energy considerations and that measures such as the reduction of carbon footprints, the implementation of hazard-resistant construction, and the densification of urban areas are adopted. The implementation of effective urban planning, encompassing the provision of sanitation, safe water, and solid waste management, is a crucial aspect that contributes to the attainment of sustainable housing. In the context of technology and production, it is crucial to utilize sustainable building materials and technologies. Local production of materials like bamboo, timber, and compressed earth blocks can reduce both costs and environmental impacts. Using prefabricated building components that can be recycled further enhances sustainability. From an economic perspective, ensuring economic sustainability requires integrating housing with employment centres to avoid the inefficiencies and excessive costs associated with remote developments. Policies should support home-based economic activities to stimulate local economies. Social considerations include fostering social cohesion and empowerment through community-based initiatives like savings groups or housing cooperatives. Community participation is vital to ensure housing solutions meet local needs and conditions. Targeted policies must focus on reducing

greenhouse gas emissions, preventing human-caused hazards, and guiding urban planning with pro-poor measures. Multi-level governance involving national and local authorities can facilitate sustainable housing solutions, with flexibility to accommodate diverse local contexts and needs (German Federal Government, 2021).

A variety of land policy strategies are employed by municipalities in Germany with the objective of developing housing. These strategies exert a considerable influence on the dynamics of supply and demand within the housing market. These strategies, particularly evident in regions like the Ruhr area, are deeply rooted in cultural theory, which shapes them into ideal-typical categories such as active, passive, reactive, and protective land policies. It is notable that protective land policy in Germany is driven by considerations of welfare. The principal objective is to enhance public welfare by addressing market failures, particularly those that result in an insufficient supply of affordable housing or problematic land consumption patterns. By concentrating on these issues, protective land policy aims to reduce the negative consequences that arise when the housing market is unable to provide affordable and adequate housing options for all social groups. In their pursuit of public welfare, German municipalities predominantly employ public law policy instruments. This approach frequently entails justifying the curtailment or encumbrance of private property rights, with an emphasis on the collective welfare benefits derived from the implementation of such policies. These measures include, but are not limited to, zoning laws, building regulations, and land use planning, which are designed to ensure that land and housing developments meet the needs of the community at large. Furthermore, these protective land policies are in close alignment with the SDGs. These policies promote public welfare by ensuring access to affordable housing, advocating for sustainable land use, and supporting the broader global agenda of sustainable development and well-being. The integration of these goals by German municipalities contributes to the creation of more sustainable and equitable urban environments, reflecting a commitment to long-term ecological and social sustainability (Shabab et al, 2020; Jossin & Peters, 2022; Hiller & Schultewolter, 2014; Richter, 2023).

4.3 HafenCity – implementation of ICT services

HafenCity Hamburg was first proposed in 1996 as a strategy for urban regeneration on the waterfront. It is currently the largest urban redevelopment project in Europe. Situated on the northern bank of the Elbe in proximity to the historic Speicherstadt warehouse district, HafenCity will serve as a residential and

employment hub, with an estimated 15,000 residents and up to 45,000 jobs upon completion in the mid-2020s. Although HafenCity has many of the size and financial characteristics of a megaproject, it was not originally planned as such. Instead, it was presented as an attempt to revitalise Hamburg's historic and underused port area and to do so in a way that is economically productive, technologically modern, and environmentally sustainable (Landis,2022).

The introduction of ICT services in HafenCity is a multi-phased process designed to enhance urban wellbeing, sustainability, and the liveability of public spaces. This method, designated as 'Happy Place Mapping', consists of five discrete phases.

1. The initial phase of the process entails the selection and delineation of the boundaries of the study area. This is achieved through on-site inspections, which serve to either confirm or modify the preliminary delimitation.

2. The second phase comprises the observation of place characteristics through three surveys, which focus on activities, perceptions, and elements that contribute to happiness. The measurement of activities is conducted in a quantitative manner, considering variables such as the number of individuals using the space and the frequency of their activities. Furthermore, the assessment encompasses the evaluation of perceptions, encompassing the visual, auditory, tactile, olfactory, and gustatory modalities, along with an assessment of their quality, categorised as either pleasant, non-influential, or annoying. The objective is to ascertain the contribution of constructed and natural features, transportation modes, and services to happiness.

3. An open questionnaire is distributed to the users of the site in order to identify the factors and elements that contribute to their emotional states, whether positive or negative. The questions are designed to align with the distinctive attributes of the location in question.

4. The fourth phase entails an analysis of the cartography with the objective of understanding the elements that compose the place, including the urban layout, historical and architectural elements, and natural environments.

5. The final phase is the construction of a map that identifies the spaces and features that contribute to the perception of happiness. The map is based on the data collected from surveys, analyses, and observations (Sepe, 2017).

The effective implementation of the 'Happy Place Mapping' method is contingent upon the utilisation of ICT services, which facilitate the efficient and accurate gathering and analysis of data. This method represents an advancement for the sustainability and employs ICT services to enhance the identification of place identity and to guide interventions. The utilisation of ICT services facilitates the

process of identifying the elements that contribute to the perception of happiness in urban settings, thereby enhancing the efficacy of the method. The comprehensive data collection on intangible aspects associated with architectural design, public spaces, and the natural environment is made possible by ICT services (Sepe, 2017; Jung & Hiebert, 2019).

4.4 Gentrification and segregation through ICT services

The advent of online real estate platforms has greatly facilitated the process for prospective buyers and investors to identify and purchase properties in a multitude of locations. Such accessibility can facilitate the process of gentrification by drawing in a greater number of affluent residents to previously low-income areas. Furthermore, investments in ICT infrastructure and smart city technologies serve to enhance the appeal of neighbourhoods through improvements in transportation, public safety, and utility management. Such enhancements frequently result in augmented property values and the displacement of long-term, low-income residents. A considerable digital divide exists in numerous urban areas, with poor residents exhibiting diminished access to ICT services relative to their more affluent counterparts. This digital divide serves to exacerbate the phenomenon of segregation, as residents lacking access to digital resources may be unable to take advantage of job opportunities, educational resources, and housing information. A considerable number of smart city initiatives are designed to cater primarily to tech-savvy, higher-income residents, which may result in low-income communities being underserved. This has the potential to exacerbate existing socioeconomic disparities and reinforce patterns of segregation. The use of digital platforms to list affordable housing options can facilitate the more efficient identification of suitable accommodation for low-income residents. It is essential that these platforms are accessible and user-friendly for all residents in order to ensure equitable benefits. ICT service can assist in the monitoring of housing markets and the enforcement of regulations designed to preserve affordable housing. The application of data analytics can facilitate the identification of trends in property prices and rents, thereby enabling policymakers to intervene when necessary to prevent displacement (Middha & McShane, 2022; Broadbent & Papadopoulos, 2012).

The issue of segregation is intimately connected to a number of other key social concerns, including social isolation, community cohesion and the digital divide. The digital divide can be bridged, and community cohesion strengthened by providing computers and internet access, thus enabling the utilisation of ICT services. Although technology has the potential to reduce social isolation by

providing new channels of communication, it does not necessarily result in greater social cohesion. The issue of segregation requires a multifaceted approach that considers the intricate social dynamics within communities. Initiatives such as 'Reach for the Clouds' must be crafted with precision to cultivate both online and offline social connections, and to guarantee that ICT services function as a vehicle for comprehensive social inclusion, rather than intensifying existing disparities. To be effective, strategies to combat segregation and social isolation must be combined with comprehensive community-building measures that use technology. This necessitates an understanding of and response to the specific needs and dynamics of different population groups, the promotion of both digital and social literacy, and the guarantee of access to resources that support long-term social and economic inclusion (Boeing, 2019; Martinez, 2017; Meredyth et al, 2004).

4.5 Transferability to other cities and municipalities in Germany

Cities are undergoing a transformation into digital sovereign cities with ICT services, where data is crucial for effective management and crisis response. A strategic approach to urban data management entails the identification of the current status, the implementation of use cases, the development of a vision, the establishment of structures, the securing of data ownership, and the creation of infrastructures. This necessitates a comprehensive assessment of the extant data landscape, the identification of deficiencies, and the determination of the requisite steps to enhance data collection and utilisation. The implementation of use cases in the cities of Bonn and Munster illustrates the concrete advantages of data-driven methodologies, thereby facilitating the formation of a supportive consensus among stakeholders. The cities of Bonn and Munster have engaged in a joint endeavour to develop a sample specification for municipal data sovereignty. This initiative is designed to guarantee the coordination, regulation, and protection of municipal data sovereignty. The objective of this initiative was to establish a uniform methodology for the administration of urban data, guaranteeing its uniform and secure management across disparate municipal departments. Sven Hense, Head of IT Applications and Digitalisation of the City of Bonn, and the City of Munster jointly developed specifications for data handling awarding procedures. The collaboration centred on the establishment of transparent and comprehensive guidelines for the management and protection of data throughout the procurement process. The formulation of a coherent vision for the utilisation of data within the urban context can inform long-term planning and investment decisions, ensuring that data initiatives are aligned with the overarching urban goals. The establishment of robust

structures for data management, including the designation of resolute teams and the implementation of clear protocols, is essential for maintaining consistency and reliability. The securing of data ownership and control is of paramount importance for the protection of the city's interests and the assurance of compliance with relevant regulations. The creation of the requisite infrastructures, such as data platforms and communication networks, provides the foundation for effective data integration and analysis. The integration and utilisation of municipal data present a number of considerable challenges, including a lack of awareness, requisite skills, inadequate infrastructure, and an insufficient data-sharing culture. It is possible that many city officials and stakeholders may not fully comprehend the potential of data-driven decision-making or may lack the requisite technical skills to implement and manage data systems effectively. Furthermore, existing infrastructure may be inadequate to support advanced data analytics or may require substantial upgrades. A culture of data sharing is imperative, as the compartmentalisation of data within disparate departments or organisations can impede comprehensive analysis and curtail the potential benefits. To surmount these obstacles, it is necessary to implement targeted training and educational programmes, to invest in infrastructure, and to cultivate a collaborative culture surrounding data sharing (Schlüter et al, 2021).

A number of German cities and municipalities, for example Darmstadt, have implemented innovative data use cases, including environmental monitoring, social infrastructure planning and the creation of data dashboards and ICT services. The aforementioned examples demonstrate the potential advantages and practical difficulties associated with the utilisation of data in urban governance. By way of illustration, environmental monitoring systems can provide real-time data on air quality, thereby assisting in the formulation of policies designed to reduce pollution and enhance public health. The optimisation of the allocation of resources, such as schools, healthcare facilities, and public transport, can be achieved through the utilisation of data in social infrastructure planning, ensuring that these resources meet the needs of the population (Schlüter et al, 2021; German Federal Government, 2021; Martino et al, 2013). The city of Cologne has implemented an integrated ICT service to facilitate the management and allocation of affordable housing. The digital platforms employed by the municipal authority facilitate enhanced coordination and accelerated processing of housing applications, conferring benefits upon both administrators and residents (City of Cologne, 2023).

The establishment of effective data governance structures and the implementation of robust legal frameworks are of paramount importance for the management of urban data. This encompasses the assurance of data quality,

security, and sovereignty. Robust governance frameworks establish clear roles and responsibilities for data management, ensuring accountability and transparency. Legal frameworks provide the necessary protections for data privacy and security, which help to build public trust in data initiatives. Ensuring data sovereignty involves maintaining control over data collected within the city and preventing unauthorised access or use by external parties. By addressing these governance and legal considerations, cities can create a secure and reliable data environment that supports effective decision-making and enhances urban living (Schlüter et al, 2021; Landis, 2022).

5. CONCLUSION

The complex and evolving landscape of affordable housing presents a multifaceted challenge, characterised by a range of definitions and approaches across different countries. This complexity is further compounded by the growing necessity to integrate sustainability principles into housing policies, an effort that is aligned with global commitments such as the SDGs. The innovative policies and strategies of Hamburg provide an illustrative case study, demonstrating how a city can address the dual challenges of affordability and sustainability through comprehensive urban planning, regulatory measures, and collaborative efforts with diverse stakeholders.

The initiatives undertaken by Hamburg, including the adaptive reuse of urban spaces, the Social Preservation Statute, and the promotion of self-build cohousing groups, illustrate the city's dedication to the creation of inclusive and affordable housing, while simultaneously fostering community integration. The city's strategic objective of constructing 10,000 new housing units on an annual basis by 2030 serves to illustrate its initiative-taking stance towards addressing housing shortages and ensuring long-term urban sustainability. The incorporation of ICT services into the management of affordable housing presents a substantial opportunity for the improvement of energy efficiency and resource management. The utilisation of ICT services enables the real-time monitoring and feedback on energy consumption, thereby empowering tenants to make informed decisions and adopt more sustainable practices. Furthermore, these technologies facilitate the optimisation of resource allocation and maintenance, thereby contributing to broader environmental sustainability goals. The implementation of ICT services also presents challenges, particularly in ensuring accessibility and engagement among low-income residents and addressing the digital divide. It is imperative that effective data governance, robust

legal frameworks and targeted educational programmes are put in place in order to overcome the aforementioned barriers and to ensure that the benefits of ICT in the affordable housing sector are fully realised. The case of Hamburg demonstrates the potential for other German cities and municipalities to adopt analogous strategies, utilising ICT services and sustainable urban planning principles to address their distinctive housing challenges. The collaborative development of data management standards, as exemplified by the cases of Bonn and Munster, and the successful implementation of integrated ICT services in Cologne, demonstrate the feasibility and advantages of these approaches.

The path towards sustainable and affordable housing necessitates a nuanced comprehension of local contexts, initiative-taking policy measures, and the incorporation of advanced technologies. By cultivating a collaborative, inclusive, and data-driven approach, cities can effectively address the housing needs of their residents while advancing their sustainability goals and contributing to a more equitable and resilient urban future.

REFERENCES

1. Altmann V., Skodzik, J., Gولاتowski, F., and Timmermann D. (2012). Investigation of the use of embedded Web Services in smart metering applications. *IECON 2012 – 38th Annual Conference on IEEE Industrial Electronics Society*, 6172 – 6177.
2. Anderberg, S., and Clark, E. (2013). Green Sustainable Øresund Region: Or Eco-Branding Copenhagen and Malmö? *Urban Sustainability: A Global Perspective*, 591–610. Michigan State University Press. doi: 10.14321/j.ctt130hjh.27
3. Alpopi, C., Iacoboaia, C., and Stănescu, A. (2014). Analysis of the current housing situation in Romania in the European context. *Transylvanian Review of Administrative Sciences*, 10(43), 5-24.
4. Asongu, S., and Nwachukwu, J. C. (2018). Educational quality thresholds in the diffusion of knowledge with mobile phones for inclusive human development in sub-Saharan Africa. *Technological Forecasting and Social Change*, 129, 164-172.
5. Baregheh, A., Rowley, J., and Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision*, 47(8), 1323–1339.
6. Boeing, G. (2020). Online rental housing market representation and the digital reproduction of urban inequality. *Environment and Planning A: Economy and Space*, 52(2), 449-468. doi: 10.1177/0308518X19869678
7. Broadbent, R. and Papadopoulos, T. (2012). Impact and benefits of digital inclusion for social housing residents. *Community Development*, 44(1), 55–67. doi: 10.1080/15575330.2012.662990
8. Bundesministerium des Innern, für Bau und Heimat (BMI, 2020). *Soziale Wohnraumförderung*. [The Federal Ministry of the Interior and Community. Social housing promotion.] Retrieved 28 01, 2024, from <https://www.bmi.bund.de/DE/themen/bauen-wohnen/stadt-wohnen/wohnraumfoerderung/soziale-wohnraumfoerderung/soziale-wohnraumfoerderung-node.html>
9. Chansomsak, S. (2008). *SUSTAINABLE ARCHITECTURE: ARCHITECTURE AS SUSTAINABILITY*. World Sustainable Building Conference (SB08). Retrieved 10 07, 2024, from https://www.researchgate.net/publication/284878994_SUSTAINABLE_ARCHITECTURE_ARCHITECTURE_AS_SUSTAINABILITY
10. City of Cologne (2023). *Voluntary Local Review 2023 Cologne. Implementing the 2030 Agenda and the Sustainable Development Goals at the local level*. City of Cologne Office for Press and PR Work. Retrieved 30 07, 2024, from https://www.stadt-koeln.de/mediaasset/content/pdf15/vlr_koeln_en_2023.pdf

11. Drewello, H., and Kulawik, N. (2022). Energiebunker Hamburg – Ecological and Economic Sustainability of a War Relic?. *Sustainability*, 14(1751). doi: 10.3390/su14031751
12. European Commission (1994). *Charter of European Cities & Towns Towards Sustainability*. European Conference on Sustainable Cities & Towns, Aalborg, Denmark. Retrieved 20 07, 2024 from https://sustainablecities.eu/fileadmin/repository/Aalborg_Charter/Aalborg_Charter_English.pdf
13. European Commission (2011). *Hamburg - European Green Capital Winner 2011*. Retrieved 20 07, 2024, from <https://circabc.europa.eu/ui/group/c6e126de-5b8c-4cd7-8d36-a1978a2a63de/library/e303a1e3-ef88-4ba2-b2dc-9101ab9fcb69/details?download=true>
14. Faludi, J. (2017). Golden Tools in Green Design: What Drives Sustainability, Innovation, and Value in Green Design Methods?. *Dartmouth Scholarship*, 2784. Retrieved 10 07, 2024, from <https://digitalcommons.dartmouth.edu/facoa/2784>
15. Gabriel M., Jacobs, K., Arthurson, K., Burke, T., and Yates, J. (2005). *Conceptualising and measuring the housing affordability problem*. National Research Venture 3: Housing affordability for lower income Australians Research Paper No. 1, Australian Housing and Urban Research Institute.
16. German Federal Government (2021). *German Sustainable Development Strategy. Update 2021*. The Federal Government. Retrieved 23 07, 2024, from <https://www.publikationen-bundesregierung.de/resource/blob/2277952/1942518/63826d442b98410c951a10f431ab0330/deutsche-nachhaltigkeitsstrategie-2021-langfassung-englisch-download-bpa-data.pdf?download=1>
17. Gibbs, D. (2000). Ecological modernisation, regional economic development and regional development agencies. *Geoforum*, 31(1), 9-19. doi: 10.1016/S0016-7185(99)00040-8
18. Gissen, D. (2003). *Big and Green: Toward Sustainable Architecture in the 21st Century*, Princeton Architectural Press New York.
19. Houghton, G. (1999). Environmental Justice and the Sustainable City. *Journal of Planning Education and Research*, 18(3), 233–243.
20. Hiller, N. and Schultewolter, D. (2014). Quo vadis German Housing Policy. *Wirtschaftsdienst* 94, 34-40. doi: 10.1007/s10273-014-1622-9
21. Hornborg, A. (2014). Urban Sustainability as Myth and Practice. In G. McDonogh, M. Checker, and C. Isenhour (Eds.), *Sustainability as Myth and Practice the Global City*. Cambridge: Cambridge University Press.

22. Hulchanski, D. J. (1995). The Concept of Housing Affordability: Six Contemporary Uses of the Housing Expenditure-to-income Ratio. *Housing Studies*, 10(4), 471-491. Retrieved 31 03, 2024, from https://edisciplinas.usp.br/pluginfile.php/4138102/mod_resource/content/0/HULCHANSKI_1995_Concept-H-Affordability_Housing-Studies.pdf
23. Jonuschat, H., and Scharp, H. (2005). *Sustainable Home Services in Germany. An Overview on Preconditions, Frameworks and Offers*. IZT, Werkstattbericht Band 72, Berlin.
24. Jossin., J., and Peters, O. (2022). Sustainable Development Goals (SDG) indicators for municipalities: a comprehensive monitoring approach from Germany. *Journal of Urban Ecology*, 8(1). doi: 10.1093/jue/juac020
25. Jung, J. K., and Hiebert, T. (2019). Imagining the Details: Happy Places and Creative Geovisualisation. *Livingmaps Review* 7.
26. Keil, R., and Desfor, G. (2003). Ecological Modernisation in Los Angeles and Toronto. *Local Environment*, 8(1), 27-44.
27. Kenngott, G. F. (1912). *The Record of a City: A Social Survey of Lowell Massachusetts*. New York: Macmillan.
28. Koebel, C., Lang, R., and Danielsen, K. (2004). *Community acceptance of affordable housing*. Virginia: National Association of Realtors, Virginia Tech Center for Housing Research and Metropolitan Institute. Retrieved 31 03, 2024, from https://digitalscholarship.unlv.edu/sea_fac_articles/350
29. Landis, J. (2022). Urban regeneration meets sustainability - HafenCity, Hamburg. In: John Landis (Eds.), *Megaprojects for Megacities*, (13), 407-428. Edward Elgar Publishing.
30. Lux, M. (2003). Efficiency and effectiveness of housing policies in the Central and Eastern Europe countries. *International Journal of Housing Policy*, 3(3), 243-265. doi: 10.1080/14616710310001603712
31. Martinez, E., Tommelein, I. D., and Alvear, A. (2017). Integration of Lean and Information Technology to Enable a Customization Strategy in Affordable Housing. In: Walsh, K., Sacks, R., Brilakis, I. (Eds.), *LC3 2017 Volume II – Proceedings of the 25th Annual Conference of the International Group for Lean Construction (IGLC)*, 95-102. doi: 10.24928/2017/0136
32. Martino, M., Guerrisi, A., Pastorelli, M., Tartaglia, M., Danov, S., and Renda, F. (2013). ICT top-level architecture and services for energy consumption management in social housing. *IECON 2013 - 39th Annual Conference of the IEEE Industrial Electronics Society*, 8148-8153.

33. McMahon, M., and Bhamra, T. (2015). Social sustainability in design: Moving the discussions forward. *Design Journal*, 18(3), 367-391. doi: 10.1080/14606925.2015.1059604
34. Meredyth, D., Hopkins, L., Ewing, S., and Thomas, J. (2004). Wired High Rise: Using Technology to Combat Social Isolation on an Inner City Public Housing Estate. In: Marshall, S., Taylor, W., and Yu, X. (Eds.), *Using Community Informatics to Transform Regions*, (13), 192-208. Idea Group Publishing.
35. Middha, B., and McShane, I. (2022). E-gentrification: Digital Community Engagement, Urban Change and Digital Rights to the City. In: Hovik, S., Giannoumis, G.A., Reichborn-Kjennerud, K., Ruano, J.M., McShane, I., and Legard, S. (Eds.), *Citizen Participation in the Information Society*, 141-165. doi: 10.1007/978-3-030-99940-7
36. Milligan, V., Phibbs, P., Fagan, K., and Gurrán, N. (2004). *A Practical Framework for Expanding Affordable Housing Services in Australia: Learning from Experience*. Final Report No. 65. Melbourne: Australian Housing and Urban Research Institute. Retrieved 31 03, 2024, from <https://www.ahuri.edu.au/research/final-reports/65>
37. Milligan, V., Phibbs, P., Gurrán, N., and Fagan, K. (2007). *Approaches to Evaluation of Affordable Housing Initiatives in Australia*, National Research Venture 3: Housing affordability for lower income Australians Research Paper No. 7. Melbourne: Australian Housing and Urban Research Institute. Retrieved 31 03, 2024 from http://www.ahuri.edu.au/publications/download/nrv3_research_paper_7
38. MOL (Mayor of London) (2004). *The London Plan: Spatial Development Strategy for Greater London*. London: Greater London Authority. Retrieved 31 03, 2024 from https://www.london.gov.uk/sites/default/files/the_london_plan_2004.pdf
39. Nchofoung, T. N., and Asongu, S. (2021). ICT for sustainable development: Global comparative evidence of globalisation thresholds, *AGDI Working Paper*, No. WP/21/061. Retrieved 10 07, 2024, from <http://hdl.handle.net/10419/249072>
40. Pittini, A. (2012). *Housing affordability in the EU. Current situation and recent trends*. Brussels: CECODHAS, European Social Housing Observatory.
41. Rees, W. E. (1997). Is 'Sustainable City' an Oxymoron?. *Local Environment*, 2(3), 303–310.
42. Richter, J. (2023). German housing policy and the current state of the housing market in Germany. *Sociedade e Território*, 35(1), 73-88. doi: 10.21680/2177-8396.2023v35n1id32125
43. Rose, J., and Wilke, C. B. (2015). Climate change vulnerability in cities: The case of Hamburg, *HWWI Research Paper*, No. 167, Hamburg. Retrieved 20 07, 2024, from <https://www.econstor.eu/handle/10419/119458>

44. Shahab, S., Hartmann, T., and Jonkman, A. (2020). Strategies of municipal land policies: housing development in Germany, Belgium, and Netherlands. *European Planning Studies*, 29(6), 1132–1150. doi: 10.1080/09654313.2020.1817867
45. Schaefer, C., Stelter, A., Godefroid, M., and Niehaves, B. (2023). Exploring Citizens' Adoption of Sustainable Innovations Implemented by Cities and Municipalities in Germany. *Sustainability*, 15, 14203. doi: 10.3390/su151914203
46. Scheller, D., and Thörn, H. (2018). Governing 'Sustainable Urban Development' Through Self-Build Groups and Co-Housing: The Cases of Hamburg and Gothenburg," *International Journal of Urban and Regional Research*, 42(5), 914-933. doi: 10.1111/1468-2427.12652
47. Schlüter, K., Strelau, L., Hellwig, D., Herth, M., Schmitz, E., Constantini, R., and Wiegand, P. (2021). *Using Data to Shape our Future Cities. Digital sovereign cities – sustainable investments in data infrastructure*. Association of German Cities.
48. Schmitt, C., and Palm, S. (2018). Sustainability at German Universities: The University of Hamburg as a Case Study for Sustainability-Oriented Organizational Development. In Leal Filho, W. (Eds.) *Handbook of Sustainability Science and Research. World Sustainability Series*. Springer, Cham. doi: 10.1007/978-3-319-63007-6_39
49. Sepe, M. (2017). Placemaking, livability and public spaces. Achieving sustainability through happy places. *The Journal of Public Space*, 2(4), 63-76. doi: 10.5204/jps.v2i4.141
50. Starkey, M. (2010). *Sustainable for Whom? An Analysis of Housing Affordability in Proto-Sustainable Cities*. Simon Fraser University. Retrieved 19 07, 2024, from <http://summit.sfu.ca/item/9988>
51. Statistisches Amt für Hamburg und Schleswig-Holstein (2019). *Wohnen in Hamburg 2018. Durchschnittlich 40,0 m² Wohnfläche pro Kopf*. Nr. 156/2019. Retrieved 21 07, 2024, from https://www.statistik-nord.de/fileadmin/Dokumente/Presseinformationen/SI19_156.pdf, accessed
52. Statistisches Bundesamt. (2023a). *Number of inhabitants in Hamburg in Germany from 1960 to 2022*. Statista. Retrieved 21 07, 2024, from <https://www.statista.com/statistics/1107045/number-inhabitants-hamburg-germany/>
53. Statistisches Bundesamt (2023b). *Entwicklung der Durchschnittsmieten (nettokalt) nicht preisgebundener Wohnungen in Hamburg anhand des Mietenspiegels von 1995 bis 2023 (in Euro pro Quadratmeter)*. Statista. Retrieved 21 07, 2024, from <https://de.statista.com/statistik/daten/studie/1083988/umfrage/mietenentwicklung-in-hamburg-anhand-des-mietenspiegels/>
54. Steinacker, J. M., Van Mechelen, W., Bloch, W., Börjesson, M., Casasco, M., Wolfarth, B., Knoke, C., Papadopoulou, T., Wendt, J., Al Tunaiji, H., Andresen, D., Andrieieva, O., Bachl, N., Badtieva, V., Beucher, F. J., Blauwet, C. A., Casajus Mallen, J. A., Chang, J. H., Clénin, G., ... Rozenstoka, S. (2023). Global Alliance for the Promotion of

- Physical Activity: the Hamburg Declaration. *BMJ Open Diabetes Research and Care*, 9(3) doi: doi.org/10.1136/bmjsem-2023-001626
55. Steinhoff, B. (2024). The impact of the Euro on affordable residential construction in Romania in comparison to Croatia within the European Union. *International Journal of Multidisciplinary and Current Educational Research*, 6(4), 1-29.
 56. Stigler, G. J. (1954). The Early History of Empirical Studies of Consumer Behavior. *The Journal of Political Economy*, 57(2), 95–113.
 57. Sulimin, V., Shvedov, V. and Lvova, M. (2021). *Sustainable development principles: international aspect*. E3S Web of Conferences 295, 01056. doi: 10.1051/e3sconf/202129501056
 58. Syam, F. H., Wisdianti, D., Sajar, S., and Bahri, S. (2023). Study of sustainable architecture concepts. *International Journal of Research and Review*, 10(4), 419-424. doi: 10.52403/ijrr.20230450
 59. Throsby, D. (2001). *Economics and Culture*. Cambridge University Press.
 60. Vogelpohl, A., and Buchholz, T. (2017). Breaking With Neoliberalization by Restricting the Housing Market: Novel Urban Policies and the Case of Hamburg. *International Journal of Urban and Regional Research*, 41, 266-281. doi: 10.1111/1468-2427.12490
 61. Warner, K. (2002). Linking Local Sustainability Initiatives with Environmental Justice. *Local Environment*, 7(1), 35–47.
 62. WCED (1987). *Our Common Future*. United Nations. Retrieved 19 07, 2024, from https://gat04-live-1517c8a4486c41609369c68f30c8-aa81074.divio-media.org/filer_public/6f/85/6f854236-56ab-4b42-810f-606d215c0499/cd_9127_extract_from_our_common_future_brundtland_report_1987_foreword_chpt_2.pdf
 63. Welfens, P., and Lutz, C. (2012). *Green ICT Dynamics: Key Issues and Findings for Germany*. EIIW Discussion paper, University Library Wuppertal. Retrieved 21 07, 2024, from <https://link.springer.com/article/10.1007/s13563-012-0017-x>
 64. Wiesemann, E. (2014). *From “Win-Win“ to “Lose-Lose” – How Neoliberalism Undermines the Sustainable City – A Case Study of Hamburg*. LUCSUS
 65. Yuan, Q., and Tang L. Y. (2021). *The Principles in Green Design*. E3S Web of Conferences 259, 02002. doi: 10.1051/e3sconf/202125902002