

Acta Universitatis Sapientiae

Economics and Business

Volume 11, 2023

Sapientia Hungarian University of Transylvania
Scientia Publishing House

Acta Universitatis Sapientiae, Economics and Business is indexed by RePEc.

Contents

<i>Ifra BASHIR – Ishtiaq QURESHI</i> Financial Well-Being and Financial Stress: Examining the Moderating Effect of Gender	1
<i>Taiwo Adebunsi ADEROGBA – Ndubuisi Johnbosco EZENWA – Rasheed Adegboyega QUADRI</i> Catalysts of Economic Welfare in Africa: A Cross-Sectional Autoregressive Distributed Lag Approach.	18
<i>Saima NAZIR – Khalid CHISTI</i> Corporate Spin-Offs and Shareholders' Wealth: A Systematic Review and Future Research Agenda	42
<i>Ambreen Khursheed WANI</i> Work–Life Balance, Supervisor Support, and Life Satisfaction in the Higher Education Sector.	64
<i>Shakira MUKHTAR – Anisa JAN – Adil ZAHOOR</i> Beyond the Big Five: How Dynamic Personality Traits Predict Financial Risk Tolerance?	93
<i>Abdulrazaq K. DAUDU – Oyedola W. KAREEM – Latifat K. OLATINWO – Suleiman B. SHUAIB – Abdulganiyu I. ABDULRAHMAN</i> Does Gender Wage Gap Exist among Farm Workers in Nigeria? Evidence from Decomposition-Matching Analysis	115
<i>Mohammed Bashir SALAUDEEN</i> Effect of Crude Oil Revenue on the Oil and Non-oil Sectors in Nigeria.	138
<i>Mayank JAIN – Taniya MALIK – Sakshi MALIK</i> Deciphering Financial Health and Risk: Hierarchical Relationships and Interdependencies among Key Factors	162
<i>Katalin NAGY-KERCŐ</i> Towards Sustainability on a Sea of Eco-Labels. Leading or Misleading?	186
<i>Muhammed Salim ANAPPATTATH – Shiby M. THOMAS</i> Demand for Kerala's International Tourism by the Top Three Source Markets: A Comparative Analysis	208
<i>Faeyzh BARHOOM</i> Revisiting the Financial Development and Income Inequality Nexus: Evidence from Hungary	227
<i>Sumit KUMAR – Baljit KAUR</i> Intergovernmental Fiscal Transfers and Tax Collection of Indian States: Estimation from Panel Data Models	258



Financial Well-Being and Financial Stress: Examining the Moderating Effect of Gender

Ifra BASHIR,¹ Ishtiaq QURESHI²

¹Department of Management Studies, University of Kashmir, Srinagar, India
e-mail: mirifra786@gmail.com

²Department of Management Studies, University of Kashmir, Srinagar, India
e-mail: ishtiaq@yahoo.co.in

Abstract: The study aims to investigate the relationship between financial well-being and financial stress while examining the moderating role of gender. The study uses a survey method, and data were collected in Kashmir Province of Jammu and Kashmir, northern India, from 168 respondents selected on a convenience sampling basis. The results strongly supported the hypothesised model and have put forth evidence that financial well-being has a negative impact on financial stress and that this relationship is moderated by gender. The study has important implications for academia, future researchers, governments, and policymakers aiming at improving their citizens' quality of life, health, and well-being, a key sustainable development goal, and the ultimate goal of the Transformative Consumer Research Agenda.

Keywords: financial well-being, well-being, sustainable development goals (SDGs), financial stress, gender

JEL Classification: G50, I30, 131

1. Introduction

Financial well-being as a term has garnered considerable attention in recent years, primarily because of three reasons: a) increasing poverty, b) increasing inequality across nations, and most importantly c) due to its connections with several key sustainable development goals (Bowman et al., 2017; Fu, 2020). Research on this subject has been classified under the category of Transformative Service Research, which is described as the combination of consumer and service research with the ultimate goal of improving the well-being of citizens, employees, and communities (L. Anderson et al., 2013). Therefore, more research is directed in this area (Brüggen et al., 2017; Mahendru, 2020). Extant research reveals the dire need for further research

on the antecedents and outcomes of financial well-being due to the variations in financial well-being scores reported across different demographic groups (CFPB (Consumer Financial Protection Bureau), 2017). The current study addresses these gaps by investigating the relationship between financial well-being and financial stress while examining whether gender moderates the established relationship.

Understanding the relationship between financial well-being and financial stress is important for three reasons: First, prior research found stress to be correlated with both wealth and well-being (Ng et al., 2009), which are key determinants of one's quality of life (Aripin et al., 2017), and the achievement of key sustainable development goals (Le Blanc, 2015). At a macro level, stress is detrimental to the entire economy (Davig and Hakkio, 2010). Second, lower levels of financial well-being trigger a stress cycle that stifles both personal and social progress (Utkarsh et al., 2020). Third, with the emergence of the COVID-19 pandemic, the financial well-being of individuals might be adversely impacted due to increasing unemployment, loss of income, and increasing debts (International Labour Organization, 2021), which can have further negative effects on the psychological well-being and physical health of individuals through financial stress. For instance, an individual's financial circumstances are found to have a substantial impact on his or her mental well-being (Hojman et al., 2016). This impact can be even worse when individuals live in a politically insecure and terrorism-affected area, for example, Kashmir, India, which is the context of the current study. The territory of Kashmir, India, has been a victim of sustained terrorism and economic and political insecurity for the past three decades. Gaibulloev et al. (2019) explored the impact of terrorism on the subjective well-being of people living in Pakistan and found that terrorism adversely affects financial well-being. It is reported in the extant literature that perceptions of political security negatively correlate with subjective well-being (Wills-Herrera et al., 2011), thereby inducing psychological stress (Gaibulloev et al., 2019). To the best of the authors' knowledge, no evidence on the financial well-being and financial stress of the citizens of Kashmir, India, exists while also considering age as a moderator in the proposed model.

The current research makes three contributions: First, the study is centred on Kashmir, India, thereby responding to the call from extant literature to add more studies on financial well-being in developing nations (Brüggen et al., 2017; Mahendru et al., 2020) due to the paucity of research there (Fu, 2020), though being the priority target of the UN 2030 agenda (Antoniades et al., 2020). Second, the authors' attempt to investigate whether the levels of financial well-being are related to financial stress. This has implications for the achievement of a key Sustainable Development Goal (SDG 3), which aims to improve the health and well-being of citizens globally. Third, the authors show how the relationship between financial well-being and financial stress varies across genders. Prior

research reveals the existence of only a few empirical studies investigating the moderating role of gender in financial matters (Falahati and Paim, 2012). Along these lines, the present study is significant because it attempts to make a crucial contribution to enhancing citizens' quality of life and improving their overall health and well-being.

The current study is structured as follows: after this introduction, section 2 presents a brief literature review of the concepts under study, which reports on key research findings from previous studies to form the present study's conceptual framework. Section 3 outlines the methodology employed for carrying out the current study. Section 4 presents the key findings of the current study, followed by a discussion in section 5. Section 6 concludes, suggesting the implications of the findings, the limitations of the current study, and directions for future research.

2. Theoretical Background and Hypothesis Development

2.1. Financial Well-Being

The concept of financial well-being is relatively new and has received considerable importance in recent years. It is a subset of subjective well-being, a subject of many studies in economics and psychology (Michael Collins and Urban, 2020), which has an impact on key determinants of a happy life such as life satisfaction, psychological well-being, and academic performance (Shim et al., 2009). However, the negative effects of political insecurity and terrorism, through adversely impacting job opportunities, wages, and investment returns, ultimately impact citizens' financial well-being and stress levels (Gaibulloev et al., 2019). Due to similar circumstances in Kashmir, India, the level of financial well-being experienced by citizens may be low, eventually affecting their health and overall well-being, a key sustainable development goal (SDG 3) and the ultimate goal of Transformative Consumer Research (TCR) (Mick, 2006).

Previously, financial well-being was conceptualized as an individual's perception of their objective financial situation. As more research is conducted in this area, financial well-being is understood nowadays as a state of financial adequacy and safety in the present and the future. A more nuanced and widely accepted definition of financial well-being was propounded by the Consumer Financial Protection Bureau in the year 2015 (CFPB, 2015). Accordingly, financial well-being was defined as "a state of being in which a person can fully meet current and ongoing financial obligations, can feel secure in their financial future and can make choices that allow enjoyment of life". Following that, other researchers adopted a similar approach in their definitions (D'Agostino et al., 2020; Kempson et al., 2017; Michael Collins and Urban, 2020).

2.2. Financial Stress

A lack of financial well-being can raise financial anxieties and make a person suffer. Research suggests that a deficiency of financial resources, especially when compared with one's peers, is considered a primary source of financial stress (Heckman et al., 2014). Generally, a lack of financial well-being has been conceptualized as financial stress in the extant literature (Prawitz et al., 2006). In contrast, several researchers have described financial stress as a mix of physical arousal and emotional responses in reaction to a financial stimulus, such as an urgent or imminent expense (Grable et al., 2015). Extant literature includes approaches to financial stress as either an antecedent or a consequence of financial well-being (Nanda and Banerjee, 2021). In the context of job security and employment status, several studies have found that an individual's financial well-being is significantly associated with financial stress (Turner et al., 1991), while some others found that the concepts are not significantly related (Gaunt and Benjamin, 2007). Therefore, the association between financial well-being and financial stress calls for a more in-depth investigation. At a micro level, a positive financial well-being attitude may ease stress among individuals, thereby positively influencing their academic, personal, and social progress (Netemeyer et al., 2018; Utkarsh et al., 2020; Xiao et al., 2009). On the other hand, at a macro level, positive perceptions about the financial conditions of the economy are related to healthy well-being and longevity, which are the prerequisites for economic development (Gaibulloev et al., 2019). Therefore, the following hypothesis has been formulated based on these shreds of evidence.

H1: Financial well-being has a direct negative effect on financial stress.

2.3. Gender as a Moderator

Demographic attributes, such as gender, age, occupation, education, and income, have been studied as important variables in many financial well-being studies (Chatterjee et al., 2019; Fazli Sabri et al., 2012; Gerrans et al., 2014; Gutter and Copur, 2011; Hira and Mugenda, 1998; Joo and Grable, 2004; Michael Collins and Urban, 2020; Narges and Laily, 2011; Sahi, 2013; Vera-Toscano et al., 2006). Among different demographic variables, the role of gender is of specific importance due to a relatively poor understanding of gender issues in financial management (Falahati and Paim, 2012). Few researchers have investigated the effect of gender on financial well-being. However, extant research reveals a mix of contradictory findings on the role of gender in several financial well-being and financial stress studies. Most researchers report that females had lower financial well-being levels and higher levels of financial anxiety compared to their male counterparts (Gerrans

et al., 2014; Gutter and Copur, 2011; Narges and Laily, 2011; Salignac et al., 2020). Unlike these researchers, Vera-Toscano et al. (2006) and Chatterjee et al. (2019) found that males had lower financial well-being levels. Accordingly, we formulate the following research hypothesis:

H2: Gender moderates the relationship between financial well-being and financial stress.

2.4. Conceptual Model

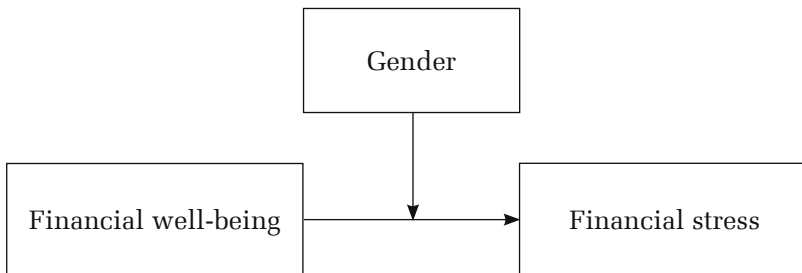


Figure 1. Relationship between financial well-being and financial stress: the moderating role of gender

3. Methods

3.1. Sampling and Data Collection

The present study has been conducted in the Kashmir Province of India. A total of 220 questionnaires using convenience sampling were distributed online through various platforms, such as Facebook, WhatsApp, Twitter, Instagram, and LinkedIn, to the citizens of various places in Kashmir using a Google web-based survey. The validity of web-based surveys as a method of data collection is confirmed by Krantz and Dalal (2000) and Gosling et al. (2004). Out of the 220 questionnaires, only 168 respondents filled in the questionnaires as required. For ascertaining the adequate sample size necessary for this study, the rule of thumb method was considered. Research directions relating to the selection of an adequate sample size suggest that the number of respondents should be at least ten times the number of questions in the questionnaire (Hair et al., 2010). Therefore, the required sample size for the study is 140 respondents. The data collection process has been carried out from August to September 2021 in the Kashmir Province of India.

3.2. Measurement

Financial Well-Being

The authors quantified financial well-being by eight items using the financial well-being scale developed by the Consumer Financial Protection Bureau (CFPB, 2017). Using a 5-point Likert scale, the scale measures aspects of one's financial situation and financial capability. All eight items in the scale are shown in *Table 1*. The sample reported a mean financial well-being score of 3.69 (SD = 0.910), with a range of 5.38.

Financial Stress

Financial stress was quantified by six items on a 5-point Likert scale using the InCharge Financial Distress Scale developed by Prawitz et al. (2006). All six items in the scale are shown in *Table 1*. The sample's average level of financial stress was 1.85 (SD = 0.648), with a range of 2.27.

Table 1. Operationalization of constructs

Main Constructs	Type (Reflective or Formative)	Measures	Reference			
Financial Well-Being (FWB)	Reflective	FWB2: "I am securing my financial future."	(CFPB, 2017)			
		FWB3: "Because of my money situation, I feel like I will never have the things I want in life."				
		FWB5: "I am just getting by financially."				
		FWB6: "I am concerned that the money I have or will save won't last."				
		FWB7: "Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month."				
		FWB8: "I have money left over at the end of the month."				
		FWB9: "I am behind with my finances."				
		FWB10: "My finances control my life."				
		Financial Stress (FS)		Reflective	FS1: "What do you feel is the level of your financial stress today?"	(Prawitz et al., 2006)
					FS2: "On the scale, mark how satisfied you are with your present financial situation."	
FS3: "How do you feel about your current financial situation?"						
FS4: "How often do you worry about being able to meet normal monthly living expenses?"						
FS6: "How often does this happen to you: You want to go out to eat, go to a movie, or do something else and don't go because you can't afford to?"						
FS8: "How stressed do you feel about your personal finances in general?"						

3.3. Data Analysis

The primary objective of the current study was to examine the relationship between financial well-being and financial stress. The authors used AMOS 23.0 to perform a confirmatory factor analysis (CFA) to determine the acceptability and applicability of the scales in the Indian context. Furthermore, descriptive statistics for all the variables were conducted. The authors used a structural model (see *Figure 3*) and a multi-group analysis (see *Table 4*) to test the conceptual model.

3.4. Measurement Model

With a Likert scale of over five items, extant research considers maximum likelihood estimation as the best estimator (Checa et al., 2019; Utkarsh et al., 2020). Therefore, the current study used the most prevalent SEM estimation procedure, maximum likelihood estimation, to empirically evaluate the proposed research model.



Figure 2. Measurement model

This was accomplished using AMOS software and a two-step structural equation modelling procedure. The measurement model was assessed in the first phase of the SEM. A confirmatory factor analysis (CFA) of the measurement model was performed using AMOS 23.0. To evaluate the measurement model (Hooper et al., 2008; Qureshi and Mehraj, 2021; Schreiber et al., 2006), multiple model fit indices were used. The

CR and Fornell and Larcker's (1981) criteria were used to assess convergent validity and discriminant validity respectively. The model for the CFA analysis is shown in *Figure 3*. The goodness-of-fit index provided by the measurement model is satisfactory. $\chi^2 = 103.373$, $DF = 76$, $CMIN/df = 1.360$, $CFI = 0.988$, $IFI = 0.988$, $NFI = 0.957$, $GFI = 0.939$, $AGFI = 0.915$, $SRMR = 0.048$, and $RMSEA = 0.041$ are the model fit indices for the CFA Model. An acceptable model fit was established by the measurement model (J. C. Anderson and Gerbing, 1988; Hair et al., 2006).

3.5. Convergent Validity

Figure 2 reveals that all factor loadings of the reflective constructs varied from 0.85 to 0.97, which exceeded the recommended level of 0.60. As a result of this test, items FWB1, FWB4, FS5, and FS7 were removed due to low factor loading to confirm convergent validity. Composite reliability (CR) was used to establish convergent validity, and the average variance was explained (AVE). To ensure convergent validity, the following criteria must be met: $CR > 0.7$, $CR > AVE$, and $AVE > 0.5$ (Hair et al., 2010; Qureshi and Mehraj, 2021). Both constructs had a CR value higher than 0.7 with an AVE higher than 0.5. Furthermore, the CR statistics is significantly higher than the related AVE value for both individual constructs (*Table 2*). As a result, both constructs met the prerequisites of convergent validity (Hair et al., 2010; Qureshi and Mehraj, 2021).

Table 2. *Confirmatory factor analysis results*

Constructs	Item Code	Estimate	CR	AVE	MSV	Discriminant Validity	
						FWB	FS
Financial	FWB10	.885	0.960	0.750	0.103	0.866	
Well-Being	FWB9	.857					
	FWB8	.873					
	FWB7	.815					
	FWB6	.868					
	FWB5	.887					
	FWB3	.844					
	FWB2	.896					
Financial	FS8	.920	0.933	0.701	0.103	-0.320	0.837
Stress	FS6	.840					
	FS4	.733					
	FS3	.842					
	FS2	.886					
	FS1	.790					

3.6. Discriminant Validity

In addition to convergent validity, establishing the discriminant validity of the measurement is also important, which is evaluated using Fornell and Larcker’s (1981) measure of average variance extracted (AVE) (Fornell and Larcker, 1981; Hair et al., 2010). The square root of a construct’s AVE must be larger than the correlations between the construct and the other constructs in the model in order to meet the discriminant validity criteria (Qureshi and Mehraj, 2021). Furthermore, the prerequisite criteria ($MSV < AVE$) should be satisfied by each construct. *Table 2* clearly shows that the square roots of all constructs’ AVEs are greater than the correlations between the two constructs. Constructs have an acceptable discriminant validity because these diagonal values are greater than the off-diagonal values in the corresponding rows and columns (Hair et al., 2010). Similarly, $MSV < AVE$ is found for both constructs in the results (see *Table 2*). Therefore, both separate constructs met the criteria for discriminant validity (Hair et al., 2010).

4. Results

The descriptive characteristics of the sample are presented in *Table 3*.

To measure the impact of financial well-being on financial stress, the current study used a structural model. Extant research suggests that the structural model provides an adequate goodness-of-fit index (J. C. Anderson and Gerbing, 1988; Hair et al., 2006). The model fit indices for SEM Model are: $\chi^2 = 81.650$, $DF = 76$, $CMIN/df = 1.074$, $CFI = 0.988$, $IFI = 0.988$, $NFI = 0.957$, $GFI = 0.939$, $AGFI = 0.915$, $SRMR = 0.027$, and $RMSEA = 0.019$.

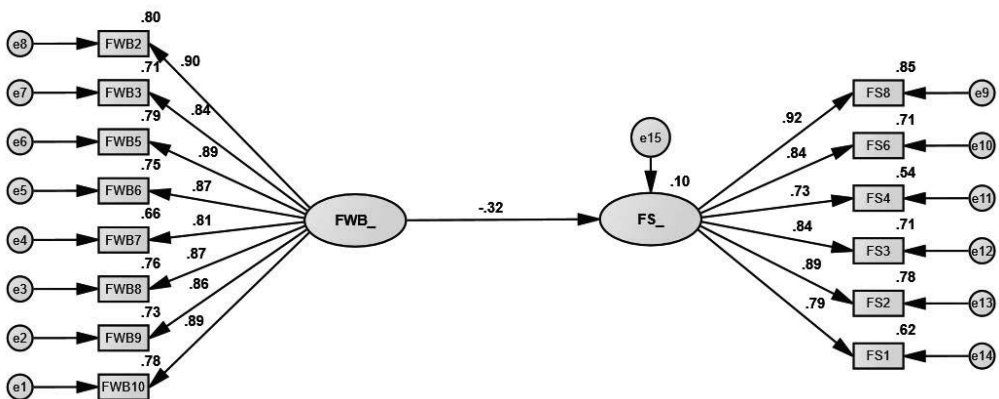


Figure 3. Results of the SEM model

The given path (FWB-FS) has a critical ratio of -4.49; the significant beta coefficient of the stated path confirms the significant negative effect of financial well-being

on financial stress ($\beta = -0.320^{***}$, $R^2 = 0.10$, $P < 0.05$). Figure 3 depicts the results of the association between financial well-being and financial stress.

H1 tested whether *financial well-being has a direct negative effect on financial stress*. As per the results of the structural model shown above (Figure 3), financial well-being is negatively related to financial stress. The results imply that positive perceptions about financial well-being are inversely related to financial stress.

Table 3. Descriptive statistics of the sample ($N = 168$)

Variables	N	%	M	SD
Income				
Less than Rs 20,000	25	14.6%		
Rs 21,000 to Rs 30,000	20	12.2%		
Rs 31,000 to Rs 40,000	27	15.9%		
Rs 41,000 to Rs 50,000	18	11%		
Rs 51,000 to Rs 60,000	12	7.3%		
Above Rs 60,000	66	39%		
Age				
Below 18 years	27	16.07%		
Between 19 and 30 years	52	30.95%		
Between 31 and 40 years	41	24.40%		
Between 41 and 50 years	29	17.26%		
Above 50 years	19	11.31%		
Marital status				
Married	70	41.5%		
Employment status				
Employed	80	47.6%		
Unemployed	88	52.3		
Education				
Less than a high school diploma	2	1.2%		
High school diploma or equivalent degree	10	6.1%		
Bachelor's degree	25	14.6%		
Master's degree	111	65.9%		
PhD	20	12.2%		
Gender				
Male	88	52.3%		
Financial well-being			3.69	.910
Financial stress			1.85	.648

4.2. A Moderation Model

To determine the impact of gender as a moderator of the relationship between financial well-being and financial stress, the authors ran a multi-group analysis. First, the model was evaluated separately for males and females to ensure that each group

had a good fit. The two groups were then compared to the variable group. Then, a constrained model with no structural parameters differing between the two subgroups of respondents was compared to an unconstrained model with all structural parameters that could be changed between the two subgroups. A comparison of the χ^2 (CMIN), DF, and significance (p) between the Unconstrained and Measurement Residuals revealed that each model was significant ($p < .05$). Results indicate that gender (male, female) has a significant moderating effect on financial well-being and financial stress associations. The results of the moderating effect are shown in *Table 4* below.

Table 4. Moderation effect

<i>Independent Variable</i>	<i>Gender</i>		<i>C.R.</i>	<i>Significance</i>
<i>Financial Well-Being</i>	<i>Male</i>	<i>-0.275</i>	<i>-2.99</i>	<i>.003</i>
	<i>Female</i>	<i>-0.235</i>	<i>-2.45</i>	<i>.014</i>
<i>Dependent variable: financial stress</i>				

H2 tested whether *gender moderates the relationship between financial well-being and financial stress*. As per the results of the moderation effect (*Table 4*), there are substantial effects of gender (male, female) on the hypothesised relationship. Results imply that males are financially better off than females.

5. Discussion

The current study investigated the relationship between financial well-being and financial stress while examining whether gender moderates the established relationship. The findings of the study support the previous body of knowledge that people with higher financial well-being levels experience less financial stress compared to people with lower financial well-being levels. Further, the study proposed that gender is an important intervening mechanism that explains the associations between financial well-being and financial stress. Although people experiencing higher financial well-being levels are more likely to experience less financial stress, this relationship differs by gender, with males having a stronger relationship than females. In other words, the financial well-being of males and the resulting financial stress are more evident. This finding is commensurate with the findings of previous researchers who report that achieving financial independence is more difficult for females (Salignac et al., 2020) and also that terrorism and political insecurity have a more significant impact on the perceived financial situation of females than on that of males (Gaibulloev et al., 2019).

The current study adds to the extant and growing literature on financial well-being by demonstrating the moderating role of gender in the significant association between financial well-being and financial stress. At the same time, our results are

in correspondence with the small body of previous research on citizens' financial well-being and stress (Choi et al., 2020; Turner et al., 1991; Utkarsh et al., 2020), especially in the context of a developing economy affected by terrorism and political insecurity. We have demonstrated the strong relationship between financial well-being and financial stress, which has been generally overlooked in the literature, as a progression of previous research. Our research provides some evidence that financial well-being could challenge financial stress. This is primarily because a positive outlook on financial well-being can enhance individuals' academic, personal, and social prosperity (Netemeyer et al., 2018; Shim et al., 2009). As such, the current study contributes to understanding the relationship between financial well-being and financial stress and the moderating processes through gender on that relationship.

The current findings on subjective perceptions of financial well-being and financial stress may help scholars to better understand the consequences of financial well-being and the antecedents of financial stress. However, given the contributions, the current study suffers from a few limitations: First, we measured financial well-being using subjective measures alone. Future studies could use a combination of objective measures (e.g. debt-to-income ratio, saving rates, or investment) and subjective measures of financial well-being, as proposed by previous research (Diener and Seligman, 2004). Second, the current study used a convenience sampling method. Future researchers can employ more systematic and robust sampling methods considering national or interstate regions of India. Finally, we believe that qualitative data in the area would provide further valuable answers to how financial stress is shaped by financial well-being.

6. Conclusions

The current study is possibly the first investigation to understand the relationship between the financial well-being and financial stress of citizens adversely affected by terrorism in the context of a developing economy. By establishing financial well-being as an important antecedent to financial stress, this study adds to the existing predictors of the latter. Our study has implications for academia or future researchers, policymakers, and financial institutions aiming at maximizing individuals' health and well-being, which has been listed as a crucial Sustainable Development Goal (SDG 3) and the goal of the Transformative Consumer Research (TCR) movement. Policymakers must focus on key antecedents to financial well-being to find ways to formulate the necessary programmes, strategies, and interventions aimed at managing financial stress, including both financially vulnerable and financially invulnerable groups.

References

- Anderson, J. C.; Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin* 103(3): 411–423. <https://doi.org/10.1037/0033-2909.103.3.411>.
- Anderson, L.; Ostrom, A. L.; Corus, C.; Fisk, R. P.; Gallan, A. S.; Giraldo, M.; Mende, M.; Mulder, M.; Rayburn, S. W.; Rosenbaum, M. S.; Shirahada, K.; Williams, J. D. (2013). Transformative service research: An agenda for the future. *Journal of Business Research* 66(8): 1203–1210. <https://doi.org/10.1016/j.jbusres.2012.08.013>.
- Antoniades, A.; Widiarto, I.; Antonarakis, A. S. (2020). Financial crises and the attainment of the SDGs: An adjusted multidimensional poverty approach. *Sustainability Science* 15(6): 1683–1698. <https://doi.org/10.1007/s11625-019-00771-z>.
- Aripin, S. N.; Fadilah, D. H.; Puteh, H. (2017). Financial wellness and quality of life among young employees. *Journal of Administrative Science* 14(3): 51–63.
- Bowman, D.; Banks, M.; Fela, G.; Russell, R.; De Silva, A. (2017). *Understanding financial wellbeing in times of insecurity* (April).
- Brüggen, E. C.; Hogreve, J.; Holmlund, M.; Kabadayi, S.; Löfgren, M. (2017). Financial well-being: A conceptualization and research agenda. *Journal of Business Research* 79: 228–237. <https://doi.org/10.1016/j.jbusres.2017.03.013>.
- CFPB (Consumer Financial Protection Bureau). (2015). *Financial Well Being: The Goal of Financial Education* (January).
- (2017a). *CFPB Financial Well-Being Scale*. May 1–2.
- (2017b). *Financial well-being in America* (September).
- Chatterjee, D.; Kumar, M.; Dayma, K. K. (2019). Income security, social comparisons and materialism: Determinants of subjective financial well-being among Indian adults. *International Journal of Bank Marketing* 37(4): 1041–1061. <https://doi.org/10.1108/IJBM-04-2018-0096>.
- Checa, I.; Perales, J.; Espejo, B. (2019). Measurement invariance of the satisfaction with life scale by gender, age, marital status and educational level. *Quality of Life Research* 28(4): 963–968. <https://doi.org/10.1007/s11136-018-2066-2>.
- Choi, S. L.; Heo, W.; Cho, S. H.; Lee, P. (2020). The links between job insecurity, financial well-being and financial stress: A moderated mediation model. *International Journal of Consumer Studies* 44(4): 353–360. <https://doi.org/10.1111/ijcs.12571>.
- D’Agostino, A.; Rosciano, M.; Starita, M. G. (2020). Measuring financial well-being in Europe using a fuzzy set approach. *International Journal of Bank Marketing* 39(1): 48–68. <https://doi.org/10.1108/IJBM-03-2020-0114>.

- Davig, T.; Hakkio, C. (2010). What is the effect of financial stress on economic activity? *Economic Review, Federal Reserve Bank of Kansas City* 95(Q II): 35–62. <https://econpapers.repec.org/RePEc:fip:fedker:y:2010:i:qii:p:35-62:n:v.95no.2>.
- Diener, E.; Seligman, M. E. P. (2004). Beyond money: Toward an economy of well-being. *Psychological Science in the Public Interest* 5(1): 1–31. <https://doi.org/10.1111/j.0963-7214.2004.00501001.x>.
- Falahati, L.; Paim, L. H. (2012). Experiencing financial problems among university students: An empirical study on the moderating effect of gender. *Gender in Management* 27(5): 311–326. <https://doi.org/10.1108/17542411211252633>.
- Fazli Sabri, M.; Cook, C. C.; Gudmunson, C. G. (2012). Financial well-being of Malaysian college students. *Asian Education and Development Studies* 1(2): 153–170. <https://doi.org/10.1108/20463161211240124>.
- Fornell, C.; Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research* 18(3): 382–388. <https://doi.org/10.1177/002224378101800313>.
- Fu, J. (2020). Ability or opportunity to act: What shapes financial well-being? In: *World Development*. Vol. 128. Elsevier Ltd. <https://doi.org/10.1016/j.worlddev.2019.104843>.
- Gaibullov, K.; Oyun, G.; Younas, J. (2019). Terrorism and subjective financial well-being: Micro-level evidence from Pakistan. *Public Choice* 178(3–4): 493–512. <https://doi.org/10.1007/s11127-018-0606-5>.
- Gaunt, R.; Benjamin, O. (2007). Job insecurity, stress and gender: The moderating role of gender ideology. *Community, Work and Family* 10(3): 341–355. <https://doi.org/10.1080/13668800701456336>.
- Gerrans, P.; Speelman, C.; Campitelli, G. (2014). The relationship between personal financial wellness and financial wellbeing: A structural equation modelling approach. *Journal of Family and Economic Issues* 35(2): 145–160. <https://doi.org/10.1007/s10834-013-9358-z>.
- Gosling, S. D.; Vazire, S.; Srivastava, S.; John, O. P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about Internet questionnaires. *American Psychologist* 59(2): 93–104. <https://doi.org/10.1037/0003-066X.59.2.93>.
- Grable, J.; Heo, W.; Rabbani, A. (2015). Financial anxiety, physiological arousal, and planning intention. *Journal of Financial Therapy* 5(2). <https://doi.org/10.4148/1944-9771.1083>.
- Gutter, M.; Copur, Z. (2011). Financial behaviors and financial well-being of college students: Evidence from a national survey. *Journal of Family and Economic Issues* 32(4): 699–714. <https://doi.org/10.1007/s10834-011-9255-2>.
- Hair, J. F.; Black, B.; J. Barry, B.; Anderson E, R. (2010). *Multivariate data analysis*. 7th ed. New Jersey: Pearson Prentice Hall.

- Hair, J. F.; Black, W.; Babin, B.; Anderson, R.; Tatham, R. (2006). *Multivariate data analysis: A global perspective*. Global edition.
- Heckman, S.; Lim, H.; Montalto, C. (2014). Factors related to financial stress among college students. *Journal of Financial Therapy* 5(1). <https://doi.org/10.4148/1944-9771.1063>.
- Hira, T. K.; Mugenda, O. M. (1998). Predictors of financial satisfaction: Differences between retirees and non-retirees. *Journal of Financial Counseling and Planning* 9(2): 75–84.
- Hojman, D. A.; Miranda, Á.; Ruiz-Tagle, J. (2016). Debt trajectories and mental health. *Social Science and Medicine* 167: 54–62. <https://doi.org/10.1016/j.socscimed.2016.08.027>.
- Hooper, D.; Coughlan, J.; Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods* 6(1): 53–60. <https://doi.org/10.21427/D79B73>.
- International Labour Organization. (2021). *Latest labour market developments*. https://www.ilo.org/wcmstp5/groups/public/@dgreports/@dcomm/documents/briefingnote/wcms_767028.pdf.
- Joo, S. H.; Grable, J. E. (2004). An exploratory framework of the determinants of financial satisfaction. *Journal of Family and Economic Issues* 25(1): 25–50. <https://doi.org/10.1023/B:JEEI.0000016722.37994.9f>.
- Kempson, E.; Finney, A.; Poppe, C. (2017). Financial well-being – A conceptual model and preliminary analysis. *Consumption Research Norway* 5(3).
- Krantz, J. H.; Dalal, R. (2000). Validity of web-based psychological research. In: Birnbaum, M. H. (ed.), *Psychological experiments on the Internet*. New York, N.Y.: Elsevier Academic Press.
- Le Blanc, D. (2015). Towards integration at last? The sustainable development goals as a network of targets. *Sustainable Development* 23(3): 176–187. <https://doi.org/10.1002/sd.1582>.
- Mahendru, M. (2020). Financial well-being for a sustainable society: A road less travelled. *Qualitative Research in Organizations and Management: An International Journal* (ahead-of-print). <https://doi.org/10.1108/QROM-03-2020-1910>.
- Mahendru, M.; Sharma, G. D.; Hawkins, M. (2020). Toward a new conceptualization of financial well-being. *Journal of Public Affairs* August. <https://doi.org/10.1002/pa.2505>.
- Michael Collins, J.; Urban, C. (2020). Measuring financial well-being over the lifecycle. *European Journal of Finance* 26(4–5): 341–359. <https://doi.org/10.1080/1351847X.2019.1682631>.
- Mick, D. G. (2006). Meaning and mattering through transformative consumer research. *Advances in Consumer Research* 33(1): 1–4.

- Nanda, A. P.; Banerjee, R. (2021). Consumer's subjective financial well-being: A systematic review and research agenda. *International Journal of Consumer Studies* March. <https://doi.org/10.1111/ijcs.12668>.
- Narges, D.; Laily, H. P. (2011). Determinants of financial wellness among Malaysia workers. *African Journal of Business Management* 5(24): 10092–10100. <https://doi.org/10.5897/ajbm10.1267>.
- Netemeyer, R. G.; Warmath, D.; Fernandes, D.; Lynch, J. G. (2018). How am I doing? Perceived financial well-being, its potential antecedents, and its relation to overall well-being. *Journal of Consumer Research* 45(1): 68–89. <https://doi.org/10.1093/jcr/ucx109>.
- Ng, W.; Diener, E.; Aurora, R.; Harter, J. (2009). Affluence, feelings of stress, and well-being. *Social Indicators Research* 94(2): 257–271. <https://doi.org/10.1007/s11205-008-9422-5>.
- Prawitz, A. D.; Garman, E. T.; Sorhaindo, B.; Neill, B. O.; Kim, J. (2006). InCharge Financial Distress/Financial Well-Being Scale: Development, administration, and score interpretation. *Financial Counseling Planning* 1714(732): 34–50. <https://doi.org/10.1037/t60365-000>.
- Qureshi, I. H.; Mehraj, D. (2021). Identifying the factors of internal green marketing: A scale development and psychometric evaluation approach. *International Journal of Manpower*. <https://doi.org/10.1108/IJM-06-2020-0276>.
- Sahi, S. K. (2013). Demographic and socio-economic determinants of financial satisfaction: A study of SEC-A segment of individual investors in India. *International Journal of Social Economics* 40(2): 127–150. <https://doi.org/10.1108/03068291311283607>.
- Salignac, F.; Hamilton, M.; Noone, J.; Marjolin, A.; Muir, K. (2020). Conceptualizing financial wellbeing: An ecological life-course approach. *Journal of Happiness Studies* 21(5): 1581–1602. <https://doi.org/10.1007/s10902-019-00145-3>.
- Schreiber, J. B.; Stage, F. K.; King, J.; Nora, A.; Barlow, E. A. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *Journal of Educational Research* 99(6): 323–338. Routledge. <https://doi.org/10.3200/JOER.99.6.323-338>.
- Shim, S.; Xiao, J. J.; Barber, B. L.; Lyons, A. C. (2009). Pathways to life success: A conceptual model of financial well-being for young adults. *Journal of Applied Developmental Psychology* 30(6): 708–723. <https://doi.org/10.1016/j.appdev.2009.02.003>.
- Turner, J. B.; Kessler, R. C.; House, J. S. (1991). Factors facilitating adjustment to unemployment: Implications for intervention. *American Journal of Community Psychology* 19(4): 521–542. <https://doi.org/10.1007/BF00937990>.
- Utkarsh, Pandey, A.; Ashta, A.; Spiegelman, E.; Sutan, A. (2020). Catch them young: Impact of financial socialization, financial literacy and attitude towards money

- on financial well-being of young adults. *International Journal of Consumer Studies* 44(6): 531–541. <https://doi.org/10.1111/ijcs.12583>.
- Vera-Toscano, E.; Ateca-Amestoy, V.; Serrano-del-Rosal, R. (2006). Building financial satisfaction. *Social Indicators Research* 77(2): 211–243. <https://doi.org/10.1007/s11205-005-2614-3>.
- Wills-Herrera, E.; Orozco, L. E.; Forero-Pineda, C.; Pardo, O.; Andonova, V. (2011). The relationship between perceptions of insecurity, social capital and subjective well-being: Empirical evidences from areas of rural conflict in Colombia. *Journal of Socio-Economics* 40(1): 88–96. <https://doi.org/10.1016/j.socec.2010.08.002>.
- Xiao, J. J.; Tang, C.; Shim, S. (2009). Acting for happiness: Financial behavior and life satisfaction of college students. *Social Indicators Research* 92(1): 53–68. <https://doi.org/10.1007/s11205-008-9288-6>.



Catalysts of Economic Welfare in Africa: A Cross-Sectional Autoregressive Distributed Lag Approach

Ayomide Oluwafunmisho KUTI

Department of Economics, Olabisi Onabanjo University, Nigeria
e-mail: kutiayomideolu@gmail.com

Taiwo Adebusuyi ADEROGBA

Department of Economics, Olabisi Onabanjo University, Nigeria
e-mail: aderogbaadebusuyi@gmail.com

Ndubuisi Johnbosco EZENWA

Alex Ekwueme Federal University, Nigeria
e-mail: jbezenwa@gmail.com

Rasheed Adegboyega QUADRI

Poznań University of Life Sciences, Poland
e-mail: quadri_adeboyega@yahoo.com

Abstract. This study provides empirical perspectives on the catalysts of economic welfare in Africa, drawing inference from macroeconomic and non-macroeconomic factors. Leveraging a sample of a balanced panel dataset of 35 countries across Africa, this study provides novel applications of the cross-sectional autoregressive distributed lag methodology to economic welfare analysis in Africa. Issues of cross-sectional dependence and slope homogeneity were accounted for whilst establishing causal relationships between economic welfare proxied by the Human Development Index and macroeconomic and non-macroeconomic drivers of welfare. Based on cross-sectional autoregressive distributed lag estimation results, a 1% increase in economic growth was shown to account for a 0.233 percent and 0.253 percent increase in economic welfare in the long run and short run respectively. In addition, technology accounted for a 1.81 percent increase in economic welfare in the long run. The outcome of the Dumitrescu–Hurlin causality test demonstrated causality between trade openness, government effectiveness, economic growth, and economic welfare.

Keywords: Africa, CS-ARDL, Human Development Index, economic welfare, poverty

JEL Classification: F43, D60, I32, C33

1. Introduction

For many decades, economic welfare has been a topical issue of policy debates in Africa. Irrespective of the progress Africa has made over the years, the level of economic welfare remains relatively low, and overall growth metrics depict significant discrepancies within and between countries of the continent (Organisation for Economic Co-operation and Development, 2015). A litany of studies has characterized welfare deficiencies in Africa as issues of relative deprivation and poverty. In recent times, this has become even more aggravated following the COVID-19 pandemic, which made Africa distinct as the most affected continent in the world in terms of loss of income of poor households, measured by poverty headcount, which increased by 3 percentage points as opposed to pre-COVID-19 estimates (United Nations Conference on Trade and Development, 2021). Africa's development strides have attracted several multilateral initiatives targeted towards poverty. Such initiatives include, but are not limited to, the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) of the United Nations. Particularly, "Goal One" of both initiatives – "Eradicate extreme poverty and hunger" and "No Poverty" – essentially stresses the need to tackle poverty in all its forms, especially in sub-Saharan Africa and South Asia, which account for 80 percent of people living in extreme poverty (United Nations Development Programme, 2022).

Whilst these relatively exogenous interventions and initiatives have increased the attention and consolidated the fight against poverty and underdevelopment, there exists a range of endogenous factors capable of addressing welfare deficiencies in Africa. As documented by the International Monetary Fund (IMF) in 2001, although macroeconomic factors are necessary for poverty eradication, remedies to poverty cannot be solely dependent on economic policies but require an all-encompassing set of well-coordinated measures. Undoubtedly, the macroeconomic environment of nations are crucial determinants of welfare improvements. However, macroeconomic stability does not ensure by itself high rates of economic growth (IMF, 2001), nor does it guarantee welfare improvement. This makes it imperative to examine both the macroeconomic and non-macroeconomic catalysts of economic welfare, as they have been evidenced to be important in addressing poverty.

Extant literature on the subject matter showed that economic welfare has been extensively explored in developed and OECD nations (Aurland-Bredesen, 2021; Deyshappriya, 2017; Lu, Gozgor, Mahalik, Padhan, and Yan, 2022; Nurvita, Rohima, Bashir, and Mardalena, 2022). However, in the context of Africa, only a few studies have examined economic welfare from the perspective of macroeconomic factors (Okoyeuzu and Kalu, 2022; Ramzi, Asma, and Chebbi, 2017; Sakyi, Bonuedi, and Opoku 2018). It is noteworthy that a few studies have also accounted for

non-macroeconomic determinants of economic welfare such as technological advancement, natural resource endowment, and government effectiveness (Ajide, 2022; Albiman and Sulong, 2017; Aljarallah, 2021; David, 2019; Fink and Ducoing, 2022; Haftu, 2019). Nevertheless, there exists no consensus about the non-macroeconomic determinants of economic welfare in Africa. Whilst taking cognizance of macroeconomic factors, this study pays particular attention to the role of technology, natural resource endowment, and political will proxied by the effectiveness of the government. It is from the foregoing that this study aims to examine the macroeconomic and non-macroeconomic drivers of economic well-being in Africa. This is generally not trivial because global poverty is envisaged to become increasingly African by 2030, rising from 55% in 2015 to 90%, cognizant of Africa's population growth trajectories (World Bank, 2019).

As a deviation from existing literature, this research fills the gap between existing single-country and cross-country analysis by employing the cross-sectional autoregressive distributed lag (CS-ARDL) method on a panel data framework, as recommended by Chudik, Mohaddes, Pesaran, and Raissi (2015). This approach has appealing features in that it dampens parameter estimate bias and takes slope heterogeneity and cross-sectional dependence into account. Also, a meta-analysis of relevant literature suggests that there are no studies that have made an attempt to establish a causal relationship between economic welfare and macroeconomic and non-macroeconomic factors (geographic and technological factors). Hence, this study accounts for causality using the Dumitrescu–Hurlin panel causality test.

Subsequent sections of this study are organized in the following way: Section 2 provides an extensive empirical review, synchronizing relevant literature on economic welfare and drivers of economic welfare. Section 3 presents the methods, materials, and empirical strategy adopted in this paper. Section 4 presents the results of our estimations and the related discussions, while section 5 concludes with some policy recommendations.

2. Review of Relevant Literature

2.1. Macroeconomic Factors and Welfare Nexus

A new metric of international trade to quantify the economic benefits of trade using a cross-country dataset from 1996 to 2016 was explored in the study of Lu et al. (2022) for 36 member nations of the Organization for Economic Co-operation and Development (OECD). The new metric was based on the proportion of a country's imports to its respective GDP. Evidence from the dynamic system GMM indicates that weaker economies benefited more from international trade than rich ones. Aurland-Bredesen (2021) found that tiny gains in growth may have a big

influence on the welfare costs of uncertainty. The study revealed the sources of uncertainty to include both economic instabilities and macroeconomic catastrophes for six distinct economic groupings. As regards growth and uncertainty, adjacent groups differ significantly from one another. However, it has been established that the gains of growth and the costs of uncertainty arising from welfare tend to be of equal magnitude. The findings in the study of Nurvita et al. (2022) showed that economic growth, spending on education, and health expenditure have a favourable impact on HDI. The conclusions of this study were based on the conventional fixed-effect estimation for a panel of eleven countries in Jambi Province. A drawback to the estimation technique used in achieving the results has been given an extensive review. Problems of degree of freedom have been identified in estimations based on fixed-effect models using a short-term panel. In a similar study, Deyshappriya (2017) employed a dynamic panel data analysis to investigate how income inequality (proxied by the Gini index) responds to macroeconomic determinants across 33 Asian countries. The study does not only include macroeconomic determinants, but it also incorporates both political and demographic factors to provide a more robust result. A parabolic connection between gross domestic product and inequality provided evidence for the well-known Kuznets hypothesis. In addition, inflation, political risk, terms of trade, and unemployment all contributed to a rise in inequality across the 33 nations, while a decline in inequality was connected with labour force participation, education, and government development aid.

The work of Okoyeuzu and Kalu (2022) analysed the effect of economic policy uncertainty and the trade confrontation between China and the United States on official development aid (ODA) to West Africa. The error correction model illustrates how well ODA adapts to the shocks and dynamics of China and the United States' rising economic instability and trade war. Aids may be utilized as a method to infiltrate markets for commerce and other economic activity, despite the continuous violence. Ramzi et al. (2017) analysed the effect of macroeconomic policies on economic development in Algeria, Morocco, Saudi Arabia, and Tunisia. Using the multivariate Markov switching approach, it was determined how trade openness, financial development, financial integration, inflation, and investment shock impact growth in four open Arab countries. In the major Arab nations, macroeconomic policy does not result in dynamic benefits owing to inflationary pressure driving economic development by way of domestic investment, according to the study's findings. Financial integration and development point to the need for fundamental reforms in the banking sector and financial markets, as well as the necessity for short-term stabilization measures adapted to macroeconomic volatility. Sakyi et al. (2018) employed a cross-section of forty African nations over a 16-year period to determine if trade facilitation enhances social wellbeing. In their research, social welfare included schooling, child health, population health,

and the indicator of human development. Estimations from the system GMM demonstrate that enhanced trade facilitation has a positive impact on social welfare.

2.2. Technological Factor and Economic Growth-Development Nexus

In the findings of Abdulqadir and Asongu (2022), who analysed the asymmetric effect of Internet access on economic growth in sub-Saharan Africa (SSA), adopting a non-linearity threshold model, revealed the significant effect of Internet access on growth. They found that Internet access had a threshold of 3.55 percent growth for economic growth, whilst government regulations were also found to be a significant factor in the operations of the telecommunication industry in sub-Saharan African countries. In contrast, a similar study conducted by Haftu (2019) for a panel sample of forty sub-Saharan African (SSA) countries from 2006 to 2015 using the robust two-step system GMM showed that the Internet has not contributed significantly to GDP per capita. However, increased access to mobile phones raised the per capita income of the region. GDP per capita changes by 1.2 percent for every 10 percent increase in mobile phone access.

Still, with regard to technological factors, in his 2019 study, David considered a panel data framework of forty-six African countries spanning from 2000 to 2015. The Dumitrescu–Hurlin panel causality test was used to estimate the tri-variate effect of telecommunication infrastructures, development, and economic growth. Employing a test for causality, they established a causal relationship between economic growth and development and telecommunication infrastructures. They further opined that telecommunication infrastructures support economic growth and development in Africa, and the reverse was also true. However, establishing a comparison between OECD and sub-Saharan African economies in terms of the role of digitalization as an antecedent for economic growth, Myovella et al. (2020) adopted the generalized linear methods of moments (GMM) estimators on a panel dataset spanning from 2006 to 2016, on thirty-three OECD and forty-one SSA. They revealed that digitalization had a positive effect on the economic growth of both country groupings and further argued that digitalization is largely dependent on the level of development the countries considered. Comparing SSA to OECD nations, the impact of broadband Internet was minimal, whereas mobile telecommunications had a greater effect in SSA countries.

2.3. Geographical Factor and Economic Growth Development Nexus

In the article of Isham, Woolcock, Pritchett, and Busby (2005), to show how nations dependent on natural resources were predisposed to increased economic and social divisions as well as weakened institutional capacity, 90 developing economies were examined. The study found that countries with natural resource

export have had more robust growth recoveries. The findings that resource rents and the quality of institutions translated to increased welfare were pronounced in Muhanji, Ojah, and Soumaré (2019). Forty-four African countries were investigated using a two-stage analysis. The results of their study were conditioned upon the degree of natural resource endowment as well as the countries' level of income.

Short-run and long-run dynamics of natural resource rents on per capita GDP and Total Factor Productivity in Saudi Arabia were examined in the studies Aljarallah (2021). Employing the ARDL and the error-correcting mechanism, he argued that natural resource is a blessing, as it increases GDP per capita and TFP in the long run. However, in a related study conducted by Ajide (2022), the empirical consistency of the resource curse hypothesis with economic complexity was unequivocally proven. The generalized method of moments (GMM), fixed-effects and random-effects estimations, and pooled OLS techniques were employed for both aggregated and decomposed model specifications. Similarly, Tabash, Mesagan, and Farooq (2022) disclosed the link between natural resources, economic complexity, and economic growth. Their study comprises a sample of twenty-four African economies for a period of twenty-three years leveraging the system GMM model. The inverse effect of natural resource rents on economic growth was documented in their study. Inference from their research established an interaction and individual effect for both natural resource as a blessing and natural resource as a curse.

Hypothesis Development

To arrive at a policy-coherent conclusion, the study aims to address the following hypotheses.

H₀₁: Macroeconomic variables are significant factors that affect economic welfare.

This study posits that macroeconomic variables are fundamental determinants of economic welfare. In this hypothesis, we argue that in order for African economies to address welfare deficiencies, there is a need to pay unparalleled attention to certain macroeconomic indices such as trade openness, economic growth, and inflation rates. Although hotly contested, trade liberalization vis-à-vis bilateral and multilateral trade agreements, and domestic economic integration into the global economy have long been posited to be a crucial path to the inclusive economic development of third-world nations. Our views are consistent with the Bhagwati hypothesis, which posits that the degree of a country's integration with the international markets provides a leverage for economies to feel the impact of foreign direct investments on economic growth and development. Similarly, economic growth as a macroeconomic parameter has also been exhaustively

documented to be a prerequisite for nations to address welfare concerns. This hypothesis will revalidate the existing arguments on this subject, as economic growth has been evidenced to be an underlying driver of welfare improvements. Lastly, this hypothesis will consider the impact of inflation on economic welfare. Consistent with a priori expectations, we posit that inflation rates adversely impact economic welfare in Africa.

H₀₂: Technological factors are positive drivers of economic welfare in Africa both in the short run and the long run.

Technological advancements have long been characterized to have fundamental influence on the national levels of per capita welfare. There seems to be broad consensus that a country's capacity to increase or maintain desired economic wellbeing and other quality-of-life indicators depends significantly on its investment in technology (Bugliarello, 1984; Freeman, 1987). More so, neo-technology theories of cross-country trade and economic growth postulate a synonymous understanding of the significance of investments in technology and the competence for national welfare. These theories, as documented in the works of Fagerberg (1987), made efforts to clarify the intricate and dependent nature of the relationship between technology and economic growth. Premised on the aforementioned, this study hypothesises that technological factors are crucial determinants of economic welfare in Africa, as it has the potential to serve as a channel for industrialization, which in turn transcends welfare improvements for African economies both in the short run and the long run.

H₀₃: Government effectiveness and geographical factors are both positive drivers of economic welfare in Africa.

The willingness of national governments to enact and implement policies that promote private sector development and also create ease in business operations, especially for the informal sector, is undoubtedly an important factor to be considered. The credibility of governments and the strength of the public service in addressing welfare concerns in Africa play an important role in curbing poverty across the region. Furthermore, several studies have investigated the impact of natural resource endowment and poverty reduction. The concept of "resource curse" has been a topical concept for nations with natural resource endowment failed to be translated to welfare improvements. This hypothesis also seeks to examine the nexus between resource abundance and its capacity to drive welfare improvements in Africa.

3. Materials and Methods

3.1. Model

This study, which is an archetype of Mara (2021), aims to determine how economic welfare responds to macroeconomic policies in Africa. Mara (2021) analysed how unemployment and social services affect the well-being of people in ten European countries. Our econometric model incorporates the macroeconomic policies identified in literature. The functional relationship is expressed in equation (1) as:

$$EconomicWelfare_{it} = f(MacroeconomicPolicies_{it}) \quad (1)$$

The broad model was formulated by tailoring it to the aims of our research while taking cognizance of factors that have been earlier identified in equation (2):

$$EcoWel_{it} = f(MacroeconomicPolicies_{it}, Technology_{it}, Geography_{it}), \quad (2)$$

where i, t signifies country i in period t , $EcoWel_{it}$ is economic welfare in country i over period t , t is the time series the study intends to cover (2002 through 2016 – 15 years), and i contains the cross-sectional characteristics of the data (35 African¹ countries being studied).

The baseline empirical model to evaluate simultaneous macroeconomic policies that affect economic welfare in Africa is given in equation (3) as:

$$EcoWel_{it} = \varphi + \sum_{i=1...15} \sigma_{\theta} MACRO_{it} + \sum_{i=...15} \rho_{\pi} \tau_{nit} + \mu_{it} \quad (3)$$

$$\mu_{it} = \phi_i + \delta_i s_i + \varepsilon_{it},$$

where $EcoWel_{it}$ represents the variable of economic welfare measure (the response variable present in the model). For measuring economic welfare, the Human Development Index (HDI) is used as a proxy. UNDP (2020) defines it as the geometric mean of the three dimensions of human development. Here we follow the methodology of UNDP (2020) and define the Human Development Index (HDI) in equation (4) as:

$$HDI_{it} = [(LEXP_{INDEX})(EDU_{INDEX})(GNI_{INDEX})]^{1/3}, \quad (4)$$

where $LEXP_{INDEX}$ is the life expectancy index, EDU_{INDEX} is the expected years of schooling, and GNI_{INDEX} is the proxy for a decent standard of living measured by

1 Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Cote d'Ivoire, Democratic Republic of Congo, Egypt, Eswatini, Gabon, Gambia, Ghana, Kenya, Madagascar, Mali, Mauritania, Mauritius, Morocco, Niger, Republic of Congo, Rwanda, Senegal, Seychelles, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, and Zambia.

gross national income per capita. In equation (3), *MACRO* measures macroeconomic policies' determinants of economic welfare in Africa (measured with trade openness, the growth rate of GDP, government effectiveness, and inflation rate). τ_{nit} is the vector of the control variable that is not of primary interest, which constitutes geographical and technological factors. However, due to the significance of these variables found in earlier research, we are unable to exclude them from consideration. i represents the selected countries, t is the year of observations, and μ_{it} includes time-invariant heterogeneity across the panel of countries; (\emptyset_i) stands for unobservable common factors that are not restricted ($\delta_i s_i$), and the idiosyncratic error terms ε_{it} , σ_θ , and ρ_π are the slope of the economic welfare model.

3.2. Data Sources and Measurements

In analysing how economic welfare responds to macroeconomic policies, this study relied on panel data from 35 African countries. The availability of reliable data and the inclination to restrict attention to how economic welfare responds to macroeconomic policies in the context of Africa served as primary considerations in the selection of countries included in the study. The data used in the study were collected from two databases (i.e. World Development Indicators and World Governance Indicators). Both databases contain information for various years up to 2016. The initial sample comprises 54 countries. Countries that did not meet our information requirements for calculating certain variables were removed. As a result, our final balanced dataset, which spans from 2002 to 2016, includes 35 countries.

Table 1. *Description of variables*

Label	Description	Indicators	Source	Motivating Study
HDI	Human Development Index	Geometric mean of life expectancy at birth, mean years of schooling, and GNI per capita	United Nations Development Programme (UNDP), 2020	(Nurvita et al., 2022)
TRADE_{OPEN}	Trade Openness	Export minus import as a ratio of GDP	World Development Indicator (WDI), 2022	(Ramzi et al., 2017)
INF_{RATE}	Inflation Rate	Inflation, GDP Deflator (annual %)	World Development Indicator (WDI), 2022	(Deyshappriya, 2017)

Label	Description	Indicators	Source	Motivating Study
GOV _{EFF}	Government Effectiveness	Effectiveness of governments in managing and introducing policies aimed at economic growth and development (estimate)	World Governance Indicator (WGI), 2022	(Adekunle, 2021)
ECON _{GROWTH}	Economic Growth	The annual growth rate of GDP per capita	World Development Indicator (WDI), 2022	(Lu et al., 2022)
TECH	Technology	Mobile cellular subscriptions (per 100 people)	World Development Indicator (WDI), 2022	(Abdulqadir and Asongu, 2022)
GEO	Natural Resources	Total natural resource rents (% of GDP)	World Development Indicator (WDI), 2022	(Isham et al., 2005)

Source: authors' own compilation (2022)

This study measures economic welfare proxied by Human Development Index as used by Bonasia et al. (2022). Macroeconomic policies were proxied by trade openness as used in Ramzi et al. (2017), inflation rate as used in Deyshappriya (2017), government effectiveness as used in Adekunle (2021), and growth rate of GDP as used in Lu et al. (2022). The inclusion of pertinent control variables was necessary to preclude issues involving biases caused by omitted variables as well as the appositeness in explaining economic welfare in Africa. The choice of control variable is the technological factor (measured by Internet users as adopted in Abdulqadir and Asongu (2022)) and the geographical factor (measured by natural resource endowment as used in Isham et al. (2005)). The variables employed in this study are presented in *Table 1*.

3.3. Empirical Strategy

This study employed a multi-step econometric procedure in arriving at the estimation technique that was employed. Before proceeding with empirical estimations, pre-estimation tests were conducted. The starting point of the analysis was investigating the normalities of the cross-country dataset acquired in consonance with Biørn (2016). The independence of the error term and of the independent variable is one of the presumptions of the linear classical regression model, i.e. ($Cov \mu/X = 0$). Correlation based on the relationship between relevant variables was established to produce results that are reliable. The variance inflation factor was considered to reach orthogonal relations among the regressors in consonance with

leading literature on the endogeneity of regressors. A multicollinearity problem is indicated by a variance inflation factor (VIF) of 5 or 10 or above.

The influence of cross-sectional dependence on estimation output is contingent on a wide range of other aspects such as the strength of the correlations that exist between different cross-sections and the very nature of cross-sectional dependence itself. According to de Hoyos and Sarafidis (2006), ignoring the issue of cross-sectional dependence in data can cause a reduction in the efficiency of estimation. Subsequent to accounting for common factors' restriction, Pesaran's cross-sectional dependence test by Pesaran (2004) and test statistic as proposed by Frees (1995) were conducted. To confirm that the variables used in this study are covariance stationary, the study moves on to panel unit root testing. The issue of testing for unit roots in models associated with panel data has received considerable attention in the past decade (Pesaran, 2007). However, earlier literature (e.g. Choi, 2001; Hadri, 2000; Maddala and Wu, 1999; Shin and Snell, 2002) approached unit root testing with the assumption that the panels exhibit cross-sectional independence. For the panel unit root properties, we will proceed to the following tests developed by Pesaran (2007), whose approach is distinctive in accounting for cross-sectional dependence in the individual series.

Empirical studies have documented the biasness of estimates arising from conventional panel techniques such as random effect, fixed effect as well as the first difference GMM when slope heterogeneity and cross-sectional dependence are ignored. The final step was to estimate the CS-ARDL model as informed by the outcome of the unit root test. Chudik et al. (2015) proposed the CS-ARDL estimation technique with short- and long-run outputs due to its potential in solving heterogeneous panel data with inherent problems of cross-sectional dependence in the short and the long run. The CS-ARDL is specified as:

$$EcoWel_{it} = \varphi_i + \sum_{l=1}^{p_{EcoWel}} \sigma_l EcoWel_{it-l} + \sum_{l=0}^{p_z} \rho_l Z_{nit-l} + \mu_{it} \quad (5)$$

To account for cross-sectional dependence, equation (5) is extended with the following cross-sectional averages:

$$EcoWel_{it} = \varphi_i + \sum_{l=1}^{p_{EcoWel}} \sigma_l EcoWel_{it-l} + \sum_{l=0}^{p_z} \rho_l Z_{nit-l} + \sum_{l=0}^p \rho_l \dot{V}_{t-l} + \mu_{it} \quad (6)$$

In equation (6), $EcoWel_{it}$ represents the dependent variable (*HDI*), followed by Z_{nit} , which is the vector of all the independent variables ($TRADE_{OPEN}$, INF_{RATE} , GOV_{EFF} , $ECON_{GROWTH}$, $TECH$, and GEO), while $\dot{V}_{t-l} = (EcoWel_{it}, Z'_{nit})$ represents the cross-sectional averages.

4. Results and Discussion

4.1. Initial Tests

The summary statistics of the datasets obtained are presented in *Table 2*. These include the mean (averages), the minimum (*MIN*), the maximum (*MAX*), and standard deviation. A high tendency towards normal distribution can be inferred from the fact that the mean and median values of the variables in the panel dataset are located within the range of values comprising the maximum and minimum. The average value of *HDI* is 0.52, while *TRADE_{OPEN}*, *INF_{RATE}*, *GOV_{EFF}*, *ECON_{GROWTH}*, *TECH*, and *GEO* have 6.172, 7.740, -0.594, 4.381, 52.681, and 12.109 as their respective average values.

Table 2. *Summary statistics*

Variable	Obs.	Mean	Std. D.	Minimum	Maximum
<i>HDI</i>	525	0.520	0.119	0.273	0.794
<i>TRADE_{OPEN}</i>	525	-6.172	12.487	-100.971	36.068
<i>INF_{RATE}</i>	525	7.740	13.717	-21.165	196.984
<i>GOV_{EFF}</i>	525	-0.594	0.608	-1.849	1.057
<i>ECON_{GROWTH}</i>	525	4.381	4.288	-36.392	33.629
<i>TECH</i>	525	52.681	42.412	0.331	163.875
<i>GEO</i>	525	12.109	11.667	0.001	58.688

Source: authors' own compilation (2022)

There is a high possibility that the slope parameter will defy theoretical predictions as a consequence of the unintended effect of multicollinearity, which occurs when several independent variables are highly correlated with one another. According to the existing body of research, conducting a test to determine whether the variables in question are affected by multicollinearity among themselves can be facilitated by testing for correlations between the variables in question. Multicollinearity is thought to be more likely in studies in which correlations between variables are greater than 0.8, leading to erroneous results by some researchers (Dao and Nguyen, 2020; Nguyen and Dang, 2020; Quoc Trung, 2021). *Table 3* reports the pairwise correlation coefficient, which helps to check the collinearity of independent variables using all the information available. The pairwise correlation coefficient reported across the variables in the study is less than 0.8. In this case, collinearity is unlikely to exist.

In addition, *Table 4* demonstrates how the VIF was applied to analyse the collinearity characteristics of the variables that were investigated. This study optimized the threshold with tolerance (reciprocal of VIF) values > 0.2 and variance inflation factors < 5 and found that the variables do not invalidate the classical linear regression model's collinearity assumption. Thus, output elasticities in the economic welfare model with marginal hindrances of slope endogeneity can be estimated using plausible evidence backed by the VIF.

Table 3. *Correlation matrix*

Variable	<i>HDI</i>	<i>TRADE_{OPEN}</i>	<i>INF_{RATE}</i>	<i>GOV_{EFF}</i>	<i>ECON_{GROWTH}</i>	<i>TECH</i>	<i>GEO</i>
<i>HDI</i>	1.000						
<i>TRADE_{OPEN}</i>	0.202*	1.000					
<i>INF_{RATE}</i>	-0.054	0.138*	1.000				
<i>GOV_{EFF}</i>	0.674*	-0.091	-0.089	1.000			
<i>ECON_{GROWTH}</i>	-0.098	0.020	0.098	0.035	1.000		
<i>TECH</i>	0.690*	0.077	-0.142*	0.400*	-0.134*	1.000	
<i>GEO</i>	-0.124*	0.376*	0.166*	-0.453*	0.127*	-0.148*	1.000

Note: * $P < 0.01$.

Source: authors' own compilation (2022)

Table 4. *Variance inflation factor*

Variables	Collinearity Statistics	
	Tolerance	VIF
<i>TRADE_{OPEN}</i>	0.827	1.210
<i>INF_{RATE}</i>	0.944	1.060
<i>GOV_{EFF}</i>	0.662	1.510
<i>ECON_{GROWTH}</i>	0.941	1.060
<i>TECH</i>	0.792	1.260
<i>GEO</i>	0.658	1.520

Source: authors' own compilation (2022)

4.2. Cross-sectional Dependence Test

Due to our reliance on panel data, there is the likelihood for cross-sectional dependence among the series of various countries. Cross-sectional dependence may arise due to common factors that are unobserved and ultimately become part of the residual (de Hoyos and Sarafidis, 2006). The conventional panel regression estimations are likely to be biased in cross-sectional dependency series.² As a result, this study

² The standard fixed-effects (FE) and random-effects (RE) estimators are consistent although not

considers the existence of dependence in the panel data, which considers different dynamics for each country in Africa that may result from a number of factors,³ and we allowed the individual responses to these factors to vary from country to country. To address the concerns expressed earlier, we employ two statistical procedures designed to test for cross-sectional dependence.⁴ The tests considered are in correlation with short periods and large numbers of cross-sections, i.e. $N(35) > T(15)$.

Table 5. *Cross-sectional dependence test*

Test	Statistic	p-value
Pesaran's CD	9.583*	0.000
Frees CD	9.296*	0.335
Total Panel (Balanced) Observations	525	

Notes: * Statistical significance at the 1% level. Null hypothesis: cross-sectional independence (correlation) in weighted residuals.

The results presented in *Table 5* point towards rejecting the null hypothesis of cross-sectional independence. Based on these results, economic welfare and its determinants in one country can be shown to be influenced by factors from other countries.

4.3. Slope Homogeneity Test

This study considered the Pesaran and Yamagata (2008) slope homogeneity tests to determine the structure of homogeneity across slopes. For panel data models with a large cross-section size (N) compared to the time series dimension (T), Pesaran and Yamagata (2008) suggested a standardized version of Swamy's test of slope homogeneity. The suggested test, expressed by $\tilde{\Delta}$, and $\tilde{\Delta}_{adj}$, capitalizes on individual slopes' cross-sectional dispersion, which is weighted by their relative precision.

$$\tilde{\Delta} = \frac{1}{\sqrt{N}} \left(\frac{\sum_{i=1}^N \tilde{\delta}_i - k}{\sqrt{2k}} \right)$$

$$\tilde{\Delta}_{adj} = \sqrt{N} \left(\frac{N^{-1} \sum_{i=1}^N \tilde{\delta}_i - k}{\sqrt{v(T,k)}} \right),$$

efficient, and the estimated standard errors are biased (de Hoyos and Sarafidis, 2006).

3 Which could be geographic, economic, policy-relevant, or technological factors.

4 Pesaran's (2004) cross-sectional dependence (CD) test and the test statistics proposed by Frees (1995).

where N represents the number of cross-section units, $\bar{\delta}_i$ is the weighted difference between the cross-sectional unit-specific estimate and the pooled estimate number of the cross-section unit, and k represents the exogenous parameters in the model. However, the $\tilde{\Delta}$ test assumes that residuals are independently distributed but allows for a heterogeneous variance (Bersvendtsen and Ditzen, 2021). Cases of heteroscedastic and serially correlated errors cannot be dealt with by using the standardized version of Swamy's test (Blomquist and Westerlund, 2013). The alternative test suitable for the situation is the Heteroscedasticity and Autocorrelation Consistent (HAC) robust test.

$$\Delta_{HAC} = \sqrt{N} \left(\frac{N^{-1} S_{HAC} - k}{\sqrt{2k}} \right)$$

The proposed test produces only minor distortions while simultaneously preserving a satisfactory level of power. The null hypothesis is accepted at a 5-percent significance level, and the cointegrating coefficients are thought to be homogenous if the test's p value is greater than 5 percent.

Table 6. *Slope heterogeneity test*

Test	Statistic	p-value
Pesaran and Yamagata (2008)		
$\tilde{\Delta}$	8.934*	0.000
$\tilde{\Delta}_{adj}$	13.078*	0.000
(Blomquist and Westerlund, 2013)		
Δ_{HAC}	11.890*	0.000
$\Delta_{HAC,adj}$	17.406*	0.000

Notes: * Statistical significance at the 1% level. HAC Kernel: Bartlett.

The results presented in *Table 6* show that the null hypothesis of slope homogeneity cannot be accepted, as the p-value of the test statistics in both tests are less than 0.01. Drawing inference from this, heterogeneity exists.

4.4. Panel Unit Root Test

In testing for unit root, the battery of first-generation tests assumed that each individual time series in the panel is cross-sectionally independent. This assumption was considered restrictive in the context of regional regressions. De-meaning the series was thought of as a solution to this restriction (Im et al., 1995). Pesaran (2007) noted that this process was rather deficient and could not work in the case of heterogeneous covariances of the error term. Considering this,

a battery of second-generation tests for unit root were proposed. This study uses the test proposed by Pesaran (2007). This direction was explored to avoid getting misleading results when factors such as cross-sectional dependence and slope homogeneity were not considered. *Table 7* reveals the outcome of the test carried out using the cross-sectionally augmented DF (CADF) and the cross-sectionally augmented IPS (CIPS).

The tests in *Table 7* were estimated at level and first difference with the inclusion of a constant term. Following the establishment of cross-sectional dependence and the unit root test, the long-run and short-run relationship between economic welfare and its determinant using the CS-ARDL approach was estimated. Inference from the test carried out exhibits symmetrical consensus. Both CADF and CIPS tests reveal that the variables are a mixture of I(0) and I(1).

Table 7. *Second-generation panel unit root test*

Variable	@Levels		@First Difference		Order of Integration
	CADF	CIPS	CADF	CIPS	
	Intercept {Intercept & Trend}				
HDI	-1.950 {-2.115}	-1.890 {-2.115}	-3.190* {-3.491*}	-3.190* {-3.657*}	I(1)
TRADE_{OPEN}	-2.437* {-2.827*}	-2.417* {-3.003*}	-4.081* {-4.294*}	-4.096* {-4.483*}	I(0)
INF_{RATE}	-3.247* {-3.334*}	-3.247* {-3.334*}	-4.472* {-4.336*}	-4.472* {-4.336*}	I(0)
GOV_{EFF}	-1.952 {-2.782*}	-2.112 {-2.906*}	-4.033* {-4.188*}	-4.073* {-4.360*}	I(1)
ECON_{GROWTH}	-3.377* {-3.406*}	-3.296* {-3.400*}	-4.751* {-4.755*}	-4.724* {-4.807*}	I(0)
TECH	-1.797 {-2.169}	-2.443* {-2.919*}	-2.902* {-2.806*}	-3.174* {-2.951*}	I(1)
GEO	-1.991 {-2.560}	-2.229 {-2.664}	-3.721* {-3.768*}	-3.660* {-3.904*}	I(1)

Note: * Statistical significance at the 1% level.

Source: authors (2022)

4.5. Cross-Sectional Autoregressive Distributed Lag (CS-ARDL)

Following the establishment of cross-sectional dependence and the unit root test, the short-run and long-run relationship of economic welfare and its determinant using the CS-ARDL method was estimated. Since the variables are a mixture of I(0) and I(1) and no variable is integrated of an order greater than one, *Table 8* reports the outcomes of the CS-ARDL estimation.

Table 8. CS-ARDL results

	Coefficients	Std. Error	z-stat	p-value
Long run				
TRADE_{OPEN}	0.028	0.0771	0.36	0.719
INF_{RATE}	-0.042	0.049	-0.87	0.384
GOV_{EFF}	3.384	2.8845	1.17	0.241
ECON_{GROWTH}	0.233**	0.099	2.33	0.020
TECH	0.181*	0.040	4.51	0.000
GEO	-7.443	7.755	-0.96	0.337
Short run				
ΔTRADE_{OPEN}	0.034	0.095	0.36	0.722
ΔINF_{RATE}	-0.054	0.071	-0.75	0.453
ΔGOV_{EFF}	4.751	4.0946	1.16	0.246
ΔECON_{GROWTH}	0.253**	0.127	1.99	0.046
ΔTECH	0.278*	0.069	4.02	0.000
ΔGEO	-13.121	13.4602	-0.97	0.330
ECT(-1)	-1.317*	0.047	-28.26	0.000
No. of Obs.	490			
No. of Groups	35			

Source: authors (2022)

Notes: *, **, and *** show statistical significance at 1, 5, and 10% respectively.

Results reveal that trade openness, government effectiveness, economic growth, and technology have a positive relationship with human development index. The positive values in the short and long run (CS-ARDL) of the coefficient of trade openness, government effectiveness, economic growth, and technology show that as these variables increase, an improvement in economic welfare in the sample

countries occurs, i.e. $\frac{\partial \text{TRADE}_{OPEN_{it}}}{\partial \text{HDI}_{it}} > 0$, $\frac{\partial \text{GOV}_{EFF_{it}}}{\partial \text{HDI}_{it}} > 0$, $\frac{\partial \text{ECON}_{GROWTH_{it}}}{\partial \text{HDI}_{it}} > 0$, and $\frac{\partial \text{TECH}_{it}}{\partial \text{HDI}_{it}} > 0$.

Conversely, inflation rate and natural resources have negative values in the short and long run, which indicates that if these variables rise, the economic welfare of

the sample countries will fall., i.e. $\frac{\partial \text{INF}_{it}}{\partial \text{HDI}_{it}} < 0$ and $\frac{\partial \text{GEO}_{it}}{\partial \text{HDI}_{it}} < 0$. More analytically,

a 1 percent increase in trade openness increases economic welfare to around 0.28 and 0.34 percentage in the long run and short run respectively. For instance, bilateral trade agreement (e.g. the Africa Free Trade and Continental Agreement) can improve trade ties and shed light on the continent's welfare. This outcome is in tandem with that of Lu et al. (2022). In relation to the effect of inflation rate (INF), the coefficient magnitude revealed that a 0.42 percentage decline in economic

welfare is a result of inflation rate in the long run. Similarly, 0.54 percentage decline in economic welfare is also caused by the inflation rate in the short run. It is important to note that rising food and other commodity prices reduce the market value of African households' disposable income. A consistent increase in the market's average price of goods suggests significant structural deficiencies.

Government effectiveness (GOV_{EFF}) increases welfare both in the long run and in the short run. 33.84 percentage and 47.51 percentage increases in welfare are associated with 1 percent increase in government effectiveness. In line with the description of the measure of government effectiveness, the ability of governments in handling and developing policies geared towards economic growth and development is evidently a core determinant of welfare improvement. Additionally, our current analysis for African countries demonstrates the progressive impact of economic growth on economic welfare. It implies that a 1 percent change in economic growth ($ECON_{GROWTH}$) is what causes a 0.233 percentage increase in economic welfare in the long run. According to the short-run results, a 1 percent change in $ECON_{GROWTH}$ increases economic welfare by 0.253 percent. Former studies (e.g. Aurland-Bredesen, 2021; Nurvita et al., 2022) also support the positive relationship between economic growth and welfare that we have found in our study.

In addition, technology ($TECH$) has a positive impact on economic welfare, which implies that a 1.81 percentage increase in economic welfare is a result of 1 percent change in technology in the long run. Also, the short-run outcomes validate that there is a positive relationship between HDI and $TECH$. This finding is in tandem with the work of Haftu (2019), who also demonstrated a significant relationship between technological advancement and GDP per capita as a proxy for welfare. Concerning the coefficient of natural resources (GEO), it decreases welfare by 74.43 and 131.20 percent when it increases by 1 percent in the long run as well as in the short run. This is consistent with the "Dutch disease" and resource curse paradox. Results show that Africa's resource endowment has failed to translate to economic welfare. However, only economic growth ($ECON_{GROWTH}$) and technology ($TECH$) were found to exert a significant impact on economic welfare at the 5 percent and 1 percent significance levels respectively.

Results show that the coefficient of ECT that signifies the speed of adjustment is negative (-1.317) and statistically significant at the 1 percent critical level. This demonstrates that in the current year, disequilibrium in economic welfare of about 132 percent from the previous years is corrected. The significance of the ECT indicates and confirms the presence of a long-run equilibrium relationship between economic welfare and the macroeconomic and non-macroeconomic factors used in this study.

4.6. Panel Granger Causality

The specification of the heterogeneity between cross-sections has been mentioned as one of the main problems that is unique to panel data models. To consider the heterogeneity across cross-sections, Hurlin and Dumitrescu (2011) assumed that all coefficients differ across panels. The results of the study's attempt to establish any causal relationship among the selected variables are presented in *Table 9*. The critical values and p-values associated with the Z-bar tilde were estimated using a bootstrap procedure to account for cross-sectional dependence.

The outcome of the D-H non-causality test reveals that there is homogeneous unidirectional causality from trade openness ($TRADE_{OPEN_{it}}$) to economic welfare (HDI_{it}). This implies that improved trade interactions accelerate the welfare of African economies. In addition, the result also established that there is a homogeneous unidirectional causality between economic welfare and government effectiveness. The implication of this outcome is that economic welfare (HDI_{it}) generates government effectiveness ($GOV_{EFT_{it}}$). The need to improve welfare is a stimulant to the willingness of government to set policies that promote welfare in Africa. Likewise, homogeneous unidirectional causality is found between economic welfare (HDI_{it}) and economic growth ($ECON_{GROWTH_{it}}$), which indicates that the latter remains a prerequisite to the attainment of optimal economic welfare. Lastly, no direction of causality was found between welfare and the rest of the variables.

Table 9. Dumitrescu–Hurlin non-causality test results

Causality	\bar{W}	\tilde{Z}	P-value	Direction
$HDI_{it} \rightarrow TRADE_{OPEN_{it}}$	3.090	5.348	0.112	Homogeneous uni-causal relationship between economic welfare and trade openness
$TRADE_{OPEN_{it}} \rightarrow HDI_{it}$	8.550	2.100	0.042	
$HDI_{it} \rightarrow INF_{RATE_{it}}$	9.068	2.407	0.070	No causal relationship between economic welfare and inflation rate
$INF_{RATE_{it}} \rightarrow HDI_{it}$	1.408	0.533	0.609	
$HDI_{it} \rightarrow GOV_{EFT_{it}}$	4.546	9.517	0.019	Homogeneous uni-causal relationship between economic welfare and government effectiveness
$GOV_{EFT_{it}} \rightarrow HDI_{it}$	2.000	2.228	0.061	
$HDI_{it} \rightarrow ECON_{GROWTH_{it}}$	5.807	4.927	0.044	Homogeneous uni-causal relationship between economic welfare and economic growth
$ECON_{GROWTH_{it}} \rightarrow HDI_{it}$	1.271	0.139	0.876	
$HDI_{it} \rightarrow TECH_{it}$	10.341	3.160	0.116	No causal relationship between economic welfare and technology
$TECH_{it} \rightarrow HDI_{it}$	2.918	4.855	0.125	
$HDI_{it} \rightarrow GEO_{it}$	3.378	6.173	0.130	No causal relationship between economic welfare and natural resources
$GEO_{it} \rightarrow HDI_{it}$	7.436	1.441	0.085	

Note: p-values computed using 1,000 bootstrap replications.

Source: authors, 2022

5. Conclusions and Policy Recommendations

The primary objective of this study is to examine the macroeconomic and non-macroeconomic determinants of economic welfare in African countries. To achieve this objective, thirty-five African countries were selected for the period from 2002 to 2016 by adopting the panel framework of the CS-ARDL, as suggested by Chudik et al. (2015). Cross-sectional dependence as well as slope heterogeneity were well accounted for. More so, the outputs of the cross-sectional dependence test led to the adoption of the second-generation panel unit-root test (CIPS and CADF) of Pesaran (2007). The findings from the CS-ARDL analysis suggest that trade openness, government effectiveness, economic growth, and technology cause an improvement in the economic welfare in the sample countries. While economic welfare in the chosen African nations is negatively impacted by the inflation rate and natural resource availability both in the long and the short run, the extent to which each of these factors affect the economic welfare were carefully addressed. However, of all the variables considered in this study, economic growth and technology were the only factors found to be statistically significant catalysts of economic welfare in Africa.

Based on the results of the findings, the study suggests the following:

(i) It is important to address the key barriers to digitalization that are prevalent in Africa such as poor infrastructure, connectivity, and illiteracy. In countries such as Tanzania, Sudan, Chad, and Burundi, which are arguably underexposed to technological advancements, the corresponding national governments must adopt policies to guarantee that there is an acceptable level of trust in technology. Digital economy is Egypt's second fastest expanding industry, while the ICT sectors in Nigeria, Kenya, and South Africa also contribute significantly to Africa's growth, but by easing Internet censorship restrictions and disruption, more opportunities could be generated.

(ii) According to the United Nations Educational, Scientific and Cultural Organization (2016), investing an average of 3.5% of a country's GDP in innovation, human capital, basic science, and education is the key to effectively promote sustainable development. The knowledge gap between the developed and underdeveloped nations will be narrowed in a few years if this criterion is embraced by the most underdeveloped nations, especially in Africa.

(iii) Growth and welfare are strongly correlated. Putting aside the continent's natural resources, it is equally important to create a welfare state that is open to all citizens. This can be done by looking at the ingrained ideas and values that form its various social structures. African leaders should develop similar social protection systems that consider the means of subsistence, properties, status, and savings of all classes of citizens.

The scope of this study is limited by the availability of data in the African countries, and only a few numbers of variables were considered. Future studies can extend the formulated model by considering more macroeconomic and non-

macroeconomic/institutional variables. Specifically, African nations are marred by the vice of corruption and non-transparent governments. This is undoubtedly a crucial factor that can slow the growth and progress of any nation. As a result, institutional factors like “Control for Corruption” and “Regulatory Quality” are important variables to be considered.

References

- Abdulqadir, I. A.; Asongu, S. A. (2022). The asymmetric effect of Internet access on economic growth in sub-Saharan Africa. *Economic Analysis and Policy* 73: 44–61. <https://doi.org/10.1016/j.eap.2021.10.014>.
- Adekunle, I. A. (2021). On the search for environmental sustainability in Africa: The role of governance. *Environmental Science and Pollution Research* 28(12): 14607–14620. <https://doi.org/10.1007/s11356-020-11432-5>.
- Ajide, K. B. (2022). Is natural resource curse thesis an empirical regularity for economic complexity in Africa? *Resources Policy* 76. <https://doi.org/10.1016/j.resourpol.2022.102755>.
- Albiman, M. M.; Sulong, Z. (2017). The linear and non-linear impacts of ICT on economic growth of disaggregated income groups within the SSA region. *Telecommunications Policy* 41(7–8): 555–572. <https://doi.org/10.1016/j.telpol.2017.07.007>.
- Aljarallah, R. A. (2021). An assessment of the economic impact of natural resource rents in the kingdom of Saudi Arabia. *Resources Policy* 76. <https://doi.org/10.1016/j.resourpol.2021.102070>.
- Aurland-Bredesen, K. J. (2021). The welfare costs of uncertainty: Cross-country evidence. *World Development* 146. <https://doi.org/10.1016/j.worlddev.2021.105478>.
- Bersvendsen, T.; Ditzen, J. (2021). Testing for slope heterogeneity in Stata. *The Stata Journal* 21(1): 51–80. <https://doi.org/10.1177/1536867X211000004>.
- Biørn, E. (2016). Panel data estimators and aggregation. *Memorandum* 19. Oslo: University of Oslo, Department of Economics.
- Blomquist, J.; Westerlund, J. (2013). Testing slope homogeneity in large panels with serial correlation. *Economics Letters* 121(3): 374–378. <https://doi.org/10.1016/J.ECONLET.2013.09.012>.
- Bonasia, M.; Napolitano, O.; Spagnolo, F.; Spagnolo, N. (2022). The economic and welfare state determinants of well-being in Europe. *International Economics* 171: 49–57. <https://doi.org/10.1016/j.inteco.2022.04.005>.
- Bugliarello, G.; Parrinello, S. (1984). Technology and Economic Development. *Metroeconomica* 36: 111–119.
- Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance* 20(2): 249–272. [https://doi.org/10.1016/s0261-5606\(00\)00048-6](https://doi.org/10.1016/s0261-5606(00)00048-6).

- Chudik, A.; Mohaddes, D. K.; Pesaran, M. H. (2015). *Long-run effects in large heterogenous panel data models with cross-sectionally correlated errors*. Federal Reserve Bank of Dallas. Globalization and Monetary Policy Institute. Available at: <http://www.dallasfed.org/assets/documents/institute/wpapers/2015/0223.pdf>.
- Dao, B. T.; Nguyen, K. A. (2020). Bank capital adequacy ratio and bank performance in Vietnam: A simultaneous equations framework. *Journal of Asian Finance, Economics and Business* 7(6): 39–46. <https://doi.org/10.13106/JAFEB.2020>.
- David, O. O. (2019). Nexus between telecommunication infrastructures, economic growth and development in Africa: Panel vector autoregression (P-VAR) analysis. *Telecommunications Policy* 43(8). <https://doi.org/10.1016/j.telpol.2019.03.005>.
- De Hoyos, R. E.; Sarafidis, V. (2006). Testing for cross-sectional dependence in panel-data models. *The Stata Journal* 6(4): 482–496.
- Deyshappriya, N. (2017). Impact of macroeconomic factors on income inequality and income distribution in Asian countries. *Asian Development Bank Institute*. Available at: www.adbi.org/sites/default/files/publication/234271/adbi-wp696.pdf.
- Fagerberg, J. (1987). A technology gap approach to why growth rates differ. *Research Policy* 16(2–4): 87–99. [https://doi.org/10.1016/0048-7333\(87\)90025-4](https://doi.org/10.1016/0048-7333(87)90025-4).
- Fink, J.; Ducoing, C. (2021). Does natural resource extraction compromise future well-being? Norwegian Genuine Savings 1865–2018. (*LSR Working Papers Series* 21/05).
- Freeman, C. (1982). *The Economics of Industrial Innovation*. 2nd edition. London: Francis Pinter.
- Frees, E. W. (1995). Assessing cross-sectional correlation in panel data. *Journal of Econometrics* 69(2): 393–414. [https://doi.org/10.1016/0304-4076\(94\)01658-m](https://doi.org/10.1016/0304-4076(94)01658-m).
- Hadri, K. (2000). Testing for stationarity in heterogeneous panel data. *The Econometrics Journal* 3(2): 148–161. <https://doi.org/10.1111/1368-423x.00043>.
- Haftu, G. G. (2019). Information communications technology and economic growth in sub-Saharan Africa: A panel data approach. *Telecommunications Policy* 43(1): 88–99. <https://doi.org/10.1016/j.telpol.2018.03.010>.
- Hashem Pesaran, M. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics* 22(2): 265–312. <https://doi.org/10.1002/jae.951>.
- Hashem Pesaran, M.; Yamagata, T. (2008). Testing slope homogeneity in large panels. *Journal of Econometrics* 142(1): 50–93. <https://doi.org/10.1016/j.jeconom.2007.05.010>.
- Henderson, D. J.; Carroll, R. J.; Li, Q. (2008). Nonparametric estimation and testing of fixed effects panel data models. *Journal of Econometrics* 144(1): 257–275. <https://doi.org/10.1016/j.jeconom.2008.01.005>.
- Hurlin, C.; Dumitrescu, E. (2011). Testing for granger non-causality in heterogeneous panels. Available at: <https://halshs.archives-ouvertes.fr/halshs-00224434v2>.

- International Monetary Fund. (2001). *Macroeconomic policy and poverty reduction*. Retrieved on: 30 August 2022, from: <https://www.imf.org/external/pubs/ft/exrp/macropol/eng/>.
- Isham, J.; Woolcock, M.; Pritchett, L.; Busby, G. (2005). The varieties of resource experience: Natural resource export structures and the political economy of economic growth. *World Bank Economic Review* 19(2): 141–174. <https://doi.org/10.1093/wber/lhi010>.
- Lu, Z.; Gozgor, G.; Mahalik, M. K.; Padhan, H.; Yan, C. (2022). Welfare gains from international trade and renewable energy demand: Evidence from the OECD countries. *Energy Economics* 112. <https://doi.org/10.1016/j.eneco.2022.106153>.
- Maddala, G. S.; Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics* 61(1): 631–652. <https://doi.org/10.1111/1468-0084.0610s1631>.
- Mara, E. R. (2021). Drivers of the shadow economy in European Union welfare states: A panel data analysis. *Economic Analysis and Policy* 72: 309–325. <https://doi.org/10.1016/j.eap.2021.09.004>.
- Muhanji, S.; Ojah, K.; Soumaré, I. (2019). How do natural resource endowment and institutional quality influence the nexus between external indebtedness and welfare in Africa? *Economic Systems* 43(1): 77–98. <https://doi.org/10.1016/j.ecosys.2018.08.005>.
- Murtazashvili, I.; Wooldridge, J. M. (2008). Fixed effects instrumental variables estimation in correlated random coefficient panel data models. *Journal of Econometrics* 142(1): 539–552. <https://doi.org/10.1016/j.jeconom.2007.09.001>.
- Myovella, G.; Karacuka, M.; Haucap, J. (2020). Digitalization and economic growth: A comparative analysis of sub-Saharan Africa and OECD economies. *Telecommunications Policy* 44(2). <https://doi.org/10.1016/j.telpol.2019.101856>.
- Nguyen, D. H.; Dang, V. D. (2020). Bank-specific determinants of loan growth in Vietnam: Evidence from the CAMELS approach. *Journal of Asian Finance, Economics and Business* 7(9): 179–189. <https://doi.org/10.13106/JAFEB.2020>.
- Nurvita, D.; Rohima, S.; Bashir, A.; Mardalena, M. (2022). The role of public spending on education, health, and economic growth toward human development index in the local economy. *Sriwijaya International Journal of Dynamic Economics and Business* 6(2): 197–210. <https://doi.org/10.29259/sijdeb.v6i2>.
- Okoyeuzu, C.; Kalu, E. U. (2022). Official development assistance to the West African Subregion: Do the trade war and economic policy uncertainties in the US and China Matter? *Research in Globalization* 4. Available at: <https://doi.org/10.1016/j.resglo.2021.100070>.
- Organisation for Economic Co-Operation and Development, OECD. (2015). *Perspetivas económicas em África 2015 (Versão Condensada): Desenvolvimento territorial e inclusão espacial: Edition 2015 (Portuguese edition)*. OECD Publishing.

- Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics* 22(2): 265–312. <https://doi.org/10.1002/jae.951>.
- Pesaran, M. H.; Yamagata, T. (2008). Testing slope homogeneity in large panels. *Journal of Econometrics* 142: 50–93. <https://doi.org/10.1016/j.jeconom.2007.05.010>.
- Petria, N.; Capraru, B.; Ihnatov, I. (2015). Determinants of banks' profitability: Evidence from EU 27 banking systems. *Procedia Economics and Finance* 20: 518–524. [https://doi.org/10.1016/s2212-5671\(15\)00104-5](https://doi.org/10.1016/s2212-5671(15)00104-5).
- Quoc Trung, N. K. (2021). Determinants of bank performance in Vietnamese commercial banks: An application of the camels model. *Cogent Business and Management* 8(1). <https://doi.org/10.1080/23311975.2021.1979443>.
- Ramzi, K.; Asma, M.; Chebbi, A. (2017). Growth, fluctuations and macroeconomic policies: Evidence from Arab open economies. *Economic Analysis and Policy* 55: 132–146. <https://doi.org/10.1016/j.eap.2017.04.007>.
- Sakyi, D.; Bonuedi, I.; Opoku, E. O. (2018). Trade facilitation and social welfare in Africa. *Journal of African Trade* 5(1–2): 35. <https://doi.org/10.1016/j.joat.2018.08.001>.
- Shin, Y.; Snell, A. (2002). Mean group tests for stationarity in heterogeneous panels. *Edinburgh School of Economics Discussion Paper Series* 107.
- Su, L.; Yang, Z. (2015). QML estimation of dynamic panel data models with spatial errors. *Journal of Econometrics* 185(1): 230–258. <https://doi.org/10.1016/j.jeconom.2014.11.002>.
- Tabash, M. I.; Mesagan, E. P.; Farooq, U. (2022). Dynamic linkage between natural resources, economic complexity, and economic growth: Empirical evidence from Africa. *Resources Policy* 78. Available at: <https://doi.org/10.1016/j.resourpol.2022.102865>.
- UNCTAD. (2021). *Facts and Figures | UNCTAD*. United Nation Conference on Trade and Development. Retrieved on: 30 August 2022, from: <https://unctad.org/press-material/facts-and-figures-7>.
- UNDP. (2022). *Sustainable Development Goals | United Nations Development Programme*. UNDP. Retrieved on: 30 August 2022, from: <https://www.undp.org/sustainable-development-goals>.
- UNESCO. (2016). *The future of scientific advice to the United Nations*. UNESCO publishing.
- World Bank Group. (2019, November 25). *Accelerating poverty reduction in Africa: In five charts*. World Bank. Retrieved on: 30 August 2022, from: <https://www.worldbank.org/en/region/afr/publication/accelerating-poverty-reduction-in-africa-in-five-charts>.



Corporate Spin-Offs and Shareholders' Wealth: A Systematic Review and Future Research Agenda

Saima NAZIR,¹ Khalid CHISTI²

¹University of Kashmir, J&K

e-mail: saimanazir.scholar@kashmiruniversity.net

²University of Kashmir, J&K

e-mail: chistikhalid@kashmiruniversity.ac.in

Abstract. The spin-off has become a common mode of restructuring in the corporate world for the last few decades and has thus attracted the interest of researchers to investigate how this form of divestiture creates value for shareholders. While there is an agreement among researchers about the wealth creation of spin-offs around the announcement of the event, the sources of this wealth generation remain controversial. Moreover, the long-run stock performance of the spin-offs invites debates, as there are varied shreds of evidence in this regard. The present study endeavours to provide an overview of the existing literature by systematically reviewing 89 theoretical and empirical works published between 1976 and 2021 on short-term and long-term wealth effects separately to provide state-of-the-art research on the topic concerned. Based on the findings of existing literature, certain suggestions for future research have been made.

Keywords: spin-off, corporate divestiture, stock prices, shareholder wealth, systematic review, demerger

JEL Classification: G14, G34

1. Introduction

Like in physical science where every action has an equal and opposite reaction, the corporate world also has a reaction for every action. The corporate action in the form of spin-offs (synonymous with demergers) is followed by the reaction on the part of the markets as a manifestation of change in stock prices, as evidenced empirically (Klein and Rosenfeld, 2010; Miles and Rosenfeld, 1983). Spin-offs provide a unique way for conglomerates to divest their business divisions. This restructuring strategy leads to the transfer of one or more divisions of a company to a newly formed or existing corporate entity. The shareholders of the original

company do not lose ownership in the spun-off entity, as the shares of the spun-off entity are distributed among them on a pro-rata basis (Krishnaswami and Subramaniam, 1999). This transaction does not lead to the generation of any cash flow and is generally tax-free (Gertner et al., 2002). Therefore, the distinctiveness of this form of corporate restructuring attracts attention and motivates researchers to gain insight into how this strategic move affects shareholders' wealth.

Spin-off has for long been a buzzword in the corporate community, as the giant business empires – in a bid to provide the best value to their investors – embrace this form of restructuring to streamline their complex business models. To what extent this divestment strategy has been successful to benefit the owners is worth knowing, and this knowledge can be attained by empirical investigation into the subject. In order to follow state-of-the-art research in a particular field of knowledge, a review of the relevant literature available on the subject is imperative (Snyder, 2019). As per the authors' knowledge, there is barely any study that provides an organized representation of the diverse literature on the reaction of the market to corporate spin-offs. Therefore, the present study endeavours to provide a systematic review of the wealth impact of shareholders in the context of spin-offs.

The study has considered all the theoretical and empirical works published from 1976 (as this marks the year in which the theoretical model was developed to show how spin-offs may create value for shareholders by expropriating wealth from bondholders) to October 2021. Also, some gaps have been identified in the existing literature, which provides the direction for future research.

The rest of the paper is organized as follows: section 2 outlays the research methodology followed for the selection of the pertinent research work, section 3 deliberates upon the theoretical and empirical substantiation of the subject matter, section 4 exhibits the conclusion of the study, section 5 underlines the limitations of the study, and section 6 highlights the gaps in the literature and proposes the direction for future research.

2. Research Methodology

A systematic review needs to delineate the criteria followed to include the study in or exclude the study from the review (Palmatier et al., 2018) and the choice of database (Kamboj and Rahman, 2015).

2.1. Inclusion/Exclusion Criteria

The study has taken into consideration the following parameters while selecting the articles for review:

2.1a. Time

The study chose the research works published since 1976, as this year marks the theoretical argument presented on how spin-offs can create value for shareholders through expropriating value from bondholders. The selected time frame, i.e. 1976–2021, presents the developments that have emerged in the selected area of research.

2.1b. Journal Articles

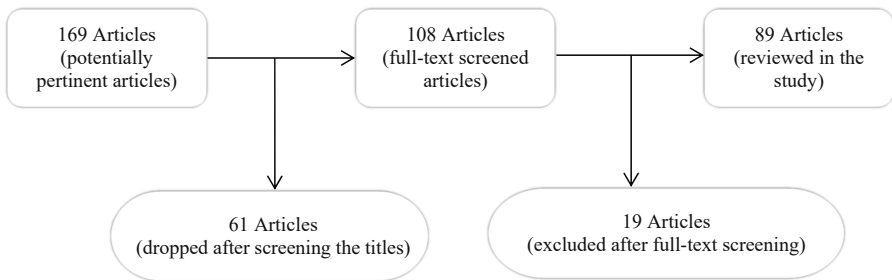
Only the articles published in peer-reviewed journals have been considered. Consequently, textbooks, conference proceedings, reports from government and non-government institutions, and student and doctoral dissertations have been excluded.

2.2. Database Selection

The articles to be included in the review have been retrieved from databases such as Emerald Insight, Elsevier (Science Direct), JSTOR, Springer, Sage, Taylor and Francis, and Wiley Online Library, following Adjei-Bamfo et al. (2019). The articles were searched using the words “spin off”, “spin-off”, “demerger”, “shareholder wealth”, “stock prices”, “stock returns”, “corporate restructuring”, and “divestment”.

2.3. Search Outcome

The preliminary search produced 169 articles. Out of these, 61 articles were dropped after screening the title and abstract, leaving a total of 108 articles. Further, full-text screening of the remaining articles was done to ensure that they fall in line with the theme of the review. This resulted in the further exclusion of 19 articles and left the final sample of 89 studies that met the criteria for inclusion in the systematic review (see *Figure 1*).

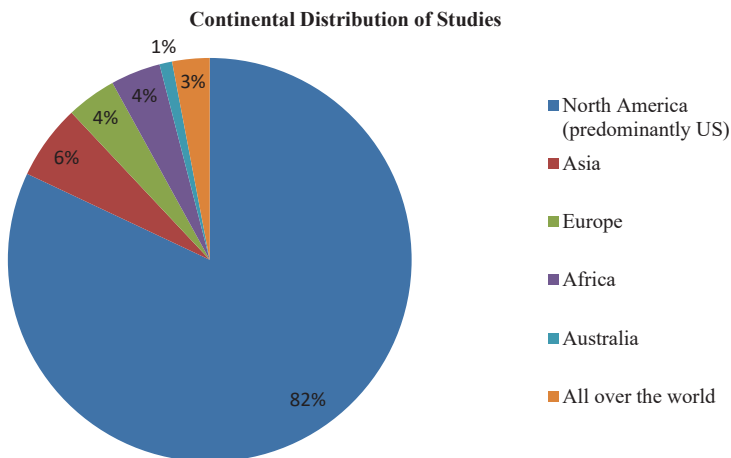


Source: generated by the authors

Figure 1. Flow chart of the article selection process for the review

2.4. Geographical Distribution of Studies

Out of a total of 89 articles included in the systematic review, 74 are based on empirical studies that draw evidence on the impact of spin-offs on shareholders' wealth and the sources of this wealth generation. Most of these studies are grounded on evidence from North America (predominantly from the US), forming 82% of the total evidence-based studies (as evident from *Figure 2*), followed by Asia, which claims 6% of the sample studies. Europe and Africa contribute 4% each followed by Australia with 1% of empirical studies on the topic. There are certain studies that have reported a positive impact of spin-offs in samples based on multiple countries, and these form 3% of the total evidence-based studies.

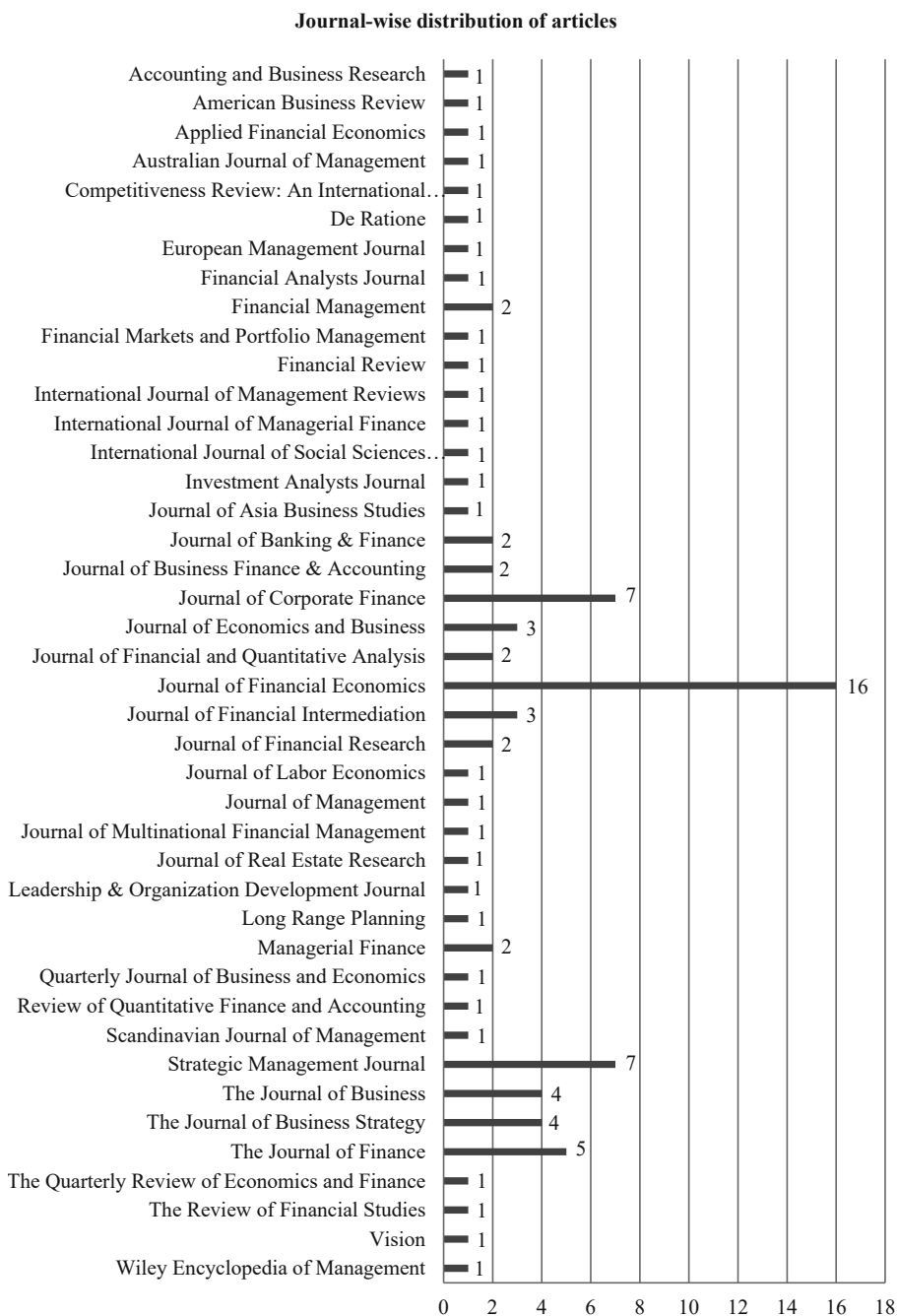


Source: generated by the authors

Figure 2. Continental distribution of studies based on the sample of the study

2.5. Journal-Wise Distribution of Articles

The distribution of the articles on the basis of journals in which they are published is provided in *Figure 3*. As depicted in the figure, there are 42 journals that have published articles on the subject matter of this review study since 1976. The highest number of articles (16) is from the *Journal of Financial Economics* followed by *Strategic Management Journal*, *Journal of Corporate Finance*, and *The Journal of Finance*. These four journals have collectively produced more than 39% of the studies on the topic during the selected period of time for the study. The remaining 61% of the articles are widely dispersed among 38 journals, indicating the attention grabbed by the topic from a large number of journals.



Source: generated by the authors

Figure 3. Journal-wise distribution of articles

3. Theoretical and Empirical Evidence in the Appraised Studies

Divestment activities (including spin-offs) are escalating and form the major drivers of restructuring activities motivated by an urge to shed unrelated businesses, transformation in the competitive atmosphere, need to raise extra funds, and stress from shareholders among others (Deloitte, 2018). A good number of studies have been conducted to date to examine the reaction of the capital markets to the spin-off of companies. These studies are consistent in their conclusion that this form of corporate restructuring leads to the positive response of shareholders on the announcement of this event (Ball et al., 1993; Chai et al., 2018) but draw inconclusive substantiation to elucidate the sources of gains to the shareholders (Ahn and Denis, 2004; Chemmanur et al., 2014; Habib et al., 1997; Maxwell and Rao, 2003). Furthermore, whether spin-offs succeed in the creation of wealth for shareholders in the long-run periods is a debatable issue in the community of academicians (Chong et al., 2009; Cusatis et al., 1993; Murray, 2008; Veld and Veld-Merkoulova, 2004).

3.1. Spin-off Announcements and the Stock Prices

Diversification diminishes the value, and this diminution is more prominent in unrelated industry diversifications (Berger and Ofek, 1995). This loss in value can be regained by shedding unrelated businesses to improve the corporate focus (Comment and Jarrell, 1995). The positive abnormal returns around the spin-offs reflect the markets' confidence in the restructuring firm's ability to improve its performance (Bhana, 2004). A mass of studies has acknowledged the positive impact of spin-off announcements on stock prices all over the world (Blount and Davidson, 1996; Harris and Glegg, 2008; Parrino, 1997; Seifert and Rubin, 1989; Veld and Veld-Merkoulova, 2004) despite the variations in methodology, sample period, and the variables studied for explaining the gains to the shareholders (Burch and Nanda, 2003; Denning, 1988; Krishnaswami and Subramaniam, 1999; Slovin et al., 1995; Veld and Veld-Markoulova, 2008). Most of these studies come from the USA (Feng et al., 2015; Miles and Rosenfeld, 1983; Rosenfeld, 1984; Seward and Walsh, 1996; Wheatley et al., 2005), and, though comparatively small in number, studies from Europe (Murray, 2008; Veld and Veld-Merkoulova, 2004) and Asia-Pacific have also begun to emerge (Aggarwal and Garg, 2019; Chai et al., 2018; Padmanabhan, 2018).

The first empirical study to see the impact of spin-off announcements on stock prices was conducted by Miles and Rosenfeld (1983). The study was based on 55 companies in the USA that spun off their divisions from January 1963 to

December 1980. It was concluded that there is a positive influence of spin-off announcements on stock prices. Wealth generation of spin-offs is not limited around the announcement dates only, but the execution of the event also boosts the yield (Vijh, 1994). Nevertheless, there are few studies that have evidenced a temporary drop in the security prices of the spun-off unit (Brown and Brooke, 1993; Seifert and Rubin, 1989), and this drop is attributed to the transitory selling pressure created by institutional investors to rebalance their portfolio (Brown and Brooke, 1993). Shareholders benefit not only from domestic spin-offs (within the country spin-offs) but also from cross-border spin-offs, and the magnitude of the gains depends on the characteristics of the foreign market in which the subsidiary is operating (Harris and Glegg, 2008). Spin-offs generate gains not only for retail shareholders but for institutional investors as well, who are relieved from the trading constraints by being able to deal either in the parent or in the spun-off unit or in both, depending upon their investment objectives and requirements (Chemmanur and He, 2016). However, the increase in returns does not come alone and brings with it an increase in the volatility of the returns due to the loss of diversification effect and the increased instability of profits (Desai and Savickas, 2010; Huson and MacKinnon, 2003). Moreover, spin-offs are sometimes devised to segregate poorly performing divisions that pose a big challenge to the management of the spun-off firm (Wruck and Wruck, 2002).

A number of possible sources are identified by different studies regarding the gains resulting from spin-offs (Ahn and Walker, 2007; Allen et al., 1995; Chemmanur and Yan, 2004; Krishnaswami and Subramaniam, 1999; Maxwell and Rao, 2003; Wruck and Wruck, 2002). These can be categorized as improved industrial focus and elimination of negative synergies (anergy), expropriation of wealth from bondholders to shareholders, merger/takeover facilitation, tax and regulatory advantages, mitigation of information asymmetry, correction of previous mistakes (undo previous mergers or acquisitions), size of the spun-off unit, efficiency in capital allocation, and others.

3.1a. Industrial Focus and Elimination of Negative Synergies

The proponents of the focus hypothesis for the abnormal returns accompanying spin-off argue that highly diversified firms reduce the efficiency of management, thereby resulting in the poor performance of the division (Berger and Ofek, 1995; Bickner, 1989; Cox et al., 1992; Johnson, 1996; Lord and Saito, 2019; Schipper and Smith, 1983). The failure of the conglomerates to realize economies of scope through diversification paves the way for corporate focus (Comment and Jarrell, 1995). So, by separating unrelated business divisions, the management can concentrate on the business in which it has a specialization (Chemmanur and Yan, 2004; Daley et al., 1997; Gordon, 1992; Ito, 1995; Jain et al., 2011; Khaugani and Priscillah,

2020; Pearson, 1998; Semadeni, 2015). Hite and Owers (1983), Miles and Rosenfeld (1983), and Rosenfeld (1984) suggest that similarly to mergers that create value by capitalizing on synergies, spin-offs create value by eliminating anergies in unrelated operating divisions of a conglomerate. Moreover, conglomerates suffer from a diversification discount, which states that diversified companies are more under-valued than focused companies (Burch and Nanda, 2003; Fluck and Lynch, 1999; Nanda and Narayanan, 1999; Slovin et al., 1995), and therefore parting the unrelated units enables the firm to fix this problem (Ahn and Denis, 2004) and also attract pure-play investors who are interested in focused firms (Khan and Mehta, 1996).

Chemmanur et al. (2014) contend that the performance of the firms is improved after the spin-off, and this improvement is more pronounced in focus-increasing spin-offs (a spin-off of unrelated divisions) than in non-focus-increasing ones. The improvement is attributed to minimization in the cost of production. Similar results have been reported by Bhana (2004), Desai and Jain (1999), Johnson et al. (1996), Murray (2008), Veld and Veld-Merkoulova (2004), and Veld and Veld-Merkoulova (2009). The findings of these studies contradict the performance deterioration of the divested unit post-spin-off, as reported by Woo et al. (1992). Moreover, inconsistent with the previous studies, Huang (2014) highlights that it is the enhanced CEO experience-retained assets match that generates abnormal returns on conglomerate divestitures rather than the corporate focus.

3.1b. Expropriation of Wealth from Bondholders to Shareholders

Researchers have attempted to elucidate whether the shareholders' gains accompanying spin-offs are due to the loss to the bondholders. In other words, does the spin-off expropriate wealth from bondholders to shareholders? There is no single answer to this question. While some studies agree with the hypothesis that there is a transfer of wealth from debtholders to shareholders (Parrino, 1997; Murray, 2008), several others do not find any evidence to support this claim (Gertner et al., 2002; Hite and Owers, 1983; Veld and Veld-Markoulova, 2008; Dittmar, 2004). Maxwell and Rao (2003) validating the theoretical argument of wealth transfer from bondholders to shareholders by Galai and Masulis (1976) contend that spin-offs lead to the loss of collateral available to the bondholders in the form of assets transferred to the spun-off units and to the termination of coinsurance arising from the operations of different divisions that are not perfectly correlated.

Murray (2008) studied the spin-offs in an environment of bank debt and documented, although very limited, deprivation in the value of debt holders. The proponents of this expropriation hypothesis argue that spin-off is used as an instrument of disproportionate allocation of debt between the parent and the spun-off unit (Parrino, 1997), while its opponents propose that spin-offs increase wealth

by the optimal allocation of debt by the optimally levered pre-spin-off firms (John, 1993). Veld and Veld-Markoulova (2008) remark that bondholders have become vigilant following the Marriott case (Parrino, 1997) and place more restrictive covenants on shareholders to avoid the expropriation of wealth. Contrary to the pure spin-offs, spin-offs preceded by carve-outs report wealth gains not only for shareholders but for the bondholders as well, as carve-out proceeds add to the collateral available to bondholders (Thompson and Apilado, 2010).

3.1c. Merger/Takeover Facilitation

Spin-offs add to the wealth of shareholders by creating pure plays to attract potential bidders who are well-versed in creating value for the stakeholders (Chemmanur and Yan, 2004; Cusatis et al., 1993; Harris and Glegg, 2008; Hite and Owers, 1983; Johnson et al., 1996). In a theoretical model, Chemmanur and Yan (2004) proposed that spin-offs can lead to an improvement in the performance of the firm by being taken over by a more efficient rival firm. Even the threat of takeover following the spin-off can pressurize the management to work efficiently, thereby resulting in improved performance.

However, contrary to the studies that analyse spin-off as a facilitator of takeover, Chemmanur et al. (2010) considered the association between anti-takeover provisions (ATPs) and share price reaction accompanying spin-off announcement and found a positive relationship between the two. They contend that instead of using ATPs for boosting returns to shareholders, CEOs use them to secure themselves from being overthrown for their inefficiency. Harris and Madura (2010) observe that spun-off units with parents having anti-takeover provision adopt poison pills, which, although resulting in a negative response of the market in the short run, work to their advantage by improving their bargaining power in a takeover bid, leading to a positive impact on wealth over a long period of time. Further, Murray (2008) does not support the claim of superior stock returns around spin-offs in anticipation of takeover premium. Rather, an argument is made that it is the weak performance and lower subsequent valuation of the shares of the firms that make them attractive targets for the acquirers.

3.1d. Tax and Regulatory Advantages

The separation of a highly regulated operating division can relieve the parent company of the complex regulatory constraints and therefore lead to a positive response to the announcement of the spin-off (Hite and Owers, 1983). Spin-offs modify the contracts with various tax and other regulatory authorities, and if these modifications are in the favour of the restructuring firms, they will be accompanied by positive stock returns (Frank and Harden, 2001; Johnson et al., 1996; Veld and Veld-Merkoulova, 2009; Schipper and Smith, 1983).

3.1e. Mitigation of Information Asymmetry

Corporate unbundling increases the flow of information about the diversified firms' operations and mitigates the asymmetry in the information held by the internal and external stakeholders (Bergh et al., 2008; Bhana, 2004; Desai and Savickas, 2010; Habib et al., 1997). The advocates of this hypothesis claim that the share price of a multi-divisional firm gives a picture of its overall performance and does not provide insight into the individual performance of each unit, and therefore, by spinning off the units, the information regarding the operations of the separated divisions is made public, which makes their valuation easy (Chemmanur and Liu, 2011; Cox et al., 1992; Nanda and Narayanan, 1999).

Habib et al. (1997) provide a theoretical analysis of how spin-offs improve value by mitigating information asymmetries. They argue that spin-offs raise the quantity of securities merchandized, which improves the pricing mechanism, thereby making it more informative. Spin-offs improve the value and result in an increase in the wealth of shareholders by diminishing the asymmetries in the information about the performance of various divisions of a diversified firm. When traded separately, the operating performance and the growth potential of the individual units are clearly visible to the market, which is not possible under the consolidated firm (Krishnaswami and Subramaniam, 1999). The misvaluation or undervaluation of diversified firms (often referred to as "diversification discount") is due to the information asymmetry that arises because of the inability of the analysts to provide accurate forecasts of the firms' future prospects of performance due to their complex nature (Feldman, 2016); and this asymmetry is reduced by spin-offs, which make it easy for the analysts to provide more accurate forecasts of the separated firms (Feldman et al., 2014). However, Chemmanur and He (2016) and Huson and MacKinnon (2003) argue that information asymmetry is not only between the management and market but among the investor classes in the market as well. The institutional investors have an informational advantage over other investors due to which they earn superior returns around the spin-off execution (Chemmanur and He, 2016). Furthermore, spin-offs increase the disparity between informed and uninformed traders, insiders, and outsiders (Allen, 2001), and this informational disparity is more pronounced when the unrelated businesses are parted (Huson and MacKinnon, 2003).

3.1f. Correction of Previous Mistakes

The "correction of previous mistakes" hypothesis asserts that spin-off is the reversing of the previous unsuccessful merger and acquisition, and therefore the gains arising from the spin-off announcement reflect the expectations about the restoration of value destroyed due to unproductive mergers, acquisitions, or takeovers (Allen et al., 1995). Fluck and Lynch (1999) developed a theoretical model to expound

on why firms acquire and then divest subsequently. They theorize that when firms are incapable of funding their profitable business opportunities, a merger offers an avenue to finance them. However, conglomeration comes at a cost of energy, which they referred to as “consolidation cost”, and when these costs surpass the financial synergy gained by the merging, the appropriate strategy for these firms is then to divest them. Marquette and Williams (2007) investigated the overall wealth effects for firms that undertake two events: a takeover followed by subsequent spin-offs. They noted significant unfavourable returns on takeover announcements and favourable returns around the announcement of spin-offs. Nevertheless, the collective results depicted an insignificant effect on overall wealth. Finally, the study failed to conclude whether spin-offs of previously acquired firms create or destroy the wealth of shareholders. Schweizer and Lagerströmb (2020) explain spin-offs with a divorce metaphor by arguing that a spin-off is a corporate divorce that results from unsuccessful marriage (previous merger or acquisition). The failure of the firms to realize synergies expected at the time of the merger as well as the poor implementation ultimately lead to the separation of the consolidated partners.

3.1g. Size

Size is found to have a positive association with the stock returns around the spin-off announcement. The bigger the size of the unit spun-off, the greater is the gain of the shareholders (Johnson et al., 1994; Veld and Veld-Merkoulova, 2004; Veld and Veld-Merkoulova, 2009). In a survey of restructuring by British and German companies, Kirchmaier (2003) found that size has a bearing on the choice of strategic and structural change by the firms. Small firms show less inclination towards inorganic expansion or contraction than large ones. However, Woo et al. (1989) report contrary findings, that small spin-offs outdo the bigger ones.

3.1h. Completion or Withdrawal of Proposed Spin-Offs

All proposed spin-offs are not actually executed (Harris and Madura, 2011), and whether a proposed spin-off is executed or later withdrawn has an implication on the response of the market. While a few studies have shown a positive relationship between the completion of spin-offs and stock returns of the announcing firms (Veld and Veld-Merkoulova, 2004), some have evidenced the opposite results, i.e. spin-offs that are later withdrawn record more increased abnormal returns than those which are completed (Alli et al., 2001; Harris and Madura, 2011; Veld and Veld-Merkoulova, 2009). Harris and Madura (2011) investigated the reason for the withdrawal of the previously announced spin-offs and found that the market timing has an impact on the decision of the firms either to go for separation or to retract the proposal. The argument is that unfavourable industrial environment

and unattractive takeover market discourage spin-offs and hence increase the likelihood of withdrawal. Another reason could be that the management finds the earlier decision of separation inexpedient and accordingly corrects it by revoking the proposal (Alli et al., 2001). Furthermore, Chai et al. (2018) argue that completion or withdrawal has no influence on the return generation of spin-offs.

3.1i. Efficiency in Capital Allocation

The growth in the share prices subsequent to spin-offs has been reported to be associated with the efficiency with which the capital is allocated. McNeil and Moore (2005) document the inverse relation between spin-off returns and the efficiency with which the capital is allocated to the units to be divested, depicting the confidence of the market in the spin-off that this restructuring would improve the efficiency of capital allocation. They note that following spin-offs, firms with high growth opportunities increase their capital expenditure, while those with lower growth potential see a reduction in it, thus establishing that spin-offs lead to a better allocation of capital. These findings are similar to those of Ahn and Denis (2004), Ahn and Walker (2007), Gertner et al. (2002), Rovetta (2006), and Johnson et al. (1996). However, these findings are challenged by Çolak and Whited (2007). The argument presented is that although spin-offs are followed by improved investment allocation, the improvement in allocation is not because of an increase in focus due to spin-offs. The authors attribute the reported improvement by previous studies to measurement errors.

3.1j. Other Sources

Several other sources have been identified in the literature that have an impact on the performance of spin-offs. The age of top executives and their external directorships play an important role in the success of spin-offs in that young and fresh minds are ready to take risks, accept challenges, and embrace new ideas to lead the organizations to new heights, and experiences gained by being the director of some other organizations help them to compete in the challenging environment (Ozbek, 2020). Semadeni and Cannella Jr (2011) demonstrate the impact of the relation between the parent and the spun-off unit following spin-off on the post-separation performance of the divested unit. They maintain that a trade-off should be fixed between having the parent's excessive and negligible involvement in the spun-off unit. Other possible sources of gains to shareholders by spin-offs include equity incentives to executives (Feng et al., 2015) and effective corporate governance (Wruck and Wruck, 2002).

Nevertheless, the meticulous research with regard to the source of the confirmed gains is still deficient, keeping in view the diversity in the claimed sources, and therefore an issue of substantial deliberation.

3.2. Long-term Stock Price Performance of the Parent and the Spun-Off Unit

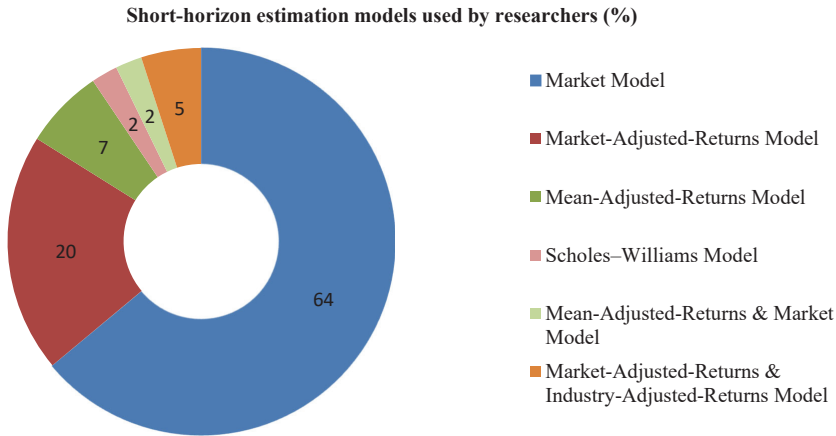
Research on the long-term impact of spin-offs on stock performance produces inconclusive evidence. While some studies claim that spin-offs result in the long-run outperformance of the concerned entities' stocks (Bhana, 2004; Chai et al., 2018; Desai and Jain, 1999; Rovetta, 2006), others rule out this statement by not finding any evidence in its support (Ball et al., 1993; Klein and Rosenfeld, 2010; Murray, 2008; Veld and Veld-Merkoulova, 2004). This inconclusiveness regarding the long-run stock performance of spin-offs makes it a debatable issue among researchers.

The first study to investigate the post-spin-off stock performance of companies was made by Cusatis et al. (1993). It reported significant positive abnormal returns for spin-offs, their parents, and the spin-off–parent combinations for the three-year post-spin-off period. Results suggested a direct relation between abnormal performance and returns for both spin-offs and parents involved in takeover activity, as the returns for the spin-off–parent combinations not involved in takeover activity showed insignificant abnormal performance. The explanation given for the reported results was that through spin-offs companies create pure plays to attract potential bidders who are well-versed in creating value for the stakeholders. The findings of this study were further corroborated by Feng et al. (2015) and Chai et al. (2018), who also evidenced superior returns, particularly for the focus-increasing spin-offs. Junge et al. (2021) propose that the post-spin-off attachment with the parent firm has an impact on the risk-taking behaviour of the spun-off unit, which has implications for its performance. In an attempt to test the claim of positive abnormal returns by spin-offs in the long run, McConnell et al. (2001) measured the returns against various benchmarks over different long-term horizons but failed to find any robust evidence to support the assertion of outperformance of returns following spin-offs. Similarly, Veld and Veld-Merkoulova (2004), after finding no superior returns in European spin-offs over a period of 3 years following spin-off, concluded that the European capital markets react efficiently to the information contained in the spin-off announcements. Additionally, Chong et al. (2009) report deterioration of wealth due to a decline in growth and profitability over an extended period.

3.3. Methodology Used to Determine Wealth Effects of Spin-Offs

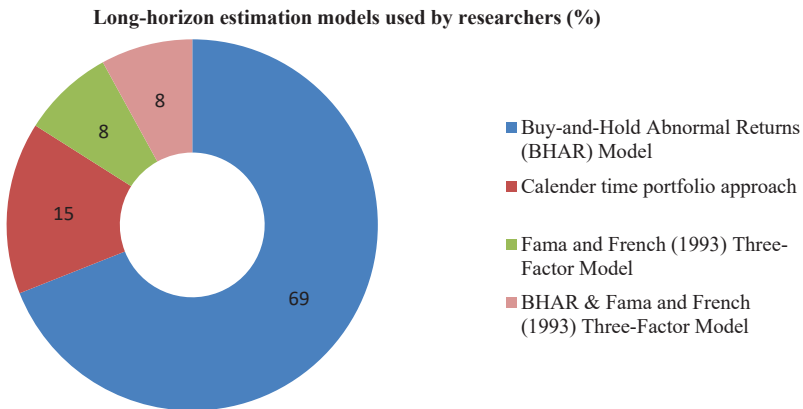
An event analysis is performed to look at how the market responds to the spin-offs. A variety of expected return models that are divided into two groups – statistical models (such as the constant mean return model, market model, market-adjusted return model, industry-adjusted return model, and so on) and economic models (e.g. Capital Asset Pricing Model and Arbitrage Pricing Theory) – can be used to determine the abnormal returns associated with the event. However,

due to their complicated implementation and negligible practical advantage over statistical models, economic models are not employed to calculate expected returns (Campbell et al., 1997). For long-horizon event studies, the buy-and-hold abnormal returns (BHAR) model and Jensen's alpha approach (also known as the calendar-time portfolio approach) are the two most often employed models for assessing abnormal stock performance (Kothari and Warner, 2007).



Source: generated by the authors

Figure 4. Short-horizon estimation models employed in the reviewed studies



Source: generated by the authors

Figure 5. Long-horizon estimation models employed in the reviewed studies

The various models adopted to identify the abnormal returns in the short- and long-horizon studies are shown in *figures 4* and *5* respectively. The market model, which was used by 64% of the studies analysed for this review, is the most

frequently employed model for return estimation in short-horizon studies, followed by the market-adjusted return model, the mean-adjusted return model, and the Scholes–Williams model, which were used by 20%, 7%, and 2% of the research articles respectively. Additionally, 7% of the studies used more than one model to assess how reliable their findings were. As far as long-horizon estimation models are concerned, BHAR is the most widely used model, followed by the calendar-time portfolio approach and the Fama and French (1993) three-factor model, which have been applied in 15% and 8% of the reviewed studies respectively.

4. Conclusions

This paper is aimed to review the existing literature on corporate spin-offs to specify what and how much we are acquainted with and what we still need to explore in order to enhance our knowledge about this significant form of restructuring. The reviewed studies confirm that spin-offs, irrespective of the markets (developed or emerging), lead to the creation of wealth for shareholders around the announcement of the event. The sources of wealth effects, as posited in the literature, are diverse and inconclusive. A number of determining factors of value creation have been studied such as merger or takeover facilitation, elimination of negative synergies and improved industrial focus, wealth expropriation from bondholders to shareholders, and so on. Of all the hypotheses claimed, the hypothesis of elimination of negative synergies and improved industrial focus has been widely supported. With regard to the long-term performance of spin-offs, there is inconclusiveness. While some studies demonstrate the stock outperformance of spin-offs in the long run, raising questions about the efficient market hypothesis, others support this theory by not finding any evidence of outshining returns from spin-offs over longer periods.

Against this backdrop, more research needs to be conducted to assist academicians as well as practitioners to gain more insight into this phenomenon and investigate how to make the best out of this restructuring practice while averting the drawbacks.

5. Limitations of the Study

The study, despite attempting to include all the relevant and reliable works on the chosen topic, has some limitations. Firstly, only the articles published in peer-reviewed journals were reviewed, which lead to the exclusion of other relevant works in this field. Secondly, an analysis of the available literature relevant for the selected period of the study showed that most of the research works pertain to developed economies, for instance, North America (predominantly the USA), and only a few studies can be traced in relation to developing economies.

6. Suggestions for Future Research

Research on the wealth effects of spin-offs in emerging economies is still in the infancy stage and needs further investigation. The confinement of the studies on the impact of corporate spin-offs to the US and Europe highlights a gap of deficiency in the current literature, which can be bridged by a deeper examination of the subject by conducting worldwide studies, particularly aimed at Asia-Pacific, to see whether their results can be extended to these markets as well or new insights might be gained. Furthermore, the explaining factors for the positive gains are non-exhaustive. What defines the gains in one market may not define the same in some other market. Therefore, a possible direction for future research could be to study the explanatory factors as posited in the current literature for further confirmation and also to attempt to find new factors, more appropriate for a particular market, which may pinpoint the gains (as is evident from Blount and Davidson (1996), where the spin-off is carried out not to attain financial advantages but in response to the changing political scenario, depicting the unique characteristics of the South African market). Further, the findings of Thomas (2002) suggesting that diversified firms do not suffer from a higher level of information asymmetry raise questions as to whether firms engage in spin-offs to mitigate asymmetry in the information. One more direction towards future research is the human aspect of the spin-offs. The separation from the parent could arouse a sense of refusal and desolation among the employees of the spun-off unit (Hoare and Cartwright, 1997), and thus the effect of the separation on employees and their performance can be explored. Also, spin-offs involve not only the restructuring of assets but the restructuring of the top management as well (Wruck and Wruck, 2002). Additional research needs to be conducted to understand the way management is structured in spin-offs and the impact of this structuring on the firms' performance. Moreover, the long-term wealth effect of spin-offs requires further insight, as there are mixed shreds of evidence in the present literature.

References

- Adjei-Bamfo, P.; Maloreh-Nyamekye, T.; Ahenkan, A. (2019). The role of e-government in sustainable public procurement in developing countries: A systematic literature review. *Resources, Conservation and Recycling* 142: 189–203.
- Aggarwal, P.; Garg, S. (2019). Restructuring through spin-off: Impact on shareholder wealth. *Managerial Finance*.
- Ahn, S.; Denis, D. J. (2004). Internal capital markets and investment policy: Evidence from corporate spinoffs. *Journal of Financial Economics* 71(3): 489–516.

- Ahn, S.; Walker, M. D. (2007). Corporate governance and the spinoff decision. *Journal of Corporate Finance* 13(1): 76–93.
- Allen, J. W. (2001). Private information and spin-off performance. *The Journal of Business* 74(2): 281–306.
- Allen, J. W.; Lummer, S. L.; McConnell, J. J.; Reed, D. K. (1995). Can takeover losses explain spin-off gains? *Journal of Financial and Quantitative Analysis* 30(4): 465–485.
- Alli, K.; Ramírez, G. G.; Yung, K. K. (2001). Withdrawn spin-offs: An empirical analysis. *Journal of Financial Research* 24(4): 603–616.
- Ball, J.; Rutherford, R.; Shaw, R. (1993). The wealth effects of real estate spin-offs. *Journal of Real Estate Research* 8(4): 597–606.
- Berger, P. G.; Ofek, E. (1995). Diversification's effect on firm value. *Journal of Financial Economics* 37(1): 39–65.
- Bergh, D. D.; Johnson, R. A.; Dewitt, R. L. (2008). Restructuring through spin-off or sell-off: Transforming information asymmetries into financial gain. *Strategic Management Journal* 29(2): 133–148.
- Bhana, N. (2004). Performance of corporate restructurings through spin-offs: Evidence from JSE-listed companies. *Investment Analysts Journal* 33(60): 5–15.
- Bickner, B. P. (1989). How a corporate breakup boosted stock prices. *Journal of Business Strategy* 10(5): 20–25.
- Blount, G.; Davidson, S. (1996). Stock market responses to corporate unbundling in South Africa. *De Ratione* 10(1): 63–73.
- Brown, K. C.; Brooke, B. A. (1993). Institutional demand and security price pressure: The case of corporate spinoffs. *Financial Analysts Journal* 49(5): 53–62.
- Burch, T. R.; Nanda, V. (2003). Divisional diversity and the conglomerate discount: Evidence from spinoffs. *Journal of Financial Economics* 70(1): 69–98.
- Campbell, J. Y.; Lo, A. W.; MacKinlay, A. C. (1997). *The econometrics of financial markets*. Princeton University Press.
- Chai, D.; Lin, Z.; Veld, C. (2018). Value-creation through spin-offs: Australian evidence. *Australian Journal of Management* 43(3): 353–372.
- Chemmanur, T. J.; He, S. (2016). Institutional trading, information production, and corporate spin-offs. *Journal of Corporate Finance* 38: 54–76.
- Chemmanur, T. J.; Jordan, B. D.; Liu, M. H.; Wu, Q. (2010). Antitakeover provisions in corporate spin-offs. *Journal of Banking & Finance* 34(4): 813–824.
- Chemmanur, T. J.; Krishnan, K.; Nandy, D. K. (2014). The effects of corporate spin-offs on productivity. *Journal of Corporate Finance* 27: 72–98.
- Chemmanur, T. J.; Liu, M. H. (2011). Institutional trading, information production, and the choice between spin-offs, carve-outs, and tracking stock issues. *Journal of Corporate Finance* 17(1): 62–82.
- Chemmanur, T. J.; Yan, A. (2004). A theory of corporate spin-offs. *Journal of Financial Economics* 72(2): 259–290.

- Chong, T. T. L.; Wong, D. W. H.; Liew, V. K. S. (2009). Do spinoffs create value in Hong Kong? *Journal of Asia Business Studies* 4(1): 23–32.
- Çolak, G.; Whited, T. M. (2007). Spin-offs, divestitures, and conglomerate investment. *The Review of Financial Studies* 20(3): 557–595.
- Comment, R.; Jarrell, G. A. (1995). Corporate focus and stock returns. *Journal of Financial Economics* 37(1): 67–87.
- Cox, R. A.; Kleinman, R. T.; Sahu, A. P. (1992). Strategically planned spin-offs: The empirical evidence. *Competitiveness Review: An International Business Journal* 2(1): 9–12.
- Cusatis, P. J.; Miles, J. A.; Woolridge, J. R. (1993). Restructuring through spinoffs: The stock market evidence. *Journal of Financial Economics* 33(3): 293–311.
- Daley, L.; Mehrotra, V.; Sivakumar, R. (1997). Corporate focus and value creation evidence from spinoffs. *Journal of Financial Economics* 45(2): 257–281.
- Deloitte. (2018). *The beginning of a new M&A season – Future of a deal*. <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/finance/in-fa-deloitte-uk-future-of-the-deal-noexp.pdf>.
- Denning, K. C. (1988). Spin-offs and sales of assets: An examination of security returns and divestment motivations. *Accounting and Business Research* 19(73): 32–42.
- Desai, C. A.; Savickas, R. (2010). On the causes of volatility effects of conglomerate breakups. *Journal of Corporate Finance* 16(4): 554–571.
- Desai, H.; Jain, P. C. (1999). Firm performance and focus: Long-run stock market performance following spinoffs. *Journal of Financial Economics* 54(1): 75–101
- Dittmar, A. (2004). Capital structure in corporate spin-offs. *The Journal of Business* 77(1): 9–43.
- Feldman, E. R. (2016). Corporate spinoffs and analysts' coverage decisions: The implications for diversified firms. *Strategic Management Journal* 37(7): 1196–1219.
- Feldman, E. R.; Gilson, S. C.; Villalonga, B. (2014). Do analysts add value when they most can? Evidence from corporate spin-offs. *Strategic Management Journal* 35(10): 1446–1463.
- Feng, Y.; Nandy, D. K.; Tian, Y. S. (2015). Executive compensation and the corporate spin-off decision. *Journal of Economics and Business* 77: 94–117.
- Fluck, Z.; Lynch, A. W. (1999). Why do firms merge and then divest? A theory of financial synergy. *The Journal of Business* 72(3): 319–346.
- Frank, K. E.; Harden, J. W. (2001). Corporate restructurings: A comparison of equity carve-outs and spin-offs. *Journal of Business Finance & Accounting* 28(3–4): 503–529.
- Galai, D.; Masulis, R. W. (1976). The option pricing model and the risk factor of stock. *Journal of Financial Economics* 3(1–2): 53–81.

- Gertner, R.; Powers, E.; Scharfstein, D. (2002). Learning about internal capital markets from corporate spin-offs. *The Journal of Finance* 57(6): 2479–2506.
- Gordon, J. M. (1992). Spin-offs: A way to increase shareholder value. *Journal of Business Strategy* 13(1): 61–64.
- Habib, M. A.; Johnsen, D. B.; Naik, N. Y. (1997). Spinoffs and information. *Journal of Financial Intermediation* 6(2): 153–176.
- Harris, O.; Glegg, C. (2008). The wealth effects of cross-border spinoffs. *Journal of Multinational Financial Management* 18(5): 461–476.
- Harris, O.; Madura, J. (2010). Cause and effects of poison pill adoptions by spinoff units. *Journal of Economics and Business* 62(4): 307–330.
- (2011). Why are proposed spinoffs withdrawn? *The Quarterly Review of Economics and Finance* 51(1): 69–81.
- Hite, G. L.; Owers, J. E. (1983). Security price reactions around corporate spin-off announcements. *Journal of Financial Economics* 12(4): 409–436.
- Hoare, S. C.; Cartwright, S. (1997). The human aspects of demerger: A new agenda for research? *Leadership & Organization Development Journal* 18(4): 194–200.
- Huang, S. (2014). Managerial expertise, corporate decisions and firm value: Evidence from corporate refocusing. *Journal of Financial Intermediation* 23(3): 348–375.
- Huson, M. R.; MacKinnon, G. (2003). Corporate spinoffs and information asymmetry between investors. *Journal of Corporate Finance* 9(4): 481–503.
- Ito, K. (1995). Japanese spinoffs: Unexplored survival strategies. *Strategic Management Journal* 16(6): 431–446.
- Jain, B. A.; Kini, O.; Shenoy, J. (2011). Vertical divestitures through equity carve-outs and spin-offs: A product markets perspective. *Journal of Financial Economics* 100(3): 594–615.
- John, T. A. (1993). Optimality of spin-offs and allocation of debt. *Journal of Financial and Quantitative Analysis* 28(1): 139–160.
- Johnson, G. A.; Brown, R. M.; Johnson, D. J. (1994). The market reaction to voluntary corporate spinoffs: Revisited. *Quarterly Journal of Business and Economics* 33(4): 44–59.
- Johnson, R. A. (1996). Antecedents and outcomes of corporate refocusing. *Journal of Management* 22(3): 439–483.
- Johnson, S. A.; Klein, D. P.; Thibodeaux, V. L. (1996). The effects of spin-offs on corporate investment and performance. *Journal of Financial Research* 19(2): 293–307.
- Junge, S.; Graf-Vlachy, L.; Mammen, J.; Meinhardt, R.; Gudd, C. (2021). The illusion of independence: Spun-off firms' risk-taking as a function of status and attachment to the parent firm. *Long Range Planning* 54(1): 101966.

- Kamboj, S.; Rahman, Z. (2015). Marketing capabilities and firm performance: Literature review and future research agenda. *International Journal of Productivity and Performance Management* 64(8): 1041–1067.
- Khan, A. Q.; Mehta, D. R. (1996). Voluntary divestitures and the choice between sell-offs and spin-offs. *Financial Review* 31(4): 885–912.
- Khaugani, M. J.; Priscillah, N. (2020). Strategic de-mergers and organizational performance of Madison Group of Companies in Kenya. *International Journal of Social Sciences Management and Entrepreneurship (IJSSME)* 4(1): 85–102.
- Kirchmaier, T. (2003). Corporate restructuring of British and German non-financial firms in the late 1990s. *European Management Journal* 21(4): 409–420.
- Klein, A.; Rosenfeld, J. (2010). The long-run performance of sponsored and conventional spin-offs. *Financial Management* 39(1): 227–247.
- Kothari, S. P.; Warner, J. B. (2007). Econometrics of event studies. In: Eckbo, B. Espen (ed.), *Handbook of empirical corporate finance*. Elsevier. 3–36.
- Krishnaswami, S.; Subramaniam, V. (1999). Information asymmetry, valuation, and the corporate spin-off decision. *Journal of Financial Economics* 53(1): 73–112.
- Lord, R. A.; Saito, Y. (2019). Why discontinue operations? Interrelated elements of the corporate focus hypothesis. *International Journal of Managerial Finance* 16(2): 182–202.
- Marquette, C. J.; Williams, T. G. (2007). Takeover-divestiture combinations and shareholder wealth. *Applied Financial Economics* 17(7): 577–586.
- Maxwell, W. F.; Rao, R. P. (2003). Do spin-offs expropriate wealth from bondholders? *The Journal of Finance* 58(5): 2087–2108.
- McConnell, J. J.; Ozbilgin, M.; Wahal, S. (2001). Spin-offs, ex ante. *The Journal of Business* 74(2): 245–280.
- McNeil, C. R.; Moore, W. T. (2005). Dismantling internal capital markets via spinoff: Effects on capital allocation efficiency and firm valuation. *Journal of Corporate Finance* 11(1–2): 253–275.
- Miles, J. A.; Rosenfeld, J. D. (1983). The effect of voluntary spin-off announcements on shareholder wealth. *The Journal of Finance* 38(5): 1597–1606.
- Murray, L. (2008). Spin-offs in an environment of bank debt. *Journal of Business Finance & Accounting* 35(3–4): 406–433.
- Nanda, V.; Narayanan, M. P. (1999). Disentangling value: Financing needs, firm scope, and divestitures. *Journal of Financial Intermediation* 8(3): 174–204.
- Ozbek, O. V. (2020). The market success of corporate spin-offs: Do CEO external directorships, age, and their interactions matter? *American Business Review* 23(2): 241–259.
- Padmanabhan, P. A. (2018). Do demerger announcements impact shareholders wealth? An empirical analysis using event study. *Vision* 22(1): 22–31.
- Palmatier, R. W.; Houston, M. B.; Hulland, J. (2018). Review articles: Purpose, process, and structure. *Journal of the Academy of Marketing Science* 46: 1–5.

- Parrino, R. (1997). Spinoffs and wealth transfers: The Marriott case. *Journal of Financial Economics* 43(2): 241–274.
- Pearson, M. (1998). Spin-offs: Breaking up is hard to do. *Journal of Business Strategy* 19(4): 31–36.
- Rosenfeld, J. D. (1984). Additional evidence on the relation between divestiture announcements and shareholder wealth. *The Journal of Finance* 39(5): 1437–1448.
- Rovetta, B. (2006). Investment policies and excess returns in corporate spin-offs: Evidence from the US market. *Financial Markets and Portfolio Management* 20(3): 287–307.
- Schipper, K.; Smith, A. (1983). Effects of recontracting on shareholder wealth: The case of voluntary spin-offs. *Journal of Financial Economics* 12(4): 437–467.
- Schweizer, R.; Lagerström, K. (2020). Understanding a demerger process: The divorce metaphor. *Scandinavian Journal of Management* 36(1): 101095.
- Seifert, B.; Rubin, B. (1989). Spin-offs and the listing phenomena. *Journal of Economics and Business* 41(1): 1–19.
- Semadeni, M. (2015). Spin-offs. *Wiley Encyclopedia of Management* 3. <https://doi.org/10.1002/9781118785317.weom030089>.
- Semadeni, M.; Cannella Jr, A. A. (2011). Examining the performance effects of post spin-off links to parent firms: Should the apron strings be cut? *Strategic Management Journal* 32(10): 1083–1098.
- Seward, J. K.; Walsh, J. P. (1996). The governance and control of voluntary corporate spin-offs. *Strategic Management Journal* 17(1): 25–39.
- Slovin, M. B.; Sushka, M. E.; Ferraro, S. R. (1995). A comparison of the information conveyed by equity carve-outs, spin-offs, and asset sell-offs. *Journal of Financial Economics* 37(1): 89–104.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research* 104: 333–339.
- Thomas, S. (2002). Firm diversification and asymmetric information: Evidence from analysts' forecasts and earnings announcements. *Journal of Financial Economics* 64(3): 373–396.
- Thompson, T. H.; Apilado, V. (2010). Second-stage events and bondholder wealth. *Managerial Finance* 36(2): 103–121.
- Veld, C.; Veld-Merkoulova, Y. V. (2004). Do spin-offs really create value? The European case. *Journal of Banking & Finance* 28(5): 1111–1135.
- (2008). An empirical analysis of the stockholder–bondholder conflict in corporate spin-offs. *Financial Management* 37(1): 103–124.
- (2009). Value creation through spin-offs: A review of the empirical evidence. *International Journal of Management Reviews* 11(4): 407–420.
- Vijh, A. M. (1994). The spinoff and merger ex-date effects. *The Journal of Finance* 49(2): 581–609.

- Wheatley, C. M.; Brown, R. M.; Johnson, G. A. (2005). Line-of-business disclosures and spin-off announcement returns. *Review of Quantitative Finance and Accounting* 24(3): 277–293.
- Woo, C. Y.; Willard, G. E.; Beckstead, S. M. (1989). Spin-offs: What are the gains? *The Journal of Business Strategy* 10(2): 29–32.
- Woo, C. Y.; Willard, G. E.; Daellenbach, U. S. (1992). Spin-off performance: A case of overstated expectations? *Strategic Management Journal* 13(6): 433–447.
- Wruck, E. G.; Wruck, K. H. (2002). Restructuring top management: Evidence from corporate spinoffs. *Journal of Labor Economics* 20(S2): S176–S218.



Work–Life Balance, Supervisor Support, and Life Satisfaction in the Higher Education Sector

Ambreen Khursheed WANI

University of Kashmir, North Campus, Delina, Baramullah, Union Territory of J&K
e-mail: ambreen@kashmiruniversity.ac.in

Abstract. The study explores the relationship between work–life balance and supervisor support in the Indian higher education sector. More specifically, the study explores the effects of supervisor support on the work–life balance of female employees working in academia. We used online panel data comprised of 300 employees working in various universities, which we analysed by employing structural equation modelling. Results reveal that supervisor support is positively related to employee work–life balance and ultimately their life satisfaction. The findings also stress the importance of supervisor support for female employees, as its presence is a major boost in helping women reach the desired work–life balance. With the objective to augment work–life balance of women academicians, the work would guide managers as well as decision makers involved in the academic sector to implement women-friendly policies and programmes.

Keywords: work–life balance, supervisor support, academics, working women, higher education sector

JEL Classification: M1

1. Introduction

Most working Indians are not satisfied with their work–life balance. Among Indian professionals, most employees rate work–life balance from average to terrible (Basu, 2019). Working hours put in by Indian employees are among the world’s highest.¹

¹ National Statistical Office. (2021). Periodic Labour Force Survey [Ministry of Statistics and Programme Implementation]. Retrieved from: http://mospi.nic.in/sites/default/files/publication_reports/Quarterly_Bulletin_PLFS_April_June_2019_M_0.pdf.

The Indian education sector is the third largest in the world, behind only China and the United States.² Since 2001, India has witnessed an almost four-fold expansion in enrolments as well as institutions (Varghese, 2015). The number of students enrolled in numerous programmes run at various colleges and universities is a whopping 35.7 million.³ A major credit of this increase goes to privately owned institutions, especially in the post-1990 period. It is noteworthy that a booming service economy in developed countries tends to generate more jobs and income. However, this is only possible when there is a universal access to higher education that is able to bring every student into the system. Despite its size and potential, the higher education sector is notorious for its poor work–life balance. As a matter of fact, few academic researchers have focused on this sector. Therefore, it can be safely claimed that unless there is a mismatch between work demands and employees’ personal/family life, the future of the entire higher education sector could be at stake, further straining India’s already fragile economy.

Many previous studies have shown that supervisor support can play an important role in helping employees achieve work–life balance (Julein et al., 2011; Lucia-Casademunt et al., 2018; Talukder et al., 2018; Rashid et al., 2022). Supervisor support received at workplace tends to improve an employee’s work–life balance equation (Jang, 2009; Russo et al., 2016; Campo et al., 2021). In order to properly meet personal and professional commitments, supervisory support plays a crucial role through offering flexible work schedules and similar other adjustments (Latip and Amirul, 2022). Employees receiving adequate supervisor support find themselves in a conducive work environment. Therefore, they can easily devote themselves towards activities that promote better work–life balance.

Allowing employees to schedule their time for the competing demands of work- and home-related duties not only helps improve employee performance but also enhances their experienced work–life balance (Lazar et al., 2010; Koon, 2022). Indeed, the presence of a better work–life balance automatically implies the presence of positive work-related attitudes among workers. For example, providing flexible working hours to employees is linked to job satisfaction and organizational commitment, especially for those with family responsibilities (Namasivayam and Zhao, 2007). Satisfaction with work flexibility is positively associated with organizational commitment (Caillier, 2013), and reduced working hours create greater job satisfaction as well as organizational commitment (Scandura and Lankau, 1997).

2 Press Information Bureau (22 April 2019). India needs a world-class higher education system. Retrieved on: 23 February 2021, from PIB: <https://pib.gov.in/newsite/PrintRelease.aspx?relid=189828>.

3 Varghese, N. V. (2015). Challenges of massification of higher education in India. New Delhi: National University of Educational Planning and Administration.

Against this backdrop, women employees expect support at workplaces and support to enable them to cope with the various challenges and complexities of the home and work spheres (Budhwar and Debrah, 2013). It is important to understand that the coexistence of different role demands with limited support has many negative consequences; not only for women but also for the organizations they work in (Akintayo, 2010; Rehman and Waheed, 2012). Therefore, there is increasing attention and interest in how women manage work and life and the support they receive in doing so.

The present study was initiated by gaps in the existing work-life balance literature. First, it is noted that the subject of work-life balance has been extensively researched in the United States (e.g. Malone and Issa, 2013; Shanafelt et al., 2015; Guo and Browne, 2022). It is only quite recently that studies are being done to investigate this issue in other national contexts (Doherty and Manfredi, 2006; McGinnity, 2021). This clearly shows that the dominance of research studies performed within the United States has created a body of knowledge that lacks a link and context with other countries. Those trying to understand this topic outside the United States often find a conflicting and disconnected understanding of the interplay of work and life within their cultural context (Poelmans et al., 2013; Brown and Faerman, 2021). Secondly, previous research has focused on personal as well as institutional predictors of work-life balance. However, the influence of supervisor support on work-life balance has been examined by many past researchers. To shed more light on this issue, it is important to theorize and identify the mechanisms through which supervisor support plays a role in helping employees reach equilibrium. Additionally, past work has investigated several subsequent outcomes of work-life balance (e.g. job satisfaction, low turnover, work engagement, better time management, better quality of life, increased job performance, life satisfaction, etc.), but the influence of better time management, quality of life, job performance, and their subsequent effects on life satisfaction has not been fully evaluated. To clarify this issue, it is important to theorize and identify the interplay between all the above components. In this study, a conceptual model (see *Figure 1*) is formulated to investigate the same. By empirically testing the relationships in our model, the researcher intends to contribute to the existing body of knowledge.

The research contributes to the existing literature in several ways. Firstly, several theoretical perspectives that link supervisory support to work-life balance (WLB) outcomes have been presented. Moreover, insights from social support theory (Pierce et al., 1991; Perrin and McDermott, 1997; Lakey and Cohen, 2000) helped make a distinction between various constructs of supervisory support and employee WLB. It can also be concluded from the literature review of social support and human resource (HR) practices that supervisor attitude and HR practices can heavily influence employee's work outcomes (Batt and Valcour, 2003; Weyant et al.,

2021; Hari and Vaithianathan, 2022). Despite evidence of the association between supervisor support and WLB (Rahim et al., 2020; Campo et al., 2021), not many studies have been done in the field of higher education, particularly in the Union Territory of Jammu and Kashmir (India). The present study addresses this gap.

The purpose of this study is to contribute to the conceptualization of life satisfaction in the relevant research by examining its relationship with work–life balance, which may hold a key to better life satisfaction. It should be noted that work–life balance has attracted considerable attention in the industrial and academic sectors; however, its relationship with life satisfaction has not been studied much. A good work–life balance has been shown to be a predictor of positive outcomes in employees’ work and life domains; life satisfaction is one such important outcome (Wahyuni and Rahmasari, 2022). In this regard, there is a need to understand its direct effects and relationship with work–life balance.

The number of important findings in this area (esp. in this unique socio-geographic region) seems quite modest. Links between the concept of work–life balance and the community under study appear to be highly limited. The article attempts to bridge this gap. Section 2 of the paper presents the latest perspectives in this field of study along with the development of a conceptual model. Section 3 discusses the theory and hypotheses of the study. Methodology is discussed in section 4. The results are discussed in section 5. Finally, Section 6 concludes the paper with limitations, implications, and scope for further research.

2. New Perspectives and Conceptual Model

The COVID-19 pandemic has affected everything. The future trend of supervisory support that employees receive will be based on how well organizational policies improve and strengthen this relationship. The importance of managerial support on employee job satisfaction cannot be overestimated and has been well documented in many studies (Ko et al., 2013; Riyanto et al., 2021; Crucke et al., 2022). Therefore, organizations need to understand that if they want to create healthy WLB for their teams, they need to heavily focus on employees in supervisory role in the workplace and analyse the same in the light of COVID-19 developments.

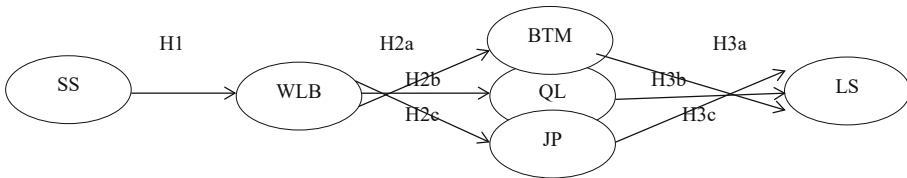
Training supervisors to be more supportive of family-friendly policies has a positive impact on organizational culture (Chenot et al., 2009). It is important to note that the pandemic has changed the paradigm from the worker who is available 24/7 and is willing to sacrifice personal life for work to the “classic corporate warrior” worker who seeks a supportive work environment, i.e. a “balanced framework worker”.

Perceived uncertainty caused by the pandemic was found to be negatively related to supervisory support, a study of university employees during the outbreak

indicated (Campo et al., 2021). However, many studies re-emphasized that during trying times such as the COVID-19 disease outbreak, supervisory or managerial support can go a long way in helping employees maintain a healthy WLB (Contreras et al., 2020; Nabawanuka and Ekmekcioglu, 2021; Vyas, 2022).

The post-pandemic world has evoked debates, speculations, and ambiguity on how futuristic supervisory roles will look like. Organizations need to carefully study the post-pandemic paths and remodel supervisory roles in the light of creating connection between WLB and the “new normal” at workplaces.

To investigate this further, a conceptual model (see *Figure 1*) has been developed to examine the relationship between work–life balance and supervisor support. The model has been justified as well as rationalized in the study. By empirically testing this model, the present study contributes to the existing body of knowledge in this field.



Note: SS = Supervisor Support, WLB = Work–Life Balance, BTM= Better Time Management, QL= Quality of Life, JP = Job Performance, LS = Life Satisfaction

Figure 1. Hypothesized model

3. Theory and Hypothesis

George Homans’s Social Exchange Theory suggests that perceived supervisor support has a positive effect on employees’ work–life balance. In his theory, Homans (1958) promoted “social behavior as exchange” (p. 606) and described the theory as one of the oldest theories of social behaviour. Because desired behaviours at work are usually implemented in response to the employee’s receiving support from the supervisor, they fall within the purview of Homans’s remarkable theory. This provides an argument for a direct relationship between employees’ organizational support and work–life balance because social exchange processes are involved in the establishment and maintenance of employee–employer relationships. Theoretically, if organizations assist individuals in managing the domains of work and life, effects will be realized in better work–life balance experienced by employees specifically, decreased work–family conflict, role conflicts, etc.

Work–Life Balance

Coined in 1986, the term work–life balance nowadays finds its usage in everyday corporate language. Work–life programmes are not new to organizations. They existed as early as in the 1930s. Before World War II, the W. K. Kellogg Company replaced the traditional three eight-hour shifts with four six-hour shifts. The new changes resulted in increased employee morale and efficiency (Lockwood, 2003).

Work and life used to be integrated in pastoral and agrarian societies. However, the industrial revolution changed this. These sectors began to have their own needs, often conflicting with each other. Hence, the demand for some balance was felt and especially raised by women employees (Jones, 1996). The expression work–life balance was first used in the mid-1970s to describe the balance between an individual’s work and personal life (Newman and Matthews, 1999). Some 50 years ago, Kanter (1977) talked about the “myth of separate worlds” and called attention to the reality that work and home are unavoidably linked. It should be noted that interest in work–life balance has grown in many quarters over the past 15 years, especially in press, government management, and employee representatives (Cabrera, 2018).

Work was not broadly divided on the basis of gender until the arrival of knowledge industry. As this industry did not require performance based on physical capabilities, as was previously required in factories and farms, women started entering like never before. This fact coupled with changes in the marital patterns and increase of smaller families resulted in increase in the number of working women (Grossman, 1981). Ismail and Ahmed (1999) observed that women’s employment poses unavoidable challenges to women themselves besides their household and society by and large. Women face challenges in terms of work interference with family roles, attainment of economic and gender equality with respect to men besides many other similar issues. This creates strain and role overload for them due to which women are not able to fulfil so many role demands and obligations adequately. Although multiple roles help in self-enhancement in terms of increased skills and better self-esteem, the pressures they create cannot be overlooked (Vasumathi and Prithi, 2018).

Organizational support certainly helps an employee achieve a better blend of professional and personal activities. According to research by Ainapur et al. (2016), strong and inclusive organizational policies have a positive relationship with work–life balance. Ahemad and Chaudhary (2013) concluded that successfully achieving work–life balance will ultimately lead to a more satisfied workforce that will contribute to workplace productivity and success. This requires the introduction of flexible timings, maternity leave, child care, pick and drop, special leaves for women (Wani and Gul, 2014; Balamurugan and Thendral, 2016).

Supervisor Support

Supervisors can provide support in form of leaves, sabbaticals, child care, remote working, etc., which will alleviate employee strain coming from the incompatible quarters of work and family. Supervisors can help by providing child care and related benefits especially to women and employees without a proper family support (Kossek and Nichol, 1992; Talukder and Galang, 2021). Scholars have confirmed the importance of supervisors' work-/family-specific support in reducing family conflict experienced by workers (Goh et al., 2015). Supervisor support driven by family-friendly benefits elicits job satisfaction, organizational commitment, and reduced turnover (Allen, 2001). Employees show greater willingness to stay with organizations that believe in supervisors' employee care in terms of looking after their family needs and similar other issues. Substantial empirical support has been received by all such arguments.

This paper addresses the issue of what characterizes the relationship between supervisor support and life satisfaction, focusing on the work–life balance of female employees. What does ultimately happen to life satisfaction when we continuously try to make improvements in all other domains preceding it? The paper strongly argues that studying a person's engagement in key areas of work and life can yield substantial gains in understanding this relationship.

Research Question: How does supervisor support lead to life satisfaction?

Supervisor Support and Work–Life Balance

The role and importance of supervisor support has been extensively reviewed in the literature (Rathi and Lee, 2017). Supervisory support in terms of work schedule flexibility, workplace support, etc. helps workers to put in more effective efforts at the workplace (Jang, 2009; Zhang and Bowen, 2021). The Social Exchange Theory (Homans, 1958) proposes that persons who give something to others also try to get something from them. This creates a balance in exchanges and tends to lead towards equilibrium. Therefore, support at work can contribute towards the creation of a healthy exchange where one party shows care for employees and the other party manages their work commitments better. This certainly builds a more balanced life where women employees encounter fewer work–family conflicts. In this light, it is proposed that:

H1. Supervisor support will positively influence work–life balance among the working women.

Work–Life Balance and Better Time Management

Time management is one of the most studied parameters in work–family research, and many studies report positive relationships between work–life balance and time management (Michel et al., 2014; Usmani, 2021). Several researchers have stressed that ill time management can prove an occupational stressor disturbing work–life balance (Fisher, 2002). The literature confirms the possibility of a positive relationship between work–life balance practices and employees’ time management (Mani, 2013). Past research indicates that having too many tasks to accomplish and an inability to manage time can cause work–family conflict (Balaji, 2014). Examples include time management grid theory (Harris, 2008), multiple resources theory (Wickens, 2017), and Covey’s time management grid (Covey, 2013). These theories confirm that individuals who get positive feelings about their work–life balance often have better time management skills. Women who experience poor work–life balance may also find the juggle between multiple roles and responsibilities quite challenging (McGee-Cooper and Trammell, 1993; Reverberi et al., 2021).

It is therefore hypothesised that:

H2a. Work–life balance will positively relate to better time management.

Work–Life Balance and the Quality of Life

The integrative quality of life (IOQL) theory (Ventegodt et al., 2003) suggests that satisfaction with life, happiness, meaning in life, fulfilment of needs, and the biological information system (balance) will lead to a better quality of life. Balance is also one important ingredient towards attaining this attribute (Sirgy et al., 2008). According to the WLB perspective, individuals who could effectively combine work and family roles experienced a higher quality of life than those who could not find this balance (Greenhaus et al., 2003; Su and Zabilski, 2022). Better quality of life is thus achieved through a better balance as well. When women perceive a control over their work and family spheres, they get positive feelings of involvement and satisfaction. Indeed, work–life balance can be seen as an important part of a broader focus on an individual’s quality of life. Therefore, it is proposed that:

H2b. Work–life balance will positively relate to quality of life.

Work–Life Balance and Job Performance

Job performance is considered one of the leading indicators of a better work–life balance experienced by employees (Rego, 2009; Puspitasari and Darwin, 2021; Borgia et al., 2022). Work and family roles are among the most important ones in a person’s life, and any conflict between the two can lead to a lot of dissatisfaction in

life. Poor job performance can not only create issues at work but also unhappiness at the home front. Research has shown the subjective and behavioural impact of better work–life balance on the individual’s desire to contribute positively towards an organization’s productivity (Leitão et al., 2019). Balanced employees endure stress presumably because they are able to experience a feeling of making a positive contribution towards organizational performance. Additionally, balanced individuals experience job satisfaction, a greater sense of job security, and better control over work life (Garg and Rani, 2014). A balanced engagement with work and family is more likely to be associated with better work engagement, creativity, retention, and productivity (Lazar et al., 2010). Therefore, it is proposed that:

H2c. Work–life balance will positively relate to job performance.

Better Time Management and Life Satisfaction

Time management research in industrial and organizational psychology has shown its positive effect on perceived control over time, health, and job satisfaction (Claessens et al., 2007; Gholipour et al., 2022). According to Macan et al. (1990), people who had control over their time reported better performance and greater life satisfaction. Time management behaviours, often understood as time control, have direct and indirect relationships with the work–family interface (Adams and Jex, 1999). Although the relationship between time management and life satisfaction has been the subject of much debate, it is hypothesised that this connection is linked to the concepts of Demirdağ (2021). Time management was a predictor of life satisfaction. Conversely, poor time management will have a negative impact on life satisfaction levels. Therefore, it is proposed that:

H3a. Better time management will positively relate to life satisfaction.

Quality of Life and Life Satisfaction

Life satisfaction and happiness are interrelated; self-fulfilling, happier, and less depressed individuals are more satisfied with life (Schütz et al., 2013). Happy employees are more likely to be open-minded, creative, and content. Those who are happier also have the spirit of seeking more opportunities. This makes such people successful in various fields of life. Quality of life (work and non-work) serves as an important antecedent to life satisfaction (Erdogan et al., 2012; Geprägs et al., 2022). Thus, employees’ QL may have a strong influence on their LS. When employees do not enjoy a good quality of life, there may be spillover effects on LS. Employees with a better quality of life may enjoy a better satisfaction with life; employees with a poor quality of life may be dissatisfied with life as well. As such, it is predicted that:

H3b. Employees’ quality of life will positively relate to employees’ life satisfaction.

Job Performance and Life Satisfaction

Motowildo et al. (1997) suggest that job performance includes task as well as contextual performance. All relationships between life satisfaction and performance measures are statistically significant (Jones, 2006). There is a positive relationship between job performance and life satisfaction (Judge and Hulin, 1993; Bernales-Turpo et al., 2022). Previous research has clearly shown that employees with better performance levels are more likely to be satisfied with their lives. Better performance is inversely related to stress. Therefore, such employees are able to perform better. A happy worker is a productive worker not only because s/he will be better committed to working harder at work, but also because s/he is generally satisfied with life (Wright and Cropanzano, 2000). Therefore, it is proposed that:

H3c. Employees' job performance will positively relate to employees' life satisfaction.

4. Method

The data obtained was analysed using quantitative analysis. Quantitative data were entered into statistical software (SPSS version 22), and various tests were run, including confirmatory factor analysis (CFA) and structural equation modelling (SEM). Factor analysis was also performed to reduce the data to a meaningful size. Correlation analysis was used to test the direction of relationship between the independent variables and the dependent variable.

Data Collection

Data was collected through an online survey of women employees working in various universities and colleges across Jammu and Kashmir (J&K) between October 2020 and February 2021. Online data collection simplifies data transfer into a database for analysis besides protecting against data loss (Carbonaro and Bainbridge, 2000). The participation was voluntary. The survey took approximately 15-20 minutes to complete. A final sample of 205 responses was obtained, out of which 25 responses were removed due to providing incomplete data. This resulted in a final sample of 180 participants. Most participants were married (66%) and under the age of 50 (see *Table 1*). Established WLB scales were used to obtain survey questions. Revisions were performed to make the scales relevant for women employees working in academics.

Table 1. Demographic profile of the sample

Variables	Number	Percentage (%)
Age		
21–30	21	12
31–40	83	46
41–50	39	22
51–60	31	17
Above 60	6	3
Area of Posting		
Urban	124	69
Rural	56	31
Marital Status		
Single	46	25
Married	129	72
Separated/Divorced	5	3
Number of Children		
None	29	16
1	26	14
2	113	63
2 <	12	7
Designation		
Assistant professor	90	50
Associate professor	49	27
Professor	15	8
Administration	26	14
Institute Where Employed		
University	126	70
College	54	30

Note: N = 180.

Measurement Scales

A 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used. Unless otherwise indicated, the higher the score, the higher the degree of each construct.

Supervisor support. The supervisory scale was measured with five items, some of which being: “My supervisor tries to meet my needs.”; “My supervisor knows me well enough to know when I have concerns about residential care.”; “My supervisor makes time to listen to me” (McGilton, 2010). Some other items were: “I look forward to supervision.” and “I feel my stress was reduced” (Fukui et al., 2014).

Work–life Balance. WLB is defined as good performance and satisfaction at work as well as at home with minimal role conflict (Clark, 2000). WLB was measured

with five items: The first item was “My personal life suffers because of work” (Hayman, 2005). The next two items were: “I often neglect my personal needs because of the demands of my work.” and “When I am at work, I worry about things I need to do outside work” (Fisher-McAuley et al., 2003). The last two items were: “I currently have a good balance between the time I spend at work and the time I have available for non-work activities.” and “Overall, I believe that my work and non-work life are balanced” (Brough et al., 2009).

Better Time Management. Time management is the process of planning the time one spends on their activities (Crutsinger, 1994). This was measured with five items: “I set deadlines for myself when I set out to accomplish a task.”; “I set priorities to determine the order in which I will perform tasks each day.”; “My workdays are too unpredictable for me to plan and manage my time to any great extent.”; “During a workday, I evaluate how well I am following the schedule I have set down for myself.”; “I finish top priority tasks before going on to less important ones” (Macan et al., 1990).

It is important to mention that the Time Management Behaviour Scale (TMBS) developed by Macan et al. (1990) originally had 33 items. To enhance the applicability as well as administration of the measure, a content validity study was conducted by a panel of experts. After thorough analysis and feedback from the panel, it was determined that a shortened version of the scale should contain the most appropriate five statements. Considering the nature of the study, these five items were found to be better indicators than others.

Quality of Life. Quality of life has been defined “as the satisfaction of an individual’s values, goals and needs through the actualization of their abilities or lifestyle” (Emerson, 1985: 282). QL was measured with five items using the Flanagan Quality of Life Scale (Flanagan, 1978). The five items were: “I am physically fit and vigorous.”; “My relationships with my parents, siblings, and other relatives are good.”; “I am able to socialize.”; “I participate in organizations and public affairs.”; “I participate in active recreation.”; “I have close friends.”

Job Performance. JP can be defined as the overall expected value from employee behaviour that is performed over a specified period of time (Motowildo et al., 1997). JP was measured with five items from Trifiletti et al’s (2009) Proactive Personality Scale. It must be noted that proactivity is a dispositional construct in which individuals are differentiated by the degree to which they act to change their environment to achieve effective performance (Bateman and Crant, 1993). Proactive employees try to persevere until desired changes are achieved in organizational settings. Therefore, proactive personality type is a predictive objective measure of job performance (Crant, 1995; Thomas et al., 2010). Taking this view into account, Trifiletti et al’s (2009) Proactive Personality Scale was considered appropriate.

Proactive personality job performance scale questionnaire: “Wherever I have been, I have been a powerful force for constructive change.”; “Nothing is more exciting than seeing my ideas turn into reality.”; “No matter what the odds, if I believe in something, I will make it happen.”; “I excel at identifying opportunities.”; “I am always looking for better ways to do things.”

Life Satisfaction. LS is the fulfilment of essential conditions and the attainment of a desired end (Wolman, 1973). LS was measured with five items of the Satisfaction with Life Scale by Diner et al. (1985). The five items were: “In most ways, my life is close to my ideal.”; “The conditions of my life are excellent.”; “I am satisfied with my life.”; “So far, I have gotten the important things I want in life.”; “If I could live my life over, I would change almost nothing.” (Slocum-Gori et al., 2009).

It should be noted that both quality of life and life satisfaction are considered important for achieving a healthy and productive lifestyle (Anand and Arora, 2009). However, many a time, the concepts are equated – creating confusion. Life satisfaction is an overall assessment of one’s feelings and attitudes about life at a particular point in time, ranging from negative to positive (Buetell, 2006), whereas quality of life is a general and constant state of well-being (Zullig et al., 2005).

Factor Analysis – An Assessment

Factor analysis was performed using varimax rotation. All measurement items were entered, and factors with Eigenvalues > 1 were extracted from all survey items. The extracted factors accounted for 68% of the variance. The variance inflation factor (VIF) scores below 3 and tolerance statistics above 0.3 indicated that there were no multicollinearity problems.

Table 2. *Reliability and correlation analysis*

Variables	Mean	SD	1	2	3	4	5	6
1. SS	4.87	1.31	(0.91)					
2. WLB	4.19	1.83	0.555**	(0.93)				
3. BTM	4.63	1.92	0.271**	0.413**	(0.92)			
4. QL	4.03	1.73	0.283**	0.417**	0.552**	(0.91)		
5. JP	4.63	1.13	0.348**	0.344**	0.558**	0.348**	(0.89)	
6. LS	5.65	0.78	0.126**	0.279**	0.336**	0.320**	0.356**	(0.91)

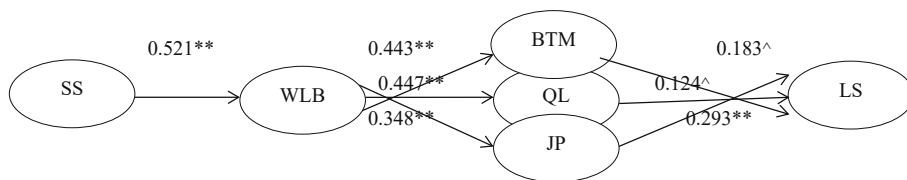
Notes: ** p < .001. Figures in parentheses on the diagonal are coefficient alphas.

Confirmatory Factor Analysis

CFA was applied to test the scales used in this study. The model was tested using SEM. AMOS 21 with maximum likelihood extraction method was applied. However, a confirmatory factor analysis was conducted to assess the fit of the measurement model prior to testing. For the constructs used in the study, Cronbach's alpha ranged from 0.89 to 0.93 (see *Table 2*). The range exceeded the recommended cut-off value of 0.70 (Nunnally and Bernstein, 1978). The fit of the overall measurement model was examined using various indices such as the Tucker–Lewis Index (TLI), Incremental Fit Index (IFI), Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI). For a reasonable model fit, the values of TLI, IFI, and CFI should be above 0.90 and RMSEA below 0.08. A six-factor measurement model was estimated for constructs such as supervisor support, work–life balance, better time management, quality of life, job performance, and life satisfaction. The χ^2 value for the model was 391.171 with 291 df ($p < 0.001$), with RMSEA = 0.061, TLI = 0.977, IFI = 0.971, and CFI = 0.971 (Bentler and Bonett, 1980; Browne, 1993). This clearly indicates an acceptable model fit, as all fit indices are within the recommended range.

Results

The analysis and findings supporting the proposed hypothesis are presented in *Figure 2*.



Notes: ** $p < 0.001$, ^ $p < 0.04$.

Figure 2. Path diagram of the structural model

The structural model shown in *Figure 2* was tested, and model adequacy was assessed by examining the model fit indices (see *Table 3*).

Assessing model fit requires testing a range of fit indices. A normal chi-square ratio is 1.728, and the value falls within the recommended range of 1 to 2. GFI and AGFI values were slightly below the acceptable limit, as they do not exceed the threshold value of 0.9. However, as suggested by Baumgartner and Homburg (1996), they can still be accepted if values are above 0.8. RMSEA is also considered

satisfactory at 0.061, in line with the recommendation of Browne (1993). Therefore, the overall results show that the model can be considered appropriate.

Table 3. *Fit indices for the proposed model*

Fit Indices	Proposed Model
Chi-square	391.118
Degrees of freedom (df)	291
Normed chi-square (CMIN/df)	1.728
p-value	<0.001
Root-Mean-Square Error of Approximation (RMSEA)	0.061
Goodness-of-Fit Index (GFI)	0.899
Adjusted Goodness-of-Fit Index (AGFI)	0.875
Comparative Fit Index (CFI)	0.976
Tucker–Lewis Index (TLI)	0.987
Incremental Fit Index (IFI)	0.907

It is pertinent to mention that the model does not measure the direct effects of SS and WLB on LS or of SS on BTM, QL, and JP. This has been done because of the assumption of independence among these dimensions. One of the strengths of SEM is the ability to test models that represent a complex set of theoretical hypotheses without impairing model fit. This economy with dimensions is not offered by classical path model or other regression models. Thus, SEM was considered the best choice.

Table 4. *Latent variables and Squared Multiple Correlations (SMCs)*

Latent Variables	SMCs
WLB	0.266
BTM	0.174
QL	0.199
JP	0.252
LS	0.182

Table 4 shows Squared Multiple Correlations (SMCs) being used for assessment. The model explains 18.2% of variance in employees' life satisfaction. Remarkably, the highest SMC is observed for WLB at 0.266. This suggests that SS alone helps explain 26.6% of the variance of WLB.

The results from Table 5 provide support for all proposed hypotheses. It should be noted that to test the proposed model link, summated scores were created by averaging the corresponding items for all six variables. Clearly indicated by a positive relation between SS and WLB ($\beta = 0.521$, $p < 0.001$), better SS for employees would in turn lead to better WLB. WLB is positively linked to BTM

($\beta = 0.443$, $p < 0.001$), QL ($\beta = 0.447$, $p < 0.001$), and JP ($\beta = 0.348$, $p < 0.001$). Results also show that WLB has the greatest impact on QL. Variables such as BTM, QL, and JP showed a positive association with LS. The strongest link was observed between JP and LS ($\beta = 0.293$, $p < 0.001$).

Table 5. Hypothesis test results

Direct Effects	Path Coefficient	t-value	p-value	Results
SS → WLB (H1)	0.521	10.329	< 0.001	Supported
WLB → BTM (H2a)	0.443	8.983	< 0.001	Supported
WLB → QL (H2b)	0.447	9.973	< 0.001	Supported
WLB → JP (H2c)	0.348	7.512	< 0.001	Supported
BTM → LS (H3a)	0.183	2.954	0.031	Supported*
QL → LS (H3b)	0.124	2.665	0.011	Supported*
JP → LS (H3c)	0.293	4.643	< 0.001	Supported

Note: * Hypothesis supported at $p < 0.04$.

5. Discussion

The main objective of the study was to examine the effects of SS on employees' WLB through a test model. Therefore, a conceptual model containing predictors and outcomes was tested regarding WLB of women working in the higher education sector of Jammu and Kashmir. Many findings add to the existing literature. First, the results of this work suggest that supervisory support received at work (Greenhaus et al., 2012) can play an important role in the achievement of WLB for employees. There are many types of support that can be offered at the workplace. However, in this study, a supervisor who makes time to listen to his/her employees, tries to meet their needs, and shows concern about similar other issues can have a huge impact on their WLB.

Second, the findings reveal that WLB bears a positive relationship with BTM, QL, and JP. Several studies (e.g. Greenhaus et al., 2003; Michel et al., 2014; Rego, 2009) have investigated the impact of better time management, quality of life, and job performance on work–life balance. This research work reiterates the same. Conversely, any incompatibility between work and family roles reduces the well-being of workers, especially of working parents (Davies and McAlpine, 1998). Commuting between work and the family environment can create a lot of challenges for the employees. The notion of work not interfering with family and vice-versa is quite invalid and obsolete. Only those organizations are able to generate positive attitudes among their workers where supervisors are ready to help employees strike a balance between the two opposing worlds they are a part of. The good news is that this intervention does not always require expensive HR plans and strategies.

Support for all hypotheses was received indicating that productive, satisfied, and efficient employees displayed higher levels of LS. This positive relationship between BTM and LS is supported by Macan et al.'s (1990) findings. Similarly, Hypothesis H2b was also supported, and many researchers reported a strong correlation between QL and LS (Erdogan et al., 2012; Yildirim et al., 2013).

The strongest link to LS was of JP at $\beta = 0.293$, thus providing further support to findings of Duckworth et al. (2009) that there is a positive relationship between the two. The results show that despite the many other factors that contribute to life satisfaction, the importance of performing well at work is critical to enjoying life satisfaction. This argument is supported by Feyerherm and Vick's (2005) study that strongly concludes that women, especially Generation X women, are changing the whole idea of priorities. For them, personal fulfilment was closely related to their professional success. Therefore, they expect their supervisors to support, guide, mentor, and develop them so they can attain a healthy WLB.

It is important to note that the findings of the study are from a sample of a developing country: India. Therefore, the results may not always be generalized in developed countries. Power distance between supervisor and subordinate is present in all societies; however, this phenomenon is more pronounced in a society like India (Sriramesh, 2013). The findings have many local, regional, and cultural undertones especially with regard to women. Considering the fact that the study has been conducted amongst women academicians of J&K (India), its context is also a novel one. Therefore, the current study contributes to the work–life balance literature by providing an understudied as well as a non-Western perspective.

Studies have emphasized the critical role of supervisors in responding to work–life imbalances. This imbalance is buffered when supervisors support their employees. The present findings clearly indicate that in the context of female employees, supervisory support is an important work-related resource. Our findings are consistent with previous research such as Ling Suan and Nasurdin (2016) and Jolly et al. (2021), who highlighted the importance of instrumental support that supervisors provide to employees in reaching their work goals and meeting family demands.

Interestingly, the results of the study showed that the relationship between supervisor support and gender was a typical one, with women expecting more from supervisors than men. An incompatible orientation between the two may weaken a woman's work commitment. Compounding this situation is that women in India are expected to be driven by a sense of nurturing and communal goals (Chadda and Deb, 2013).

As already mentioned, this study highlights the important role of supervisory support in helping working women achieve the desired work–life balance. Applying this information, academic institutions must sensitize themselves

towards improvement in their dealing with female workforce. This can be highly facilitated by proper supervisory support.

It is worth noting that the findings of the present study came from a non-Western perspective. However, several comparisons can be made with studies conducted in the West on this topic. The significant relationship between work–life balance and BTM, QL, and JP is consistent with the socio-cultural context findings, e.g. Greenhaus et al's (2003) research in the West and Goyal and Babel's (2015) study in India. The significant relationship between SS and LS is consistent with earlier research conducted in a Western context (Duckworth et al., 2009).

The results of studies conducted in affluent Western countries cannot be generalized in most cases to developing countries. This is due to local, regional, cultural, and economic factors that have to be taken into account when generalizing the results. Therefore, the findings of this study cannot be generalized to occupational groups, cultures, and female employees worldwide. There is still a universal application of the study in terms of homogeneity in the problems faced by women all over the world. This study provides a non-Western perspective on the relationship between supervisory support and work–life balance of working women.

6. Limitations, Implications, and Scope for Further Research

No study is without limitations. Still, the results of this work can propel future research in this area. First, the data were collected from a single source. Had multiple sources been used, the conclusions could have carried more weight. Response biases, such as self-presentation, may exist because all variables were self-reported at only one point in time. In order to reduce single-source bias, adequate steps (following Avolio et al., 1991) were taken. Moreover, the design of the study is non-experimental. Thus, a direct investigation of causality is not possible. In order to mitigate the study limitations, a systematic replication of this work in different samples using different measures would be useful for generalization. Another shortcoming is that no mediators have been considered in the study model. Nonetheless, it is recognized that other variables, such as individual factors, non-work as well as environmental factors, may play a role in explaining the relationship between SS, WLB, and LS. Finally, the data used in the research was compiled from J&K, India. The Western world and Asian cultures have idiosyncratic values, which may greatly differ. Therefore, findings should not be generalized without first determining the cultural context. This is especially important with reference to women, as the treatment they receive may

vary from culture to culture. It would be interesting to replicate this study in other cultures as well.

Forthcoming research could be aimed at looking into WLB in a more integrated manner. Therefore, investigating WLB along the lines of life enrichment and satisfaction could provide a deeper understanding of this concept to all stakeholders (employees, families, organizations, etc.). An examination of life satisfaction and its relationship with WLB could also assist understanding in terms of creating new theories as well as perspectives.

The results also suggested several additional possibilities for research in future. Further analysis of SS and its different dimensions may provide better and deeper insights into the role it plays in helping employees achieve the desired WLB. An additional inquiry is necessary to increase the validity (internal and external) of the present findings. The shortcomings of the cross-sectional design used in the study can be improved by a longitudinal design. Further, concerns about common method variance can be addressed by using multiple sources of data.

SS is of utmost importance since it is related to several outcomes, including the WLB, QL, LS, etc. of employees. The results of this work suggest that managers can improve WLB, BTM, QL, and JP and increase employee LS through better SS. Managers today are becoming more wary of work–life balance issues than their predecessors. Their efforts aim to improve connections between the domains of work and life by improving employees' job-related skills, networks, and coping strategies – this is supported by relevant research. This piece of enquiry reveals that SS along with WLB will have an important and positive impact on employees' LS. These findings are particularly relevant for the education sector, which has recently become a high-stress sector for its employees in Jammu and Kashmir (India) and elsewhere. Therefore, it is noteworthy that SS has a positive effect on WLB, BTM, QL, and JP and ultimately on employees' LS.

In conclusion, this study examined the relationship between SS and LS through WLB, BTM, QL, and JP. This research fills a gap by building on theories like George Homans's Social Exchange Theory, Time Management Theory, Multiple Resources Theory, IOQL theory, etc. to examine the ultimate relationship between SS and LS. According to these theories, much of an individual's social life involves interactions between individuals (corporate actors in this case). Organizations can be viewed as social exchanges where supervisory support can result in better work engagement and sense of control over time. Employees and supervisors must be viewed as two critical resources that, if they work in harmony, can alleviate all kinds of negative emotions at work. Recognition and effective management of a worker's socio-emotional needs results in the improvement of his/her quality of life.

This puts us in a better position to answer our research question: "How does supervisor support lead to life satisfaction?" It seems that SS does provide support

that has been related to employees' LS in the education sector of J&K (India) for a long time.

Ethical Approval

All ethical guidelines were followed. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national). Informed consent was obtained from all participants for being included in the study. This article does not contain any studies with animal subjects performed by any of the authors.

Informed Consent

The participants have consented to the submission of the case report to the journal.

References

- Adams, G. A.; Jex, S. M. (1999). Relationships between time management, control, work–family conflict, and strain. *Journal of Occupational Health Psychology* 4(1): 72.
- Ahemad, M.; Chaudhary, A. (2013). A review of quality of work life balance for women employees (A case study of working women in academics). *International Journal of Trends in Economics Management and Technology (IJTEMT)* 2(1).
- Ainapur, P.; Vidyavathi, B.; Kulkarni, K.; Mamata, P. (2016). Work–life balance policies, practices and its impact on organizational performance. *International Journal of Latest Technology in Engineering, Management & Applied Science (IJLTEMAS)* V(VII): 11–21.
- Akintayo, D. I. (2010). Work–family role conflict and organizational commitment among industrial workers in Nigeria. *Journal of Psychology and Counseling* 2(1): 1–8.
- Allen, T. D. (2001). Family-supportive work environments: The role of organizational perceptions. *Journal of Vocational Behavior* 58(3): 414–435.
- Anand, M.; Arora, D. (2009). Burnout, life satisfaction and quality of life among executives of multinational companies. *Journal of the Indian Academy of Applied Psychology* 35(1): 159–164.
- Avolio, B. J.; Yammarino, F. J.; Bass, B. M. (1991). Identifying common methods variance with data collected from a single source: An unresolved sticky issue. *Journal of Management* 17(3): 571–587.

- Balaji, R. (2014). Work life balance of women employees. *International Journal of Innovative Research in Science, Engineering and Technology* 3(10).
- Balamurugan, G.; Thendral, L. M. (2016). A study on reason behind work–life imbalance for women at IT and BPO in around Trichy. *International Journal of Human Resource Research Review* 4(3): 158–164.
- Basu, S. D. (2019). 60% working Indians rate work–life balance from average to terrible: Monster.com survey. *The Economic Times*.
- Bateman, T. S.; Crant, J. M. (1993). The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior* 14(2): 103–118.
- Batt, R.; Valcour, P. M. (2003). Human resources practices as predictors of work–family outcomes and employee turnover. *Industrial Relations: A Journal of Economy and Society* 42(2): 189–220.
- Baumgartner, H.; Homburg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing* 13(2): 139–161.
- Bentler, P. M.; Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin* 88(3): 588.
- Bernales-Turpo, D.; Quispe-Velasquez, R.; Flores-Ticona, D.; Saintila, J.; Ruiz Mamani, P. G.; Huancahuire-Vega, S.; Morales-García, W. C. (2022). Burnout, professional self-efficacy, and life satisfaction as predictors of job performance in health care workers: The mediating role of work engagement. *Journal of Primary Care and Community Health* 13: 21501319221101845.
- Borgia, M. S.; Di Virgilio, F.; La Torre, M.; Khan, M. A. (2022). Relationship between work–life balance and job performance moderated by knowledge risks: Are bank employees ready? *Sustainability* 14(9): 5416.
- Brough, P.; O’Driscoll, M. P.; Biggs, A. (2009). Parental leave and work–family balance among employed parents following childbirth: An exploratory investigation in Australia and New Zealand. *Kōtuitui: New Zealand Journal of Social Sciences Online* 4(1): 71–87.
- Brown, H.; Kim, J. S.; Faerman, S. R. (2021). The influence of societal and organizational culture on the use of work–life balance programs: A comparative analysis of the United States and the Republic of Korea. *The Social Science Journal* 58(1): 62–76.
- Browne, M. W.; Cudeck, R.; Bollen, K. A.; Long, J. S. (eds.). (1993). *Alternative ways of assessing model fit. Testing structural equation models*. London: SAGE.
- Budhwar, P. S.; Debrah, Y. A. (2013). Human resource management in Pakistan. In: *Human Resource Management in Developing Countries*. Routledge. 122–140.
- Buetell, N. (2006). Life satisfaction, a sloan work and family encyclopedia entry. *Sloan Work–Family. Encyclopedia*.

- Cabrera, E. (2018). From subjection to dispossession: Butler’s recent performative thought on Foucault’s latest work. *CLCWeb: Comparative Literature and Culture* 20(4): 8.
- Caillier, J. G. (2013). Satisfaction with work–life benefits and organizational commitment/job involvement: Is there a connection? *Review of Public Personnel Administration* 33(4): 340–364.
- Campo, A. M. D. V.; Avolio, B.; Carlier, S. I. (2021). The relationship between telework, job performance, work–life balance and family supportive supervisor behaviours in the context of COVID-19. *Global Business Review* 09721509211049918.
- Carbonaro, M.; Bainbridge, J. (2000). Design and development of a process for web-based survey research. *Alberta Journal of Educational Research* 46(4). <https://doi.org/10.11575/ajer.v46i4.54834>.
- Chadda, R. K.; Deb, K. S. (2013). Indian family systems, collectivistic society and psychotherapy. *Indian Journal of Psychiatry* 55(Suppl. 2): S299.
- Chenot, D.; Benton, A. D.; Kim, H. (2009). The influence of supervisor support, peer support, and organizational culture among early career social workers in child welfare services. *Child Welfare* 88(5): 129–147.
- Claessens, B. J. C.; van Eerde, W.; Rutte, C. G.; Roe, R. A. (2007). A review of the time management literature. *Personnel Review* 36(2): 255–276.
- Clark, S. C. (2000). Work/family border theory: A new theory of work/family balance. *Human Relations* 53(6): 747–770.
- Contreras, F.; Baykal, E.; Abid, G. (2020). E-leadership and teleworking in times of COVID-19 and beyond: What we know and where do we go. *Frontiers in Psychology* 11: 590271.
- Covey, S. R. (2013). *The 7 habits of highly effective people: Powerful lessons in personal change*. New York: Simon and Schuster.
- Crant, J. M. (1995). The proactive personality scale and objective job performance among real estate agents. *Journal of Applied Psychology* 80(4): 532.
- Crucke, S.; Kluijtmans, T.; Meyfroidt, K.; Desmidt, S. (2022). How does organizational sustainability foster public service motivation and job satisfaction? The mediating role of organizational support and societal impact potential. *Public Management Review* 24(8): 1155–1181.
- Crutsinger, C. (1994). *Thinking smarter: Skills for academic success. Teacher edition*. Brainworks.
- Davies, L.; McAlpine, D. D. (1998). The significance of family, work, and power relations for mothers’ mental health. *Canadian Journal of Sociology / Cahiers canadiens de sociologie* 23(4): 369–387.
- Demirdağ, S. (2021). The mediating role of life satisfaction in the relationship between time management and communication skills. *Kuram ve Uygulamada Eğitim Yönetimi Dergisi* 27(1): 967–984.

- Diener, E. D.; Emmons, R. A.; Larsen, R. J.; Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment* 49(1): 71–75.
- Doherty, L.; Manfredi, S. (2006). Action research to develop work–life balance in a UK university. *Women in Management Review* 21(3): 241–259.
- Duckworth, A. L.; Quinn, P. D.; Seligman, M. E. (2009). Positive predictors of teacher effectiveness. *The Journal of Positive Psychology* 4(6): 540–547.
- Emerson, E. B. (1985). Evaluating the impact of deinstitutionalization on the lives of mentally retarded people. *American Journal of Mental Deficiency* 90(3): 277–288.
- Erdogan, B.; Bauer, T. N.; Truxillo, D. M.; Mansfield, L. R. (2012). Whistle while you work: A review of the life satisfaction literature. *Journal of Management* 38(4): 1038–1083.
- Feyerherm, A.; Vick, Y. H. (2005). Generation X women in high technology: Overcoming gender and generational challenges to succeed in the corporate environment. *Career Development International* 10(3): 216–227.
- Fisher, G. G. (2002). *Work/personal life balance: A construct development study*. Doctoral dissertation. ProQuest Information and Learning.
- Fisher-McAuley, G.; Stanton, J.; Jolton, J.; Gavin, J. (2003, April). Modelling the relationship between work life balance and organisational outcomes. In: *Annual Conference of the Society for Industrial-Organisational Psychology*. Orlando. 1–26.
- Flanagan, J. C. (1978). A research approach to improving our quality of life. *American Psychologist* 33(2): 138.
- Fukui, S.; Rapp, C. A.; Goscha, R.; Marty, D.; Ezell, M. (2014). The perceptions of supervisory support scale. *Administration and Policy in Mental Health and Mental Health Services Research* 41(3): 353–359.
- Garg, D.; Rani, S. (2014). Work–life balance: A key driver to improve organizational performance. *International Journal of Research* 1(11): 1471–1477.
- Geprägs, A.; Bürgin, D.; Fegert, J. M.; Brähler, E.; Clemens, V. (2022). The impact of mental health and sociodemographic characteristics on quality of life and life satisfaction during the second year of the COVID-19 pandemic—results of a population-based survey in Germany. *International Journal of Environmental Research and Public Health* 19(14): 8734.
- Gholipour, H. F.; Kalantari, H. D.; Kousary, M. (2022). Self-employment and life satisfaction: The moderating role of perceived importance of family, friends, leisure time, and work. *Journal of Behavioral and Experimental Economics* 100: 101922.
- Goh, Z.; Ilies, R.; Wilson, K. S. (2015). Supportive supervisors improve employees' daily lives: The role supervisors play in the impact of daily workload on life satisfaction via work–family conflict. *Journal of Vocational Behavior* 89: 65–73.
- Goyal, K. A.; Babel, A. A. (2015). Issues and challenges of work–life balance in banking industry of India. *Pacific Business Review International* 8(5): 113–118.

- Greenhaus, J. H.; Collins, K. M.; Shaw, J. D. (2003). The relation between work–family balance and quality of life. *Journal of Vocational Behavior* 63(3): 510–531.
- Greenhaus, J. H.; Ziegert, J. C.; Allen, T. D. (2012). When family-supportive supervision matters: Relations between multiple sources of support and work–family balance. *Journal of Vocational Behavior* 80(2): 266–275.
- Grossman, A. S. (1981). Working mothers and their children. *Monthly Lab. Rev.* 104: 49.
- Guo, J.; Browne, C. V. (2022). Women’s employment, work–life balance policies, and inequality across the life course: A comparative analysis of Japan, Sweden and the United States. *Journal of Women and Aging* 34(3): 294–308.
- Hari, G. K.; Vaithianathan, V. (2022). The effectiveness of management attitude on labour performance: A behavioral study on plantation workers in Idukki district, Kerala. *Psycho-Technological Approaches in Heutagogy* 132.
- Harris, D. (2008). *Web 2.0 Evolution into the intelligent Web 3.0: 100 most asked questions on transformation, ubiquitous connectivity, network computing, open technologies, open identity, distributed databases and intelligent applications*. Emereo Pty Ltd.
- Hayman, J. (2005). Psychometric assessment of an instrument designed to measure work–life balance. *Research and Practice in Human Resource Management* 13(1): 85–91.
- Homans, G. C. (1958). Social behavior as exchange. *American Journal of Sociology* 63(6): 597–606.
- Ismail, M.; Ahmad, A. (eds.). (1999). *Women and work: Challenges in industrializing nations*. Asean Academic Press.
- Jang, S. J. (2009). The relationships of flexible work schedules, workplace support, supervisory support, work–life balance, and the well-being of working parents. *Journal of Social Service Research* 35(2): 93–104.
- Jolly, P. M.; Gordon, S. E.; Self, T. T. (2021). Family-supportive supervisor behaviors and employee turnover intention in the foodservice industry: Does gender matter? *International Journal of Contemporary Hospitality Management* 34(3): 1084–1105.
- Jones, F. E. (1996). *Understanding organizations: A sociological perspective*. Copp Clark.
- Jones, M. D. (2006). Which is a better predictor of job performance: Job satisfaction or life satisfaction? *Journal of Behavioral and Applied Management* 8(1): 20–42.
- Judge, T. A.; Hulin, C. L. (1993). Job satisfaction as a reflection of disposition: A multiple source causal analysis. *Organizational Behavior and Human Decision Processes* 56(3): 388–421.
- Julein, M.; Somerville, K.; Culp, N. (2011). Going beyond the work arrangement: The crucial role of supervisor support. *Public Administration Quarterly* 35(2): 167–204.

- Kanter, R. M. (1977). Some effects of proportions on group life. In: Rieker, Patricia Perri; Carmen, Elaine (eds.), *The gender gap in psychotherapy*. Springer, Boston, MA. 53–78.
- Ko, J.; Hur, S.; Smith-Walter, A. (2013). Family-friendly work practices and job satisfaction and organizational performance: Moderating effects of managerial support and performance-oriented management. *Public Personnel Management* 42(4): 545–565.
- Koon, V. Y. (2022). A multilevel analysis of work–life balance practices. *Asia Pacific Journal of Human Resources* 60(2): 429–450.
- Kossek, E. E.; Nichol, V. (1992). The effects of on-site child care on employee attitudes and performance. *Personnel Psychology* 45(3): 485–509.
- Lakey, B.; Cohen, S. (2000). Social support theory and measurement. In: Cohen, S.; Underwood, L. G.; Gottlieb, B. H. (eds.), *Social support measurement and intervention: A guide for health and social scientists*. Oxford University Press. 29–52.
- Latip, A. A.; Amirul, S. R. (2022). Conceptualising the roles of human resource in managing flexible working arrangements. *Labuan Bulletin of International Business and Finance (LBIBF)* 20(1): 74–86.
- Lazar, I.; Osoian, C.; Ratiu, P. (2010). The role of work–life balance practices in order to improve organizational performance. *European Research Studies Journal* 13(1): 201–214.
- Leitão, J.; Pereira, D.; Gonçalves, Â. (2019). Quality of work life and organizational performance: Workers' feelings of contributing, or not, to the organization's productivity. *International Journal of Environmental Research and Public Health* 16(20): 3803
- Ling Suan, C.; Mohd Nasurdin, A. (2016). Supervisor support and work engagement of hotel employees in Malaysia: Is it different for men and women? *Gender in Management* 31(1): 2–18.
- Lockwood, N. R. (2003). Work/life balance. *Challenges and Solutions SHRM Research USA* 2(10).
- Lucia-Casademunt, A. M.; Garcia-Cabrera, A. M.; Padilla-Angulo, L.; Cuellar-Molina, D. (2018). Returning to work after childbirth in Europe: Well-being, work–life balance, and the interplay of supervisor support. *Frontiers in Psychology* 68.
- Macan, T. H.; Shahani, C.; Dipboye, R. L.; Phillips, A. P. (1990). College students' time management: Correlations with academic performance and stress. *Journal of Educational Psychology* 82(4): 760–768.
- Malone, E. K.; Issa, R. R. (2013). Work–life balance and organizational commitment of women in the US construction industry. *Journal of Professional Issues in Engineering Education and Practice* 139(2): 87–98.
- Mani, V. (2013). Work–life balance and women professionals. *Global Journal of Management and Business Research* 13(5).

- McGee-Cooper, A.; Trammell, D. (1993). *Time management for unmanageable people*. New York: Bantam Books.
- McGilton, K. S. (2010). Development and psychometric testing of the supportive supervisory scale. *Journal of Nursing Scholarship* 42(2): 223–232.
- McGinnity, F. (2021). Work–life conflict in Europe. In: Michalos, Alex C. (ed.), *Encyclopedia of Quality of Life and Well-Being Research*. Cham: Springer International Publishing, 1–6.
- Michel, A.; Bosch, C.; Rexroth, M. (2014). Mindfulness as a cognitive–emotional segmentation strategy: An intervention promoting work–life balance. *Journal of Occupational and Organizational Psychology* 87(4): 733–754.
- Motowildo, S. J.; Borman, W. C.; Schmit, M. J. (1997). A theory of individual differences in task and contextual performance. *Human Performance* 10(2): 71–83.
- Nabawanuka, H.; Ekmekcioglu, E. B. (2021). Millennials in the workplace: Perceived supervisor support, work–life balance and employee well-being. *Industrial and Commercial Training*.
- Namasivayam, K.; Zhao, X. (2007). An investigation of the moderating effects of organizational commitment on the relationships between work–family conflict and job satisfaction among hospitality employees in India. *Tourism Management* 28(5): 1212–1223.
- National Statistical Office. (2021). *Periodic Labour Force Survey* [Ministry of Statistics and Programme Implementation]. Retrieved from: http://mospi.nic.in/sites/default/files/publication_reports/Quarterly_Bulletin_PLFS_April_June_2019_M_0.pdf.
- Newman, M.; Mathews, K. (1999). Federal family-friendly workplace policies: Barriers to effective implementation. *Review of Public Personnel Administration* 19(3): 34–48.
- Nunnally, J. C.; Bernstein, I. (1978). *Psychometric theory*. New York: MacGraw-Hill.
- Perrin, K. M.; McDermott, R. J. (1997). Instruments to measure social support and related constructs in pregnant adolescents: A review. *Adolescence* 32(127): 533–557.
- Pierce, G. R.; Sarason, I. G.; Sarason, B. R. (1991). General and relationship-based perceptions of social support: Are two constructs better than one? *Journal of Personality and Social Psychology* 61(6): 1028–1039.
- Poelmans, S.; Greenhaus, J.; Maestro, M. L. H. (eds.). (2013). *Expanding the boundaries of work–family research: A vision for the future*. Palgrave Macmillan.
- Press Information Bureau. (2019, April 22). *India needs a world-class higher education system*. Retrieved on: 23 February 2021, from PIB: <https://pib.gov.in/newsite/PrintRelease.aspx?relid=189828>.

- Puspitasari, A. S. A.; Darwin, M. (2021). Effect of work–life balance and welfare level on millennial employee performance through work engagement. *International Journal of Science and Society* 3(1): 334–344.
- Rahim, N. B.; Osman, I.; Arumugam, P. V. (2020). Linking work–life balance and employee well-being: Do supervisor support and family support moderate the relationship? *International Journal of Business and Society* 21(2): 588–606.
- Rashid, S.; Subhan, Q. A.; Imran, M. (2022). Impact of work life balance, workload and supervisory support on teachers’ job performance with mediating role of stress: A case of private institutions of Islamabad, Pakistan. *International Journal of Business and Management Sciences* 3(1): 21–34.
- Rathi, N.; Lee, K. (2017). Understanding the role of supervisor support in retaining employees and enhancing their satisfaction with life. *Personnel Review* 46(8): 1605–1619.
- Rego, A. (2009). Do the opportunities for learning and personal development lead to happiness? It depends on work–family conciliation. *Journal of Occupational Health Psychology* 14(3): 334–348.
- Rehman, R. R.; Waheed, A. (2012). Work–family conflict and organizational commitment: Study of faculty members in Pakistani universities. *Pakistan Journal of Social and Clinical Psychology* 10(1): 23–26.
- Reverberi, E.; Manzi, C.; Van Laar, C.; Meeussen, L. (2021). The impact of poor work–life balance and unshared home responsibilities on work–gender identity integration. *Self and Identity* 21(5): 1–20.
- Riyanto, S.; Endri, E.; Herlisha, N. (2021). Effect of work motivation and job satisfaction on employee performance: Mediating role of employee engagement. *Problems and Perspectives in Management* 19(3): 162–174.
- Russo, M.; Shteigman, A.; Carmeli, A. (2016). Workplace and family support and work–life balance: Implications for individual psychological availability and energy at work. *The Journal of Positive Psychology* 11(2): 173–188.
- Scandura, T. A.; Lankau, M. J. (1997). Relationships of gender, family responsibility and flexible work hours to organizational commitment and job satisfaction. *Journal of Organizational Behavior: The International Journal of Industrial Occupational and Organizational Psychology and Behavior* 18(4): 377–391.
- Schütz, E.; Sailer, U.; Al Nima, A.; Rosenberg, P.; Arntén, A. C. A.; Archer, T.; Garcia, D. (2013). The affective profiles in the USA: Happiness, depression, life satisfaction, and happiness-increasing strategies. *PeerJ* 1(8): e156.
- Shanafelt, T. D.; Hasan, O.; Dyrbye, L. N.; Sinsky, C.; Satele, D.; Sloan, J.; West, C. P. (2015). Changes in burnout and satisfaction with work–life balance in physicians and the general US working population between 2011 and 2014. *Mayo Clinic Proceedings* 90(12): 1600–1613.

- Sirgy, M. J.; Reilly, N. P.; Wu, J.; Efraty, D. (2008). A work–life identity model of well-being: Towards a research agenda linking quality-of-work–life (QWL) programs with quality of life (QOL). *Applied Research in Quality of Life* 3(3): 181–202.
- Slocum-Gori, S. L.; Zumbo, B. D.; Michalos, A. C.; Diener, E. (2009). A note on the dimensionality of quality of life scales: An illustration with the Satisfaction with Life Scale (SWLS). *Social Indicators Research* 92(3): 489–496.
- Sriramesh, K. (2013). Power distance and public relations: An ethnographic study of Southern Indian organizations. In: Culbertson, H.; Chen, N. (eds.), *International Public Relations*. Routledge. 181–200.
- Su, Z.; Zabilski, A. (2022). What is the relationship between quality of working life, work–life balance and quality of life? *Worldwide Hospitality and Tourism Themes* 14(3): 247–260.
- Talukder, A. K. M.; Vickers, M.; Khan, A. (2018). Supervisor support and work–life balance: Impacts on job performance in the Australian financial sector. *Personnel Review* 47(3): 727–744.
- Talukder, A. M. H.; Galang, M. C. (2021). Supervisor support for employee performance in Australia: Mediating role of work–life balance, job, and life attitude. *Journal of Employment Counseling* 58(1): 2–22.
- Thomas, J. P.; Whitman, D. S.; Viswesvaran, C. (2010). Employee proactivity in organizations: A comparative meta-analysis of emergent proactive constructs. *Journal of Occupational and Organizational Psychology* 83(2): 275–300.
- Trifiletti, E.; Capozza, D.; Pasin, A.; Falvo, R. (2009). A validation of the proactive personality scale. *Testing Psychometrics Methodology in Applied Psychology* 16(2): 77–93.
- Usmani, S. (2021). Technology-assisted supplemental work, work life enrichment and work–family conflict: The moderating role of time management. *City University Research Journal* 11(1).
- Varghese, N. V. (2015). *Challenges of massification of higher education in India*. New Delhi: National University of Educational Planning and Administration.
- Vasumathi, A.; Prithi, S. (2018). Work–life balance of women workers in tannery industry, Tamil Nadu – An empirical bivariate study. *International Journal of Services and Operations Management* 29(3): 420–438.
- Ventegodt, S.; Merrick, J.; Andersen, N. J. (2003). Quality of life theory I. The IQOL theory: An integrative theory of the global quality of life concept. *The Scientific World Journal* 3: 1030–1040.
- Vyas, L. (2022). “New normal” at work in a post-COVID world: Work–life balance and labor markets. *Policy and Society* 41(1): 155–167.
- Wahyuni, S.; Rahmasari, D. (2022). Investigating the antecedents and outcomes of work–life balance: Evidence from garment industries in Indonesia. *Diponegoro International Journal of Business* 5(1): 1–11.

- Wani, A.; Gul, M. (2014). Incessant struggle between work and life: An empirical study. *Advances in Economics and Business Management (AEBM)* 1(42.0): 221.
- Weyant, E. C.; Wallace, R. L.; Woodward, N. J. (2021). Contributions to low morale, part 1: Review of existing literature on librarian and library staff morale. *Journal of Library Administration* 61(7): 854–868.
- Wickens, C. D. (2017, June). Mental workload: Assessment, prediction and consequences. In: *International Symposium on Human Mental Workload: Models and Applications*. Cham: Springer. 18–29.
- Wright, T. A.; Cropanzano, R. (2000). Psychological well-being and job satisfaction as predictors of job performance. *Journal of Occupational Health Psychology* 5(1): 84–94.
- Wolman, B. B. (1973). *Handbook of general psychology*. Englewood Cliffs, N.J.: Prentice-Hall.
- Yildirim, Y.; Kilic, S. P.; Akyol, A. D. (2013). Relationship between life satisfaction and quality of life in Turkish nursing school students. *Nursing and Health Sciences* 15(4): 415–422.
- Zhang, R. P.; Bowen, P. (2021). Work–family conflict (WFC) – Examining a model of the work–family interface of construction professionals. *Safety Science* 144: 105469.
- Zullig, K. J.; Valois, R. F.; Huebner, E. S.; Drane, W. (2005). The relationship between health-related quality of life and life satisfaction in adolescents. *Quality of Life Research* 14: 1573–1584.



Beyond the Big Five: How Dynamic Personality Traits Predict Financial Risk Tolerance?

Shakira MUKHTAR,¹Anisa JAN,²Adil ZAHOOR³

Department of Management Studies,
Islamic University of Science and Technology, Awantipora, J&K, India
e-mails: ¹shakiramukhtar@yahoo.in; ²anisa.jan@islamicuniversity.edu.in;
³adylzahoor7@gmail.com

Abstract. The present study examines the impact of dynamic personality traits (emotions, financial self-efficacy, trait anger, resilience, and intolerance of uncertainty) on the financial risk tolerance of an investor. To that end, the study uses data collected from 486 stock market investors adopting a structured questionnaire, and the hypothesised relationships are evaluated through structural equation modelling. Results indicate that financial self-efficacy, positive emotion, and resilience improve the investor's financial risk tolerance, whereas intolerance of uncertainty, trait anger, and negative emotions bear a negative influence on financial risk tolerance. These findings are novel to the financial risk tolerance literature and deepen our understanding of the precursors of risky investment behaviour. Further, this study entails several practical implications for financial advisors and wealth managers.

Keywords: financial risk tolerance, resilience, emotions, financial self-efficacy, intolerance to uncertainty, trait anger

JEL Classification: G11, G41, O3

1. Introduction

Over the past two decades, researchers, financial advisers, consumers, and policymakers have been confronted with new and ever more complicated shifts in the financial landscape (Grable, 2016). As a result, the study of the exact ways in which individuals make decisions under risky situations has gained increasing traction. Particularly the role of financial risk tolerance (FRT) in explaining an individual's investment behaviour and the factors that determine financial risk tolerance have attracted substantial research and policy attention. A person's financial risk tolerance is their ability to accept uncertainty while making financial

decisions (Grable et al., 2004) or the readiness to engage in a financial action whose results are ambiguous and carry the possibility of a measurable loss. FRT represents an individual's tolerance for market volatility in terms of investing (Hallahan et al., 2004).

Financial risk tolerance is the underlying factor in a diverse array of financial decision-making contexts (Rai et al., 2021). For instance, an individual's financial risk tolerance affects their routine debt-versus-savings decisions, the choice of mortgage (Grable 1999), credit card adoption (Cope et al., 2013) and management (Campbell, 2006), pattern of expenditure (long-term vs short-term) (Sung et al., 1996), insurance purchase (Shusha 2017), and distribution of assets (Nguyen et al., 2019). Moreover, financial regulatory authorities worldwide also require financial advisors to examine their clients' financial risk propensity before providing investment recommendations or executing financial investment strategies (Hari et al., 2018). Countries such as the USA, the UK, Australia, and Canada have specific laws mandating the assessment of customers' risk tolerance by financial advisors (Wahl et al., 2020).

The Securities and Exchange Board of India (SEBI) has also advised wealth managers to offer meaningful advice after carefully considering the client's risk tolerance and financial needs. Therefore, an exhaustive and thorough understanding of investors' financial risk tolerance is not only a legal requirement but also a moral binding on wealth managers. Moreover, among the several factors required for making optimal portfolio selections based on risk and reward, the most important factor is the knowledge of risk tolerance (Droms, 1987). For designing investment strategies, an asset allocation decision model is built on four critical inputs, namely basic aim or purpose, time horizon, financial stability, and FRT (Garman et al., 2011; Grable, 1999). Despite the fact that the first three inputs are simple and easily available for investment planners and managers, FRT is a highly individualized and intricate phenomenon whose assessment is relatively difficult (Larkin et al., 2013). As a result, an increasing scholarly endeavour has been focused on generating an understanding of the dynamics of an individual's tolerance in risking current wealth for future growth that can be incorporated into designing precisely tailored financial advisory services (Gibson et al., 2013).

For that purpose, an extensive body of literature has tried to explore the factors that determine an investor's financial risk tolerance. These factors include financial literacy and investment experience (Awais et al., 2016), socio-demographic (Mukit 2020), attitudinal characteristics (Gondaliya et al., 2016), culture (Weber et al., 1998), bio-psychosocial characteristics (Patel et al., 2019), self-esteem and sensation seeking (Leon et al., 2020), emotional intelligence (Dhiman et al., 2018), etc. Among all the underlying factors, personality traits are considered to be the most significant determinant of an investor's financial risk tolerance (Sarwar et al., 2020).

However, while examining the impact of personality traits on FRT, the vast majority of scholars used the Big Five model of personality, which categorizes individual personality into five dimensions, also referred to as OCEAN (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) (McCrae et al., 1987). Although a widely used framework, the Big Five taxonomy has lately attracted some criticism. Scholars such as Block (1995) and Brooks et al. (2021) argue that the Big Five model tends to oversimplify personality by assuming that personality traits are fixed and intractable. Clark et al. (2012) further argue that these traits are stable over time and have a longer-term impact on an individual. It fails to address why under different situations individuals behave differently for the same type of investment choice. Brooks et al. (2021) posit that the Big Five taxonomy (named by Goldberg (1990)) includes only a group of five stable traits that fail to capture the dynamism of personality in different contexts. Since according to the prior studies the limitation of stable traits is that they cannot be developed and moulded according to the context of situations, this urges the present study to examine the personality qualities that an investor imbibes and that can be developed, moulded, and learned over a period of time. Although Brooks et al. (2021) have offered a preliminary insight into this phenomenon, the evidence of dynamic personality traits (i.e. those psychological traits which, unlike the obdurate predispositions, do not remain constant and are therefore malleable in affecting FRT) is still far from conclusive.

In the light of this, the purpose of the present study is to examine the nebulous influence of dynamic personality characteristics (resilience, trait anger, financial self-efficacy, intolerance of uncertainty, and emotions) on an investor's financial risk tolerance. The evaluation of dynamic personality qualities might explain diversity in investor financial risk tolerance beyond that which is described by static personality, demographic and other socio-economic components investigated till date. Prior studies, such as Breaban et al. (2018), have shown how different emotional states influence the financial behaviour of an investor. Further: Gambetti et al. (2012) showed how trait anger influences the willingness to engage in risky investment decision making; Conlin et al. (2015) pointed out how intolerance of uncertainty determines investors' risk-averse nature; Hamurcu (2019) highlighted how resilience can reduce the behavioural biases of an investor and thereby result in a higher level of FRT; Asebedo et al. (2019) explained how financial self-efficacy can be developed and used to increase the financial satisfaction and financial risk tolerance of an investor in times of market anomalies.

The present study highlights the limitations of using exclusively the Big Five personality trait model to predict FRT. While the Big Five provide a useful framework for understanding personality, they may not capture the full range of individual differences in risk-taking behaviour (Brooks et al., 2021). The authors argue that incorporating dynamic personality traits, such as resilience, financial

self-efficacy, intolerance of uncertainty, trait anger, and emotions, may provide a more complete picture of how personality influences financial decision-making. Second, the paper advances our understanding of the relationship between personality and financial risk tolerance. By identifying specific dynamic personality traits that predict risk-taking behaviour, the authors provide an insight into the psychological mechanisms underpinning financial decision-making and can inform future research and practice in this area. For example, they suggest that individuals with high levels of resilience may be more willing to take risks in order to explore new opportunities, while those with high levels of positive emotions may be more willing to take risks in order to achieve long-term goals. Finally, the paper has important implications for both research and practice. By highlighting the importance of dynamic personality traits, the authors suggest new avenues for future research on personality and financial decision-making. Additionally, the identification of specific personality traits that predict risk tolerance may be useful for financial advisors and other practitioners who work with individuals to develop investment strategies.

The study is structured as follows. Section 2 presents the theoretical background of the study and the basis on which the hypotheses are developed. Section 3 contains the methodology employed such as data collection, questionnaire design, theoretical model, and statistical tools and techniques used. Section 4 presents the results and analysis. Section 5 concludes and discusses some limitations of the study.

2. Literature Review

2.1. Impact of Emotions on Financial Risk Tolerance

Emotions are mental states induced by neurophysiological changes related to ideas, sensations, behavioural responses, and a level of pleasure or dissatisfaction (Panksepp, 2005). A wide range of emotions have been examined in the psychology literature regarding their influence on decision-making in the context of risk. Forgas (1995) found that emotions have a greater impact in situations where concrete information is scarce and thereby taking a rational decision is more difficult. He further mentions that people experiencing positive emotions tend to have a positive outlook on life. They are usually optimistic regarding the outcomes of risky decisions. Seo et al. (2007) argue that people who experience positive emotions may utilize them to improve their decision-making efficacy and make better choices. The possible explanation mentioned by Johnson et al. (1983) is that individuals experiencing positive emotions tend to overestimate rewards and

underestimate risks (uncertain outcomes) and are thus willing to invest in risky assets. Bagozzi (2000) found that positive emotions serve as a powerful catalyst for action, bringing along inspiration, encouragement, and affirmation upon achieving an optimal financial goal. Literature supports that positive emotions such as hope, happiness, being inspired, enthusiasm, feeling proud and active, etc. encourage risk taking by increasing investors' confidence (Finucane et al., 2000; Kuhnen et al., 2011). Therefore, based on the available literature assessment, the following hypotheses are developed for this study:

H1: Positive emotions are positively correlated to financial risk tolerance.

Negative emotions have received a mixed response in research studies with regard to financial risk tolerance. For instance, Lee et al. (2011) reported that people who experienced negative emotions of fear tended to avoid making risky investment decisions. Frijda (1987) further adds that fear leads to avoidance of uncertain and doubtful investment activities, and therefore people with negative emotions sell stocks quickly. Gambetti et al. (2012) highlighted that anxious people avoid getting engaged into purchasing risky financial products. In an experiment conducted by Schulreich et al. (2016), it was shown that participants experiencing a sensation of fear tended to exhibit loss aversion behaviour. Similarly, emotions of sadness were also shown to decrease risk tolerance among investors (Vazquez et al., 2014).

Another negative emotion, anger, has generated opposite study results. Vazquez et al. (2014) and Fessler et al. (2004) report in their studies that anger tends to increase the reckless behaviour of an individual and thereby decrease the loss aversion level among investors. Lerner et al. (2006) argue that anger increases the feeling of confidence in the ability to manage finances, and thereby it increases the risk tolerance of an investor. Therefore, based on the existing evidence, our study assumed the dominating negative impact of negative emotions on financial choices, leading to the formulation of the following hypothesis:

H2: Negative emotion is negatively correlated to financial risk tolerance.

2.2. Financial Self-Efficacy

The ability to handle one's own financial affairs is known as financial self-efficacy. Having confidence in one's own abilities is essential for the successful self-management of financial resources (Farrell et al., 2016). Self-efficacy is one of the best indicators of successful performance in a variety of domains (Marlatt, 1985) since it boosts one's confidence in his or her ability to execute a specific behaviour (Stajkovic 1998). Lapp (2010) highlighted the role of financial self-efficacy in reaching long-term financial objectives. He further argues that financial self-efficacy has an essential role in forecasting financial behaviour during times of market instability. Stajkovic et al. (2018) reports that self-efficacy is a dynamic quality that motivates

and controls behaviour. When an individual has confidence in their ability to manage their money, they are more resilient when confronted with uncertainties and thereby make risky investment choices. Previous literature has shown how financial self-efficacy influences investment strategies (Forbes et al., 2010), retirement saving strategies (Dietz et al., 2003), and wealth accumulation (Chatterjee et al., 2011). Based on the findings of prior studies, we propose the following hypothesis:

H3: Financial self-efficacy is positively correlated to financial risk tolerance.

2.3. Resilience

Resilience is the individual's ability to recover quickly from an adversity, to adapt successfully to new situations, and to tolerate pressure or even thrive under it (Chapman et al., 2008). In other words, resilience is the ability of an investor to cope with financial instability (Salignac et al., 2019). Adger (2000) termed resilience as a dynamic personal trait marked by adaptability rather than stability. Literature shows that resilience is positively correlated to emotional stability (Friborg et al., 2005; Oshio et al., 2018; Shafieezadeh, 2012). As resilience is considered a more dynamic and changing process over time, investors can be assisted in developing resilience. It is not a quality that people either possess or lack but rather a set of behaviours, attitudes, and actions that may be acquired (Salignac et al., 2019).

Limited study has been conducted till now on exploring the links between resilience and financial risk-taking behaviour. However, knowing the relationship between resilience and risk appetite might provide significant insight into the effect of personality traits on risk tolerance. The creation of services to support individuals through times of financial distress can be facilitated by a greater knowledge of resilience (Brooks et al., 2021).

H4: Resilience is positively correlated to financial risk tolerance.

2.4. Intolerance of Uncertainty

The tendency to react emotionally, cognitively, and behaviourally to uncertain situations is called intolerance of uncertainty (IU). Buhr et al. (2009) argue that those who are intolerant of uncertainty hold negative ideas about future outcome, experience anxiety and therefore behave poorly when confronted with uncertain circumstances. A person with high sensitivity to ambiguity experiences higher anxiety and discomfort in ambiguous or uncertain situations (Dugas et al., 2004; Freeston et al., 1994; Rosser, 2019). Nouri (2020) reported in his study that a higher intolerance of uncertainty leads to anxiety, which in turn hampers financial decision-making. Conlin et al. (2015) argue that people who experience a higher degree of intolerance of uncertainty tend to avoid investing in stock market investments.

H5: Intolerance of uncertainty is negatively correlated to financial risk tolerance.

2.5. Trait Anger

A study conducted by Pease et al. (2015) showed positive relationship between neuroticism and the trait anger of an individual. Neurotic individuals take a pessimistic approach to getting involved in risky investment decisions (Rustichini et al., 2012; Young et al., 2012). People with trait anger are more likely to become enraged even at the slightest provocation, and these feelings are generally accompanied by feelings of hatred and disdain. Anger leads to increased anxiety, and anxiety tends to make a person conservative. Therefore, people tend to avoid getting involved in risky decisions while they are angry (Owen, 2011). Hassan et al. (2013) report that anger and individuals' investment behaviour are negatively correlated to each other. Anger causes an investor to make hasty judgments, which may be the consequence of his/her aggressive temperament, and as a result the investor is unable to attain his or her optimal financial goal. Therefore, people ranking high on trait anger tend to avoid getting involved in risky decision-making because of the feeling of the anxiety and emotional instability.

H6: Trait anger is negatively correlated to financial risk tolerance.

Based on the above discussion and the review of prior studies, it can be argued that the risk tolerance of an investor is strongly shaped by his/her dynamic personality characteristics, which might influence the success of investment decisions. *Figure 1* depicts the proposed model of the current study, where emotions, financial self-efficacy, resilience, intolerance of uncertainty, and trait anger have been treated as independent variables, whereas financial risk tolerance has been treated as dependent variable.

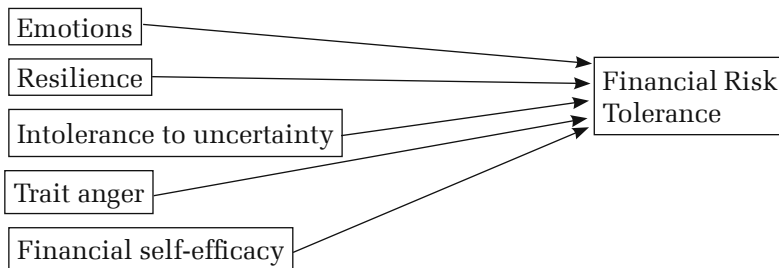


Figure 1. *Proposed model*

3. Methodology

In order to test the research hypothesis of this study, a cross-sectional survey was used. The study tested the proposed model by applying a statistical technique known as structural equation modelling (SEM) assisted by an analysis of moment

structure (AMOS), which is a covariance-based software. SEM represents the most appropriate and a well-substantiated method for analysing the complex behavioural cause and effect relationships in management research (Nusair et al., 2010). This research study used convenience sampling technique. The sample size of the study was determined by using Hair et al's (2010) criterion of a 1:10 (item to respondents) ratio. To further verify that our sample size is adequate for the parametric statistical analysis, we conducted the Olkin (2017) test of sampling adequacy. The result (0.897) indicated an adequate sample size (Field, 2009). The sample of the study consisted of stock market investors across India. Data were collected from November 2021 to March 2022 via an online structured questionnaire. In order to obtain a more representative sample of the population, the questionnaires were distributed through personal visits, emails, and social media websites, such as LinkedIn, to reach stock market investors across different cities. The data of the stock market investors was obtained with the help of various investment and brokerage companies in India. Further, stock market investor groups present on social media websites also served as potential resources for data collection. The surveyed investors were of different age groups, had various occupations, education and income levels.

The responses were elicited from 550 stock market investors, but some of them had to be ignored due to apparent inconsistencies or because they had left some sections blank. Consequently, the valid responses of a total of 486 investors were included in the analysis. Respondents were asked to fill in the required fields of the sub-sections regarding demographics, emotions, financial self-efficacy, resilience, intolerance of uncertainty, trait anger, and financial risk tolerance. The questionnaire consisted of 49 items altogether. The demographic distribution of the sample showed that 292 respondents were men and 194 were women. Further, it also revealed that 323 stock market investors were unmarried and 163 were married. 31.4% of the investors were between the age bracket of 31–40 years, whereas 20.2% of them fell in the age group of 51 years and above. 29.4% of the investors had postgraduate qualification, whereas 10.5% of them had higher secondary education. 49.9% of the investors had income levels of 20k–50k Rs, whereas 11.2% of the respondents had income levels between 75k and 1 lakh Rs, as shown in *Table 1*.

To measure the stock market investors' financial risk tolerance, a 5-item scale developed by Grable et al. (2004) was used. Responses were measured on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree". To gain a comprehensive picture of the emotions of stock market investors while filling out the survey, we used a 10-item emotion scale, which is the brief version of the positive and negative affect schedule (PANAS) scale developed by Thompson (2007). A brief version of the scale was used to reduce respondents' fatigue while going through the wide range of questions. The PANAS scale is considered the most reliable and most cited scale for assessing emotions and was used here to assess investors' current

as well as recent (past few weeks) emotional state. The adopted scale consisted of a 5-point Likert scale ranging from “never” to “always” to evaluate positive and negative emotions such as upset, alert, inspired, nervous, enthusiastic, happy, angry, etc. A thorough literature study revealed that there is limited research available on how financial self-efficacy might be fostered to boost stock market investors’ financial risk tolerance. For this purpose, we used a 6-item scale developed by Lown (2011). Responses were measured on a 4-point Likert scale ranging from “not at all true” to “entirely true”. Some examples of items used in the financial self-efficacy scale are: “It is hard to stick to my spending plan when unexpected expenses arise.”; “I lack confidence in my ability to manage my finances.”; etc.

Table 1. Demographic characteristics

Characteristics	Frequency	Percentage
Age		
18–30	153	31.4
31–40	123	25.3
41–50	112	23.1
51 and above	98	20.2
Gender		
Male	292	60.7
Female	194	39.3
Marital status		
Married	163	33.6
Unmarried	323	66.4
Educational background		
< Higher secondary level	66	10.5
Graduate	112	23.3
Post-graduate	143	29.4
PhD or above	98	20.1
Professional	67	16.7
Monthly income (Rs)		
Below 25,000	97	19.9
25,000–50,000	202	42.9
50,000–75000	59	12.1
75,000–100000	57	11.7
100,000 <	71	13.4

Similarly, in order to explore the relation of resilience with respect to financial risk tolerance, a 5-point Likert scale was used that ranged from “strongly disagree” to “strongly agree”. The scale developed by Smith et al. (2008) consisted of 6 items such as: “I tend to bounce back quickly after hard times.”; “I recover quickly when something bad happens.”; etc. A 12-item scale developed by Carleton et

al. (2007) was used to evaluate the responses regarding uncertainty questions. The scale ranged from “not at all like me” to “entirely like me”. The items used in the scale were: “Unforeseen events upset me greatly.”; “It frustrates me not having all the information I need.”; etc. – these were used to evaluate how each item corresponds with the respondent’s character. Trait anger is one of the widely studied personality traits with respect to financial decision-making. In order to explore the relationship between trait anger and investors’ financial risk tolerance, we employed a 10-item scale developed by Spielberger et al. (1983). The scale ranged from “almost never” to “almost always” with items such as “I have a fiery temper”, I am quick-tempered”, etc.

4. Data Analysis and Results

4.1. Common Method Bias

The study adopted Harman’s single-factor test to identify common method bias. Results revealed that the total variance extracted by a single factor is 38.67%, which is less than the threshold value of 50%. Therefore, common method bias is not the problem for this study.

4.2. Reliability and Validity

This study used Cronbach’s alpha and composite reliability (CR) to test the variables. Cronbach’s alpha and the CR value of all the variables exceeded the recommended value of 0.700 (Nunnally, 1994). Composite reliability was assessed using the statistical package tool by Gaskin (2016). Variables’ composite reliability ranged from .757 to .921, which is above the benchmark value (Hair et al., 2010). The convergent validity of scale items was measured with the master validity tool by Gaskin and Linn (2016). We used average variance extracted (AVE) for establishing convergent validity, as suggested by Fornell et al. (1981). For each of the constructs included in the study, the AVE values were above the threshold value of 0.500. Therefore, the present study scales corroborate the requisite convergent validity. Further, the study used the heterotrait-monotrait (HTMT) ratio to measure the discriminant validity of the scale. All the values were below the threshold value of 0.85 (Henseler et al., 2015). The results of the above-mentioned tests are shown in *tables 2 and 3*.

Table 2. *Factor loadings, reliability, and convergent validity*

Construct	Factor loading	Alpha	CRE	AVE
EMO1	.823	.887	.890	.645
EMO2	.734			
EMO3	.982			
EMO4	.827			
EMO5	.759			
EMO6	.946			
EMO7	.721			
EMO8	.744			
EMO9	.769			
EMO10	.840			
INTOL1	.758	.921	.922	.796
INTOL2	.913			
INTOL3	.821			
INTOL4	.709			
INTOL5	.975			
INTOL6	.862			
INTOL7	.761			
INTOL8	.768			
INTOL9	.793			
INTOL10	.761			
INTOL11	.798			
INTOL12	.794			
ANG1	.947	.800	.761	.595
ANG2	.760			
ANG3	.714			
ANG4	.710			
ANG5	.762			
ANG6	.847			
ANG7	.742			
EFF1	.845	.758	.757	.653
EFF2	.805			
EFF3	.948			
EFF4	.740			
EFF5	.786			
EFF6	.953			
RESI1	.870	.886	0.887	.569
RESI2	.798			
RESI3	.816			
RESI4	.797			
RESI5	.757			

Construct	Factor loading	Alpha	CRE	AVE
FRT1	.817	.921	0.821	.699
FRT2	.857			
FRT3	.723			
FRT4	.735			
FRT5	.838			

Table 3. *Discriminant validity (HTMT ratio)*

	Positive emotions	Negative emotions	Resilience	Trait anger	Intolerance of uncertainty	Self-efficacy	FRT
Positive emotions							
Negative emotions	0.521						
Resilience	0.589	0.459					
Trait anger	0.543	0.338	0.498				
Intolerance of uncertainty	0.301	0.514	0.465	0.395			
Self-efficacy	0.594	0.362	0.224	0.489	0.466		
FRT	0.215	0.346	0.529	0.431	0.377	0.484	

4.3. Measurement Model

To test the measurement model of the study, confirmatory factor analysis (CFA) was estimated by using AMOS. As part of the CFA, factor loadings were computed for each item, whose results are presented in *Table 2*. It has been observed from the results that all factor loadings exceed 0.7, suggesting that the factor extracts sufficient variance from that variable. Further, models' overall goodness of fit were measured with model fit indices (CMIN/df, RMSEA, CFI, GFI, and TLI), and all values were within their corresponding permissible ranges.

Table 4. *Model fit indices*

Fit indices	Obtained value
CMIN/df	3.261
SRMR	.057
CFI	.983
TLI	.908
RMSEA	.061
GFI	.927

The six factor model trait – anger, emotions, intolerance of uncertainty, resilience, financial self-efficacy, and financial risk tolerance – yielded a good model fit, as shown in *Table 4*. Results of the measurement model indicate that the overall model is a better fit, and, consequently, the theoretical model is appropriate and fits the observed data well. It is inferred that the hypothesised six-factor CFA model matches the sample data extremely well.

4.4. Structural Model

The next required step of analysis was to evaluate the hypothesised relationships. An AMOS-generated structural equation model was utilized to test the correlations. If the value of CMIN/df is less than 5 and that of goodness of fit (GFI) index, Tucker–Lewis Index (TLI), and Confirmatory Fit Index (CFI) is more than 0.90, then the model is deemed well-fitting (Hair et al., 2010). In addition to it, an acceptable model is approved only if the estimated value of the root mean square residual (RMR) is less than 0.05 and the root mean square error approximation (RMSEA) is between 0.05 and 0.08. The model's fit indices of the study fell within the allowable range as follows: CMIN/df = 3.251, GFI = .927, TLI = .958, CFI = .908, SRMR = .519, and RMSEA = .061, as presented in *Table 4*.

The squared multiple correlation for FRT is 0.328, indicating that emotions, financial self-efficacy, intolerance of uncertainty, and resilience explain 32.8% of the variance in financial risk tolerance. Further, the results of this study indicate that there is positive and substantial effect of emotions on financial risk tolerance and thus validate hypotheses H1 and H2 ($b = 0.21$, $p = 0.01$). The relationship between financial self-efficacy and financial risk tolerance is positive and statistically significant ($b = 0.31$, $p = 0.01$), confirming the acceptance of hypothesis H3. Positive and substantial effects of resilience on financial risk tolerance were also observed ($b = 0.27$, $p = 0.01$), which supports H4. The relationship between intolerance of uncertainty and financial risk tolerance is negative and statistically significant ($b = -0.24$, $p = 0.05$), thus leading to the acceptance of hypothesis H5. The influence of anger on financial risk tolerance is negative and statistically significant ($b = -0.20$, $p = 0.05$), supporting the hypothesised relationship included in H6. Results of the tested hypothesis are presented in *Table 5*.

Table 5. *Direct relationships*

Independent variables (IV)		Dependent variable (DV)	Estimate	P-value
Financial self-efficacy	→	FRT	0.31	***
Intolerance of uncertainty	→	FRT	-0.24	***
Trait anger	→	FRT	-0.20	**
Positive emotion	→	FRT	0.21	***
Resilience	→	FRT	0.27	***
Negative emotion	→	FRT	-0.17	**

Notes: *** and ** indicate significance at 1% and 5% levels respectively.

For a comprehensive understanding of the relationship between the components, *Table 6* contains an inter-construct correlation matrix. From the matrix, several intriguing conclusions are drawn on the link between dynamic personality characteristics and FRT. Positive emotions are found to have a strong association with resilience (0.39). Similarly, a link between positive emotions and financial self-efficacy has been discovered (0.36). A negative correlation was found between negative emotions and resilience (-0.27) and between trait anger and resilience (-0.19). Similarly, evaluating their relationship with financial risk tolerance suggested that FRT was positively correlated with resilience (0.35), self-efficacy (0.33), and positive emotions (0.32) while negatively correlated with negative emotions (-0.19), intolerance of uncertainty (-0.23), and trait anger (-0.18).

Table 6. *Inter-construct correlations*

	Mean	SD	Positive emotions	Negative emotions	Resilience	Trait anger	Intolerance of uncertainty	Self-efficacy	FRT
Positive emotions	3.18	0.681	1						
Negative emotions	3.06	0.774	-0.25***	1					
Resilience	3.38	0.805	0.39***	-0.27***	1				
Trait anger	4.01	0.773	-0.16**	0.30***	-0.19**	1			
Intolerance of uncertainty	3.89	0.631	-0.09	0.33***	-0.24***	0.31***	1		
Self-efficacy	4.03	0.832	0.36***	-0.24***	0.38***	-0.21**	-0.19*	1	
FRT	3.97	0.752	0.33***	-0.19*	0.35***	-0.18*	-0.23**	0.33***	1

Notes: A Spearman's correlation matrix is presented here of positive and negative emotions, resilience, financial self-efficacy, trait anger, intolerance of uncertainty, and financial risk tolerance. *, **, and *** indicate significance at the 5%, 1%, and 0.1% levels respectively.

5. Discussion and Conclusions

The study attempted to examine the direct impact of dynamic personality traits on the financial risk tolerance of stock market investors in India. The independent variables of the study included positive and negative emotions (EMO), financial self-efficacy (FSE), resilience (RSE), trait anger (ANG), and intolerance of uncertainty (INTOL), whereas the dependent variable was represented by the financial risk tolerance (FRT) of an investor.

EMO were found to have significant impact on an investor's FRT (Brooks et al., 2022; Forgas, 1995; Forgas et al., 1987; Johnson et al., 1983). The findings of this study are in accordance with the appraisal tendency framework (Lerner et al., 2001) and emotional valence theory (Breaban et al., 2018), which shows that financial risk tolerance tends to increase monotonically with the positive emotions and to decrease with negative emotions towards investments. Investors experiencing positive emotions tend to behave optimistically. They see the bright side of the risky investments and tend to measure the possible outcome in terms of gain rather than in terms of loss, thus leading to an increased investment activity. With respect to negative emotions, the study found a negative relationship between EMO and FRT. Similar results were also found by other researchers (Brooks et al., 2021; Lee et al., 2011; Schulreich et al., 2016). The possible argument is that negative emotions are associated with critical thinking and more information processing. This results in the risk-averse nature of the investor. Some studies (Vazquez et al., 2014; Lerner et al., 2006) argue the contrary, that negative emotions lead to reckless decision-making and cause investors to feel more confident about risk taking. Hence, omitting the emotion factors while formulating the investment policies or theoretical models can provide an incomplete view of how individuals engage in investment decisions.

Overall sample findings revealed a positive relationship between FSE and FRT, supporting previous findings (Asebedo et al., 2019; Brooks et al., 2021; Stajkovic et al., 2018; Tang et al., 2019). Study findings align with the those of the PERMA (Positive emotion, Engagement, Relationships, Meaning, and Achievement) framework utilized by Asebedo et al. (2019) for their study. A possible explanation for our result is that higher levels of financial self-efficacy tend to increase the confidence and emotional wellbeing of an individual, which leads to higher financial risk tolerance. Hence, financial advisors should focus on developing practices that increase the financial self-efficacy level among the investors to make them sufficiently confident to participate in investments decisions.

The findings of the study suggest that INTOL is negatively correlated with the FRT of an investor. The possible explanation is that individuals react more strongly to losses than to equivalent benefits. Therefore, they avoid risks or uncertain investments, which may cause anxiety or fear of losing money. Similar findings have been reported by Buhr et al. (2009) and Conlin et al. (2015).

Sample results reveal that resilience (RESI) is positively and significantly correlated with the financial risk tolerance (FRT) of an investor. Resilience is a quality, behaviour, thought which can be developed or improved over time. Its malleable nature gives an opportunity to financial advisors and counsellors to develop this quality in an investor and help him/her to take financial risks. During financial adversity or uncertainty, it is resilience that tends to assist the

investor. Resilience, in a nut shell, leads to an increase in ability to cope with market anomalies, thus increasing the FRT of an investor. A similar finding was also reported by Brooks et al. (2021) and Salignac et al. (2019).

The findings of the study reveal that ANG has negative impact on an investor's FRT. Similar findings were presented by Owen (2011) and Tamimi et al. (2009). The argument of our study is based on the logic that persons with high anger levels tend to exaggerate the negative side and underestimate the positive side because anger generates feelings of hate and disgust. Angry investors view investments in terms of loss rather than in terms of gain. So, they avoid risk taking when confronted with risky investments. Contrary to our findings, several researchers (Brooks et al., 2021; Gambetti et al., 2012) report that trait anger is positively associated with attitude towards risk. According to their study, individuals with high scores on trait anger are more willing to invest in risky assets than individuals who score lower, as angry investors make more reckless decisions. They focus on only gaining rather than losing money.

The study endeavoured to take a look beyond the Big Five personality traits on which there is already an abundance of literature. The Big Five personality model contains only characteristics that are stable and cannot be strengthened or improved over time. However, the current research attempted to encompass all the dynamic personality traits that are present in investors and may be developed and increased over time. Further, there is a paucity of research on the direct association between dynamic personality characteristics and financial risk tolerance. The disclosure of the link between dynamic personality qualities, such as trait anger, financial self-efficacy, etc., and financial risk tolerance enables investors to deal with financial uncertainty and to take risky investment decisions.

The most important limitation of our study is that emotions and other dynamic personality characteristics change over time. Our research is only applicable to a given time period. Therefore, a future study should involve extended research periods (longitudinal data). Second, future research should focus on incorporating socio-demographic characteristics, such as culture, the significance of peer groups, etc., while analysing investor's FRT. The economic component of a country may also be included for analysis to make it more comprehensive, i.e. how changes in a country's economic status can influence an investor's risk tolerance. Furthermore, a future study may employ more objective measurements to examine investors' FRT. Researchers can compare investors of two or more nations based on these personality features. Future studies can take a large sample size to make their sample more representative. Researchers can increase the variety of investors by expanding the study's sample size. To expand the scope of this study, future research may incorporate financial literacy, investing expertise, etc. as a moderating variable between dynamic personality characteristics and financial risk tolerance.

References

- Abbott–Chapman, J.; Denholm, C.; Wyld, C. (2008). Social support as a factor inhibiting teenage risk-taking: Views of students, parents and professionals. *Journal of Youth Studies* 11(6): 611–627.
- Adger, W. N. (2000). Social and ecological resilience: Are they related? *Progress in Human Geography* 24(3): 347–364. <http://dx.doi.org/10.1191/030913200701540465>.
- Asebedo, S.; Payne, P. (2019). Market volatility and financial satisfaction: The role of financial self-efficacy. *Journal of Behavioral Finance* 20(1): 42–52.
- Awais, M.; Laber, M. F.; Rasheed, N.; Khursheed, A. (2016). Impact of financial literacy and investment experience on risk tolerance and investment decisions: Empirical evidence from Pakistan. *International Journal of Economics and Financial Issues* 6(1): 73–79.
- Bagozzi, R. P. (2000). The poverty of economic explanations of consumption and an action theory alternative. *Managerial and Decision Economics* 21(3–4): 95–109.
- Block, J. (1995). A contrarian view of the five-factor approach to personality description. *Psychological Bulletin* 117(2): 187–215. DOI: 10.1037/0033-2909.117.2.187.
- Breaban, A.; Noussair, C. N. (2018). Emotional state and market behavior. *Review of Finance* 22(1): 279–309.
- Brooks, C.; Sangiorgi, I.; Saraeva, A.; Hillenbrand, C.; Money, K. (2022). The importance of staying positive: The impact of emotions on attitude to risk. *International Journal of Finance & Economics* 1–30. <https://doi.org/10.1002/ijfe.2591>.
- Brooks, C.; Williams, L. (2021). The impact of personality traits on attitude to financial risk. *Research in International Business and Finance* 58: 101501. DOI: 10.1016/j.ribaf.2021.101501.
- Buhr, K.; Dugas, M. J. (2009). The role of fear of anxiety and intolerance of uncertainty in worry: An experimental manipulation. *Behaviour Research and Therapy* 47(3): 215–223.
- Campbell, J. Y. (2006). Household finance. *The Journal of Finance* 61(4): 1553–1604.
- Campos-Vazquez, R. M.; Cuijly, E. (2014). The role of emotions on risk aversion: A prospect theory experiment. *Journal of Behavioral and Experimental Economics* 50: 1–9. DOI: 10.1016/j.socec.2014.01.001.
- Carleton, R. N.; Norton, M. P. J.; Asmundson, G. J. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders* 21(1): 105–117.
- Chatterjee, A.; Hambrick, D. C. (2011). Executive personality, capability cues, and risk taking: How narcissistic CEOs react to their successes and stumbles. *Administrative Science Quarterly* 56(2): 202–237.
- Cobb-Clark, D. A.; Schurer, S. (2012). The stability of big-five personality traits. *Economics Letters* 115(1): 11–15.

- Conlin, A.; Kyröläinen, P.; Kaakinen, M.; Järvelin, M. R.; Perttunen, J.; Svento, R. (2015). Personality traits and stock market participation. *Journal of Empirical Finance* 33: 34–50.
- Cope, A.; Rock, A.; Schmeiser, M. D. (2013). *Risk perception, risk tolerance and consumer adoption of mobile banking services*. DOI: 10.2139/ssrn.2048565.
- Dhiman, B.; Raheja, S. (2018). Do personality traits and emotional intelligence of investors determine their risk tolerance? *Management and Labour Studies* 43(1–2): 88–99. DOI: 10.1177/0258042x17745184.
- Dietz, B. E.; Carrozza, M.; Ritchey, P. N. (2003). Does financial self-efficacy explain gender differences in retirement saving strategies? *Journal of Women & Aging* 15(4): 83–96.
- Droms, W. G. (1987). Investment asset allocation for PFP clients. *Journal of Accountancy* 163(4): 114–118.
- Dugas, M. J.; Buhr, K.; Ladouceur, R. (2004). The role of intolerance of uncertainty in etiology and maintenance. *Expert Review of Neurotherapeutics* 12(8): 937–947. DOI: 10.1586/ern.12.82.
- Farrell, L.; Fry, T. R.; Risse, L. (2016). The significance of financial self-efficacy in explaining women’s personal finance behaviour. *Journal of Economic Psychology* 54: 85–99.
- Fathollah Nouri, M. (2020). *The influence of intolerance of uncertainty on decision making in individuals with high trait anxiety*. Thesis. Available at: <https://studenttheses.uu.nl/handle/20.500.12932/39337>.
- Fessler, D. M.; Pillsworth, E. G.; Flamson, T. J. (2004). Angry men and disgusted women: An evolutionary approach to the influence of emotions on risk taking. *Organizational Behavior and Human Decision Processes* 95(1): 107–123.
- Field, A. (2009). *Discovering statistics using SPSS (introducing statistical methods)*. Sage Publications Ltd.
- Finucane, M. L.; Alhakami, A.; Slovic, P.; Johnson, S. M. (2000). The affect heuristic in judgments of risks and benefits. *Journal of Behavioral Decision Making* 13(1): 1–17.
- Forbes, J.; Kara, S. M. (2010). Confidence mediates how investment knowledge influences investing self-efficacy. *Journal of Economic Psychology* 31(3): 435–443.
- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin* 117(1): 39–66. <https://doi.org/10.1037/0033-2909.117.1.39>.
- Forgas, J. P.; Bower, G. H. (1987). Mood effects on person-perception judgments. *Journal of Personality and Social Psychology* 53(1): 53–60. DOI: 10.1037//0022-3514.53.1.53.
- Fornell, C.; Larcker, D. F. (1981). *Structural equation models with unobservable variables and measurement error: Algebra and statistics*. Los Angeles, CA: Sage Publications Sage CA.

- Freeston, M. H.; Rhéaume, J.; Letarte, H.; Dugas, M. J.; Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences* 17(6): 791–802.
- Friborg, O.; Barlaug, D.; Martinussen, M.; Rosenvinge, J. H.; Hjemdal, O. (2005). Resilience in relation to personality and intelligence. *International Journal of Methods in Psychiatric Research* 14(1): 29–42.
- Frijda, N. H. (1987). Emotion, cognitive structure, and action tendency. *Cognition and Emotion* 1(2): 115–143.
- Gambetti, E.; Giusberti, F. (2012). The effect of anger and anxiety traits on investment decisions. *Journal of Economic Psychology* 33(6): 1059–1069.
- Garman, E.; Fogue, R. (2011). *Personal finance*. Cengage Learning.
- Gibson, R. J.; Michayluk, D.; Van de Venter, G. (2013). Financial risk tolerance: An analysis of unexplored factors. *Financial Services Review* 22: 23–50.
- Goldberg, L. R. (1990). An alternative “description of personality”: The big-five factor structure. *Journal of Personality and Social Psychology* 5: 9(6): 1216–1229.
- Gondaliya, V.; Dhinaiya, G. (2016). Assessing financial risk tolerance: Do demographic, socioeconomic and attitudinal factors work. *International Journal of Marketing & Financial Management* 4(5): 32–38.
- Gable, J. (1999). Financial risk tolerance revisited: The development of a risk assessment instrument. *Financial Services Review* 8(3): 163–181. DOI:10.1016/S1057-0810(99)00041-4.
- Gable, J. E. (2016). Financial risk tolerance. In: Xiao, J. J. (ed.), *Handbook of consumer finance research*. Springer. 19–31.
- Gable, J. E.; Joo, S.–H. (2004). Environmental and biophysical factors associated with financial risk tolerance. *Journal of Financial Counseling and Planning* 15(1): 73–82.
- Hair, J. F.; Ortinau, D. J.; Harrison, D. E. (2010). *Essentials of marketing research*. Vol. 2. New York, NY: McGraw-Hill/Irwin.
- Hallahan, T. A.; Faff, R. W.; McKenzie, M. D. (2004). An empirical investigation of personal financial risk tolerance. *Financial Services Review* 13(1): 57–78.
- Hamurcu, C. (2019). Does resilience affect aversion-based behavioral finance biases? *Journal of Accounting, Finance and Auditing Studies* 5(1): 254–269.
- Hari, J.; Pirsch, E.; Rawitzer, H. (2018). Women are scaredy-cats and men are conquerors? *Journal of Financial Services Marketing* 23(2): 128–139.
- Hassan Al-Tamimi, H. A.; Anood Bin Kalli, A. (2009). Financial literacy and investment decisions of UAE investors. *The Journal of Risk Finance* 10(5): 500–516. DOI: 10.1108/15265940911001402.
- Hassan, E. U.; Shahzeb, F.; Shaheen, M.; Abbas, Q.; Hameed, Z.; Hunjra, A. I. (2013). Impact of affect heuristic, fear and anger on the decision making of individual investor: A conceptual study. *World Applied Sciences Journal* 23(4): 510–514.

- Henseler, J.; Ringle, C. M.; Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science* 43(1): 115–135.
- Johnson, E. J.; Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal of Personality and Social Psychology* 45(1):20–31.
- Kuhnen, C. M.; Knutson, B. (2011). The influence of affect on beliefs, preferences, and financial decisions. *Journal of Financial and Quantitative Analysis* 46(3): 605–626.
- Lapp, W. M. (2010). *The missing link: Financial self-efficacy's critical role in financial capability*. San Francisco, CA: EARN Research Institute. 54–63.
- Larkin, C.; Lucey, B. M.; Mulholland, M. (2013). Risk tolerance and demographic characteristics: Preliminary Irish evidence. *Financial Services Review* 22(1). DOI: 10.2139/ssrn.1969375.
- Lee, C. J.; Andrade, E. B. (2011). Fear, social projection, and financial decision making. *Journal of Marketing Research* 48(SPL): S121–S129.
- Leon, F. M.; Angie, A. (2020). Factors affecting financial risk tolerance on young investors in Indonesia. *Indonesian Management and Accounting Research* 18(1): 48–61.
- Lerner, J. S.; Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology* 81(1): 146–159. <https://doi.org/10.1037/0022-3514.81.1.146>.
- Lerner, J. S.; Tiedens, L. Z. (2006). Portrait of the angry decision maker: How appraisal tendencies shape anger's influence on cognition. *Journal of Behavioral Decision Making* 19(2): 115–137.
- Lown, J. M. (2011). Development and validation of a financial self-efficacy scale. *Journal of Financial Counseling and Planning* 22(2): 54–63.
- Marlatt, G. A. (1985). Situational determinants of relapse and skill-training interventions. In: Marlatt, G. A.; Gordon, J. R. (eds.), *Relapse prevention: Maintenance strategies in the treatment of addictive behaviors*. 71–127.
- McCrae, R. R.; Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology* 52(1): 81–90. <https://doi.org/10.1037/0022-3514.52.1.81>.
- Muktadir-Al-Mukit, D. (2020). Do sociodemographic factors have influence on risk tolerance level of stock market investors? An analysis from a developing country perspective. *South Asian Journal of Business Studies* 11(2): 149–173. DOI: 10.1108/sajbs-11-2019-0193.
- Nguyen, L.; Gallery, G.; Newton, C. (2019). The joint influence of financial risk perception and risk tolerance on individual investment decision-making. *Accounting & Finance* 59(1): 747–771.
- Nunnally, J. C. (1994). *Psychometric theory 3E*. New York, NY: Tata McGraw-Hill Education.

- Nusair, K.; Hua, N. (2010). Comparative assessment of structural equation modeling and multiple regression research methodologies: E-commerce context. *Tourism Management* 31(3): 314–324.
- Oshio, A.; Taku, K.; Hirano, M.; Saeed, G. (2018). Resilience and Big Five personality traits: A meta-analysis. *Personality and Individual Differences* 127: 54–60.
- Owen, J. M. (2011). Transdiagnostic cognitive processes in high trait anger. *Clinical Psychology Review* 31(2): 193–202.
- Panksepp, J. (2005). Affective consciousness: Core emotional feelings in animals and humans. *Consciousness and Cognition* 14(1): 30–80.
- Patel, M. B.; Dave, G. (2019). A study of impact of bio-psychosocial characteristics of an investor on financial risk tolerance with special reference to investors in Anand City. *International Journal of Innovative Studies in Sociology and Humanities (IJISSH)* 4(4): 97–103.
- Pease, C. R.; Lewis, G. J. (2015). Personality links to anger: Evidence for trait interaction and differentiation across expression style. *Personality and Individual Differences* 74: 159–164.
- Rai, K.; Gupta, A.; Tyagi, A. (2021). Personality traits leads to investor's financial risk tolerance: A structural equation modelling approach. *Management and Labour Studies* 46(4): 422–437. DOI: 10.1177/0258042x211018955.
- Rosser, B. A. (2019). Intolerance of uncertainty as a transdiagnostic mechanism of psychological difficulties: A systematic review of evidence pertaining to causality and temporal precedence. *Cognitive Therapy and Research* 43(2): 438–463.
- Rustichini, A.; DeYoung, C. G.; Anderson, J. C.; Burks, S. V. (2012). Toward the integration of personality theory and decision theory in the explanation of economic and health behavior. *SSRN Electronic Journal*. DOI: 10.2139/ssrn.2119057.
- Salignac, F.; Marjolin, A.; Reeve, R.; Muir, K. (2019). Conceptualizing and measuring financial resilience: A multidimensional framework. *Social Indicators Research* 145(1):17–38.
- Sarwar, D.; Sarwar, B.; Raz, M. A.; Khan, H. H.; Muhammad, N.; Azhar, U.; Kasi, M. K. (2020). Relationship of the Big Five personality traits and risk aversion with investment intention of individual investors. *The Journal of Asian Finance, Economics and Business* 7(12): 819–829. DOI: 10.13106/jafeb.2020.vol7.no12.819.
- Schaefer, R. E. (1978). *What are we talking about when we talk about "risk"? A critical survey of risk and risk preference theories*. Laxenburg: IIASA.
- Schulreich, S.; Gerhardt, H.; Heekeren, H. R. (2016). Incidental fear cues increase monetary loss aversion. *Emotion* 16(3): 402–412.
- Seo, M.-G.; Barrett, L. F. (2007). Being emotional during decision making—good or bad? An empirical investigation. *Academy of Management Journal* 50(4): 923–940.

- Shafiezadeh, R. (2012). The relationship between resilience and the big five personality factors. *Knowledge & Research in Applied Psychology* 13(3): 95–102.
- Shusha, A. A. (2017). Does financial literacy moderate the relationship among demographic characteristics and financial risk tolerance? Evidence from Egypt. *Australasian Accounting, Business and Finance Journal* 11(3): 67–86.
- Smith, B. W.; Dalen, J.; Wiggins, K.; Tooley, E.; Christopher, P.; Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine* 15(3):194–200.
- Spielberger, C.; Jacobs, G.; Russell, S.; Crane, R. (1983). Assessment of anger: The state-trait anger scale. *Advances in Personality Assessment* 2: 161–189.
- Stajkovic, A. D.; Bandura, A.; Locke, E. A.; Lee, D.; Sergent, K. (2018). Test of three conceptual models of influence of the big five personality traits and self-efficacy on academic performance: A meta-analytic pathanalysis. *Personality and Individual Differences* 120: 238–245.
- Stajkovic, A. D.; Luthans, F. (1998). Social cognitive theory and self-efficacy: Going beyond traditional motivational and behavioral approaches. *Organizational Dynamics* 26(4): 62–74. [https://doi.org/10.1016/S0090-2616\(98\)90006-7](https://doi.org/10.1016/S0090-2616(98)90006-7).
- Sung, J.; Hanna, S. D. (1996). Factors related to risk tolerance. *Financial Counseling and Planning* 7: 11–20.
- Tang, S.; Huang, S.; Zhu, J.; Huang, R.; Tang, Z.; Hu, J. (2019). Financial self-efficacy and disposition effect in investors: The mediating role of versatile cognitive style. *Frontiers in Psychology* 9: 2705. DOI: 10.3389/fpsyg.2018.02705.
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the positive and negative affect schedule (PANAS). *Journal of Cross-Cultural Psychology* 38(2): 227–242.
- Wahl, I.; Kirchler, E. (2020). RiSk SCreening on the Financial Market (RISC–FM): A tool to assess investors’ financial risk tolerance. *Cogent Psychology* 7(1): 1714108. DOI: 10.1080/23311908.2020.1714108.
- Weber, E. U.; Hsee, C. (1998). Cross-cultural differences in risk perception, but cross-cultural similarities in attitudes towards perceived risk. *Management Science* 44(9): 1205–1217.
- Young, S.; Gudjonsson, G. H.; Carter, P.; Terry, R.; Morris, R. (2012). Simulation of risk-taking and its relationship with personality. *Personality and Individual Differences* 53(3): 294–299. DOI: 10.1016/j.paid.2012.03.014.
- *** *The Kaiser–Meyer–Olkin (KMO) test for sampling adequacy*. Available at: <https://www.statisticshowto.com/kaiser-meyer-olkin/>.



Does Gender Wage Gap Exist among Farm Workers in Nigeria? Evidence from Decomposition-Matching Analysis

Abdulrazaq K. DAUDU,^{1*} Oyedola W. KAREEM,¹
Latifat K. OLATINWO,² Suleiman B. SHUAIB,³
Abdulganiyu I. ABDULRAHMAN⁴

¹Department of Agricultural Extension and Rural Development,
University of Ilorin, Ilorin, Nigeria

²Department of Agricultural Economics and Extension,
Kwara State University, Malete, Nigeria

³Department of Science Education, Agricultural Unit,
University of Ilorin, Ilorin, Nigeria

⁴Department of Economics, University of Ilorin, Ilorin, Nigeria

e-mails: ^{1*} daudu.ak@unilorin.edu.ng, kareem.ow@unilorin.edu.ng,

² latifatolatinwo@hotmail.com, ³ shuaib.sb@unilorin.edu.ng,

⁴ agrahman@unilorin.edu.ng

Abstract. Using a cross-sectional survey data of agricultural farms, we investigate gender-based differences in farm wages among farm workers by randomly allocating farm workers into treatment (female) and control (male) groups with a simple random sampling technique. We used the Blinder–Oaxaca decomposition method to establish the gender wage gap and Propensity Score Matching to address assumptions and heterogeneity difficulties that plague the decomposition technique. Results show that female farm workers earn ₦9,170.83 less compared to their male counterparts, which indicates an unadjusted gender gap. This gender gap in farm wages is explained by the specific factors included in our model, so upgrading these variables could reduce gender inequalities in farm wages. Matching results indicate that the gender gaps estimated with nearest neighbour matching and kernel-based matching are 9.8% and 21.6% higher, respectively, than the gaps measured by the decomposition technique. Thus, the matching procedure was successful in identifying a sizeable proportion of gender gaps that are unexplained due to discrimination between male and female farm workers.

Keywords: decomposition, farm workers, gender wage inequality, labour, matching, wage gap

JEL Classification: J01, J16, J31

1. Introduction

Most people in Africa, south of the Sahara, work in agriculture. The phenomenon known as “casualization” occurs as a result of decreased pressure on labour costs brought on by the increased industrialization of agriculture and increased global competition. In order to supplement their revenue, independent smallholder farmers are becoming more and more dependent on paid labour. For women, these patterns have important implications. The increasing proportion of women in the labour market is one of the most obvious current trends. For example, women make up more than 45% of the Nigerian workforce (World Bank, 2019). In both rural and urban areas between 1990 and 2009, women’s participation in the formal and informal labour market increased, but it remained lower than that of men (Olowa and Adeoti, 2014). There is a significant gender education gap, with net enrolment rates for boys and girls of 70 percent and 58 percent respectively (World Bank SCD, 2018). A lack of investment in women limits their ability to enter the labour market, work successfully, and advance into more secure, high-paying employment (Enfield, 2019).

Both men and women work in agriculture as wage or family workers. Unlike wage labour, which is remunerated, family labour is not, but family members always appreciate it (Ajah, 2012). According to FAO (2011), the amount of family labour that a household can mobilize and the amount of labour that can be hired in local labour markets affect labour availability. According to the data, the wage gap between men and women is the highest and lowest at the top of the income distribution, while wages for hired farm workers are low (Blau and Kahn, 2017). Several studies have been undertaken to estimate the value of work in agriculture (Haruna et al., 2010; Jirgi et al., 2011; Lawal et al., 2008; Anyanwu, 2010; Iheke and Nwaru, 2009; Okoye et al., 2009). According to all research results, labour input has a significant impact on agricultural production and productivity (Ajah, 2012). Because of their position and responsibilities within the family, both men and women can own farms. Housekeeping is by far the most widespread form of employment in agriculture, while employment is rare. Households without paid labour, whether agricultural or non-agricultural, produce primarily for their own use (subsistence) or for modest profits, from which households purchase their essentials for consumption. According to the World Bank SCD (2018), most women are stuck in low-paying jobs due to the high proportion of women in agriculture (73.5 percent). It is evident from the value of labour in agriculture that work, whether performed by men or women, has a substantial impact on the growth of agriculture. But this is also one of the key reasons why men and women fight, particularly in poor nations like Nigeria. The gender wage gap, or the discernible discrepancy between men’s and women’s wages, has been the subject of political debate and economic research for several decades (ILO, 2009). Suffragettes and

feminists have argued that wages for women's work are lower than for men's work. Despite the fact that women are seen as more involved in agricultural production, they claimed that women were underpaid in agriculture, as men earned more than women. According to several studies (Fontana, 2009; ILO, 2009; Ahmed and Maitra, 2010), typically women are paid less than males for jobs with equivalent levels of education and experience (Ajah, 2012).

The evidence attempts to explain wage differentials in the workplace in terms of observable individual characteristics (such as education, experience, occupation and occasionally motivation, expectations, and field of study) and horizontal and vertical employment segregation. While the wage gap has decreased generally in size over time, Blau, Lawrence, and Kahn (2006) found that the percentage of the disparity that cannot be accounted for by characteristics connected to human capital is growing. These factors can account for a sizeable portion of the gender pay gap, although most analyses, according to the OECD (2009), leave out a sizeable portion of the disparity. The unexplainable aspect of the gender pay gap demonstrates the impact of covert problems such as discrimination against women in the workplace. Since it is rarely obvious and there are measurement challenges, it is challenging to determine just how much it contributes to the magnitude of the wage gap. Gender wage gaps, segregation, and inequality in productive sectors, including agriculture, are significant global challenges that require gender mainstreaming in policy frameworks (Adam, Osano, Birika, Amadi, and Bwisa, 2017; Bryant, 2006; Holmes and Slater, 2008; Kilu, 2017; Mbilinyi, 2016; Orr et al., 2016; Peterman, Quisumbing, Behrman, and Nkonya, 2011; Mensah-Bonsu et al., 2019). Some studies in Nigeria have examined pay disparities across a range of occupations, but they have not specifically focused on gender (Aderemi, 2015; Aromolaran, 2006; Ogwumike et al., 2006). Aminu (2010) evaluated the effects of government wage review policies on the pay difference for urban male and female workers in the public and private sectors in his most recent and sole study on gender pay gap. Furthermore, to the best of our knowledge, none of these studies have attempted to close or at least narrow the gender pay gap in agribusiness.

This study would add to the existing body of literature on gender and wage gaps among Nigerian farm workers. Reducing the wealth gap between men and women is high on the Nigerian government's policy agenda, as evidenced by a series of induction programmes. Understanding these differences is crucial to achieving gender equality and tackling wage stagnation and poor pay more generally. Given that women are paid equally for an equal amount of work, determining the gender pay gap among hired agricultural workers is crucial for social justice (Fisher et al., 2021). However, for economic growth, the importance of labour as a factor of production and the gender wage gap among agricultural workers are particularly relevant to discussions about sustainable food policy in sub-Saharan Africa.

The remainder of this work is structured as follows. Section 2 focuses on a global review of relevant literature, and Section 3 presents the methodology, sampling technique, data collection, and estimation strategy. In Section 4, we report the results of the empirical findings and discussion, while Section 5 concludes the study and draws policy recommendations.

2. Review of Relevant Literature

Women in Nigeria have advanced significantly in the workplace during the past three decades, with higher labour force participation, notable increases in educational attainment, growth in employment in higher-paying occupations, and notable increases in real income. Despite these improvements, there is still a gender pay gap that favours men in almost all occupations (Fapohunda, 2013). The prevalent consensus is that salaries for men and women are different. Equal pay laws were passed in Nigeria about 40 years ago. Gender equality laws have been strengthened by the Equality Act 2010 and the Gender Equality Duty 2007, which is mandatory for all public organizations. However, Nigeria still has a long way to go to achieve equality in the workplace. Nigeria, where women are underrepresented in higher-paying, more prestigious positions, has one of the largest gender pay discrepancies in the world, according to the UNDP (2009). The lower pay for women adversely affects their families and children due to the resulting financial instability. When workers are well rewarded, they are driven to perform better (Fapohunda, 2013). Nigerians perceive unemployment as being considerably more urgent than poverty despite the fact that it is estimated that one third of the country's population lives in poverty (World Bank, 2015). Prior to 2015, the country saw a very high and sustained economic growth although this had minimal effect on the poverty rate. Nigeria has emerged from its 2016 recession, according to the magazine *Enhancing Financial Innovation & Access* (EFInA, 2018). The formal economy employs only 8% of adults, and thus even modest gains in economic growth have not had a favourable effect on employment rates. 11.2 percent work in their own businesses unrelated to farming, 16.7 percent own their own firms, and 23.4% rely on farming as their primary source of income (EFInA, 2018). Olowa and Adeoti (2014) assert that women's engagement in the job market is greatly impacted by their level of education. Olowa and Adeoti (2014) used data from the Harmonized National Living Standard Survey to analyse the effects of education on women's labour market involvement in rural Nigeria (NLSS, 2010). Women work in non-farm enterprises in 26.85% of the cases and on farms in 73.15 percent. The primary agricultural, forestry, and fishing activities on these farms are agriculture and angling. Non-farm activities include, among other things, manufacturing, sales, and services (Enfield, 2019).

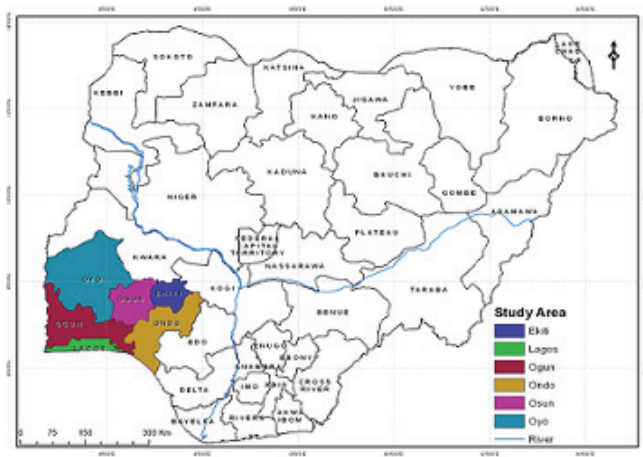
In Nigeria, a person's career path is mostly determined by their birth circumstances, including their residence, gender, and the line of employment of their parents. For instance, general Household Survey panel statistics show that 50% of the children of agricultural workers are employed in the industry (Enfield, 2019). This demonstrates how factors like skills, effort, and talents – which should generally have an impact on job outcomes – are typically unrelated to personal opportunity and employment outcomes (World Bank, 2015). Discrimination against women is pervasive in the workplace. They make less money for the same amount of education and experience, are less likely to be active than men are, and are more likely to work in low-paying fields like agriculture and unofficial occupations (World Bank, 2015). Ekerebi and Adeola (2017) stress how male and female farmers' crop values differ from one another. Women do a wide range of duties and make up between 60 and 80 percent of the labour force, making them the backbone of the agricultural industry. Despite the importance of their work, female farmers have less access to resources and less control over their plots than male farmers (FAO, 2011). A gender discrepancy in crop value was noted in both the southern and northern regions. Female farmers use less fertilizers and are less likely to use irrigation or automated farming techniques despite the fact that male farmers have more household wealth and better crop values (Enfield, 2019). Differences in wealth, education, and access to irrigation may contribute to some of the variations in crop value (Ekerebi and Adeola, 2017).

According to Hertz et al. (2009), men in Ghana made 31% more money than women in urban areas and 58% more money in rural areas. The Women on Farms Project (WFP) and the Centre for Rural and Legal Studies (CRLS) conducted research on this in 2009. According to the survey, women received 457 rand on a monthly basis, while men received an average of 667 rand. With the exception of rural Panama, where women made an average of 11% more than men, Hertz et al. (2009) found that women in rural regions earned on average 28 percent less than men. Economic and gender inequality are interrelated and reinforce each other. In Nigeria, women are subjected to a wide range of traditional and sociocultural discriminatory practices that have an impact on their lives and disadvantage them relative to males in a number of circumstances. For instance, just 28% of the wealthiest males and 75.8% of the poorest women never attended school. Women are much less likely than men to own land. Additionally, women favour low-paying, unskilled employment (British Council, 2012). Men typically occupy permanent positions in export value chains, whereas women are typically hired as temporary or casual employees (Deutsche Gesellschaft für Internationale Zusammenarbeit, 2013). The growth and productivity that are fuelled by agriculture can be significantly impacted by empowering women. Given equal access to supplementary resources such as education, women would be equally productive as agricultural producers as men and could provide comparable returns (USAID, 2011).

3. Data and Methods

The Study Area

We conducted our research in southwest Nigeria. The region, which is presented in *Figure 1*, is located between latitudes 6N and 4S and longitudes 4W and 6E and is made up of six states: Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo. It covers roughly 114,271 km² in size. South-west Nigeria experiences 1,200–1,500 mm of annual rainfall on average, with monthly average temperatures that range from 18–24 °C in the rainy season to 30–37 °C in the dry season (Adepoju et al., 2011). Due to the rich alluvial soil, agriculture predominates in this region of the country. Cassava, corn, yam, coconut yam, cowpea, vegetables, and cash crops such as cacao, kola nut, rubber, citrus, coffee, cashew, mango, and oil palm are among the main food crops.



Source: authors' compilation (2022)

Figure 1. Map of Nigeria showing the south-western region

Sampling Method

A three-stage sampling process was used to select respondents for this study. The first phase involved a random selection of 50% of the states in the south-west region of the country (i.e. Ogun, Osun, and Oyo). In the second phase, 8 agricultural companies (including crop production, poultry/livestock farming, and agro-processing) were randomly selected from each state, amounting to a total of 24 companies. The list of registered agricultural workers was retrieved from the respective national associations of agricultural companies (arable farmers, poultry/

livestock, and agro-processing). In the third phase, 30 farm workers (15 male and 15 female) were randomly selected from each of the farms, totalling 720 (360 male and 360 female) respondents.

Data Collection and Analysis

The World Bank Survey Solutions application was used to collect empirical data via a survey questionnaire that was deployed on tablets running the Android operating system. The questionnaire was divided into categories according to our study's objectives. Before answering questions posed by the surveyors, respondents were required to sign a consent form. All respondents were encouraged to leave at any moment during the survey if they felt uncomfortable. Every respondent received sufficient information regarding our study's goal and the benefits of participating. To quantify the gender pay gap and determine how much of it is due to socioeconomic factors, various agricultural activities (farming, livestock, poultry, and agricultural processing and marketing) and how much is not accounted for and may be the result of discrimination, we used parametric (Blinder–Oaxaca decomposition) and non-parametric (Propensity Score Matching, PSM) methods. The gender wage gap was determined using the Blinder–Oaxaca decomposition analysis (Blinder, 1973; Oaxaca, 1973), but the PSM has the advantage of avoiding the parametric assumptions of the Blinder–Oaxaca method and addressing the heterogeneity problems that plague the parametric decomposition methods (Ñopo, 2008). As a result, PSM encourages comparable comparisons. In short, the two methods are complementary, and their combination allows for a robustness check of the results.

Estimation Strategy

Blinder–Oaxaca decomposition: The Blinder–Oaxaca decomposition technique has been extensively used in the literature (Fisher et al., 2021) to investigate the possible reasons of intergroup differences in outcome variables. We used the Blinder–Oaxaca decomposition technique (Blinder, 1973; Oaxaca, 1973) to measure and explain gender differences in wage payments in this study. This has become a standard method for separating “gaps” in outcome variables such as farm workers' wages among different population groupings. Estimating the wage pay equation for male and female subsamples is the first step in the Blinder–Oaxaca decomposition method:

$$Y_i = \beta_i X_i + \varepsilon_i, \quad (1)$$

where Y is the wage's natural log, i represents male (m) and female (f) hired farm workers, X represents a vector of control variables, and β shows the average change in Y that corresponds to a unit change in X . The statistical error term ε , which is

a random variable that explains why the model cannot fit the data perfectly, is used to correct for the other explanatory factors in the model. Our specification of X followed Barham et al. (2020), who examined the key variables affecting wages, annual income, and poverty levels of US farm workers, and Fisher et al. (2021), who analysed farm workers and the gender pay gap in US agriculture. The vector X includes the socioeconomic characteristics (such as age, marital status, education, household size), farm job characteristics (job tenure, hours worked, various farm job tasks such as land preparation and cultivation, harvest and post-harvest handling, or processing), and the state fixed effects. The estimated male–female wage disparity is then divided into components that can be explained and that remain unexplained:

$$\bar{Y}_m - \bar{Y}_f = \hat{\beta}_m(\bar{X}_m - \bar{X}_f) + \bar{X}_f(\hat{\beta}_m - \hat{\beta}_f) = E + U, \quad (2)$$

where \bar{Y} and \bar{X} indicate the dependent and explanatory variables' means, $\hat{\beta}_m$ and $\hat{\beta}_f$ are the estimates of the parameters in equation (1) for male and female farm workers separately, \bar{Y}_m and \bar{Y}_f are the expected mean values of the dependent variable for the subsamples of male and female farm workers, \bar{X}_m and \bar{X}_f represent the average values of vector variables for male and female farm workers that determine their wage pay, and $\hat{\beta}_m - \hat{\beta}_f$ denotes the vector of estimated returns to the wage gap factors for male and female farm workers respectively. The percentage of the average salary gap between men and women that is due to variations in the measurable attributes of men and women is shown in the first set of terms following the first equal sign in Equation (2); this is often referred to as the “Explained Gap”, or “Endowment Effect” (E). The second set of terms following the first equal sign in Equation (2) stands for the fraction of the gender pay difference caused by changes in returns on unmeasured qualities, also known as the “Unexplained Gap” (U). However, some studies have linked the unexplained gap to women’s increased demand for time flexibility in the workplace (Goldin, 2014; Fisher et al., 2021), weaker bargaining skills (Babcock and Laschever, 2009), and less competitive nature (Niederle and Westerland, 2007). The impact of discrimination as well as any unmeasured traits that are correlated with both gender and farm wages are included in the upper measure of pay discrimination known as U . This measure also takes into account the influence of unmeasured factors.

Propensity Score Matching (PSM): Due to differences in the empirical distribution of attributes, the Blinder–Oaxaca decomposition could not be accurate when used between male and female farm workers (Frlich, 2007; Ñopo, 2008). According to Frlich (2007), this misspecification can be addressed by Propensity Score Matching (PSM), which enables us to distinguish between and compare farmers taking account of the observations between men and women. According to Frlich (2007), PSM is well suited to distinguish between wage differentials caused by discrimination and other unobserved factors and those caused by unequal human

capital endowments. Meara et al. (2020) and Fisher et al. (2021) published two recent studies that used PSM to examine the gender wage gap among agricultural workers. PSM was therefore employed to evaluate the common disparity in farm pay between male and female agricultural labourers. A binary choice model calculates the propensity score, which in this example indicates the likelihood that a farm labourer is female, in the first PSM step. We employ a logit model to regress the binary female variable on the previously mentioned explanatory variables, X . Then, using a matching algorithm, we matched each female farmworker to one or more male farmworkers depending on how close their propensity scores were. After estimating the propensity for each group of farmworkers, we estimated the average treatment on the treated (ATT) adopting the most widely used matching approaches in the literature, such as nearest neighbour matching (NNM) and kernel-based matching (KBM), pioneered by Heckman (1997). We were able to compare the propensity values between the treatment and control groups using nearest neighbour matching. Then, using these modified controllers, the counterfactual is built for the treated entities. Using the weighted average of the outcomes, kernel matching determines the difference between each outcome observation in the treated group and the control group. Each control group is given a weight based on their distance from the treatment unit. An overview of how to understand various matching estimators is provided by Heckman et al. (1998), Dehejia and Wahba (2002), and Frölich (2004). Following Hosny (2013), we represent the two ATT matching estimators as follows:

$$ATT = \frac{1}{n^1} \sum 1 \{ (Y_{1i} | T_i = 1) - \sum j r_1 (Y_{0i} | T_i = 0) \}, \quad (3)$$

where n^1 is the total number of treatment cases, and r stands for a system of scaled weights that calculates how far apart each control unit and the intended treatment unit are from one another. According to Morgan and Harding (2006), the main differences between these estimators are the weight given to multiple matches (r) when more than one is employed and the number of matches determined for each target case to be matched. The mean treatment effect on those treated (ATT) is estimated using Equation (4) and by averaging the within-game variations in the outcome variable (farm wages) between the treated and control groups (Rosenbaum and Rubin, 1985; Dehejia and Wahba, 2002), as follows:

$$E(Y_1 - Y_0 | T = 1, P(x)) = E[E(Y_1 | T = 1, P(x)) - E(Y_0 | T = 0, P(x))] \quad (4)$$

In the final PSM phase, differences between matched treatment and control cases are calculated for the outcome variable (log of farm earnings). The average treatment effect, a measurement of the unexplained gender pay disparity in farm wages, is the sum of these changes.

Results and Discussion

Descriptive Statistics Results

Table 1 presents the descriptive statistics of all variables of interest for our sample of farm workers. We use the t-test statistics technique to estimate the descriptive statistics of our selected samples. Using this technique, we were able to examine whether there are indeed differences between the treatment and control groups with regard to the explanatory variables. For this study, our treatment variable is a female farm worker, while a male farm worker was used as a control and was constructed as a binary variable taking values of 1 and 0 respectively. Significant differences existed in both the binary and continuous variables included in our descriptive analysis for the sampled farm workers. Our outcome variable is farm wages, which was measured in term of naira per month. Our outcome (farm wages) was supported by Fisher et al. (2021), who examined farm workers and gender wage gap in US agriculture and used real wage per hour as a measure of outcome variable. By average, our results show that the farm wage was ₦38,320.83/month for men and ₦29,150.00/month for female farm workers. Female farm workers were likely to receive about 24% less monthly wages than their male counterparts. This finding shows a gender gap in wages among farm workers, which is statistically significant ($p < 0.01$), and this could be influenced by some socioeconomic and institutional factors. Our result corroborates the work of Fisher et al. (2021), who revealed a gender difference in real wage among US farm workers. Our results show that farm workers are on average 37.54 years old for the full sample. When comparing the age of agricultural workers between men (38.49 years) and women (36.65 years), there was no significant age difference between the two categories at 0.01%. However, this finding suggests that they are all at a young and active age. Results indicated that the average number of years of schooling was 7.54 years for male and 6.34 years for female farm workers, respectively, in the entire sample. The educational levels of male and female farm workers are not significantly different. This finding supports the earlier work of Fisher et al. (2021), where no significant difference was found among US agricultural workers. The high rate of transition from basic to higher education observed among male and female farm workers suggests why education is more valued especially in southwest Nigeria. This supports the FAO's (2013) claim that Nigeria's literacy rate has been rising since 1991; from 66.4 percent in 2008 to about 80 percent in 2015. In addition, the average household size of farm workers in the male subsample was 8.13 people, while in the case of the female colleagues was 6 people. In comparison, there is a significant difference between the two categories at 1%. Results in *Table 1* show that the majority of male and female farmworkers had more than 10 years of farming experience, with a significant difference observed between the two groups ($p < 0.01$).

Table 1. Descriptive statistics, overall and by gender

Variable	Total sample (N = 720)		Male farm workers (n = 360)		Female farm workers (n = 360)		Mean difference	t-values	p-values
	1	2	3	Mean	S.D.	(2-3)			
	Mean	S.D.	Mean	S.D.	Mean	S.D.			
Dependent variable									
Farm wage (₦/month)	33735.42	8395.42	38320.83	8480.92	29150.00	5206.449	9170.83	14.277	0.000***
Socioeconomic characteristics									
Age of farm worker (years)	37.54	7.522	38.49	8.097	36.65	6.800	1.775	2.601	0.004***
Marital status (1 = married, 0 = otherwise)	1.16	0.365	1.21	0.407	1.11	0.311	0.100	3.023	0.000***
Education (years of schooling)	6.94	5.695	7.54	5.710	6.34	5.628	1.200	2.319	0.925
Household size (number)	7.06	1.533	8.13	1.251	6.00	0.939	2.121	20.996	0.002***
Farm work experience (years)	13.07	4.151	13.34	5.134	12.79	2.833	0.554	1.464	0.000***
Membership of labour union (1 = yes, 0 = otherwise)	0.78	0.417	0.88	0.331	0.68	0.468	0.196	5.292	0.000***
Number of years of residence in the village	14.51	6.085	13.2	7.689	15.81	3.417	-2.604	-4.795	0.000***
Job characteristics									
Job status (1 = permanent, 0 = otherwise)	0.48	0.501	0.54	0.499	0.42	0.495	0.121	2.663	0.114*
Job skill (1 = skilled, 0 = otherwise)	0.62	0.486	0.70	0.457	0.53	0.499	0.171	3.906	0.000***
Lives on farm (1 = yes, 0 = otherwise)	0.31	0.462	0.37	0.483	0.25	0.434	0.117	2.784	0.000***
Average work hours (hours/month)	41.71	9.366	47.95	7.244	35.48	6.726	12.471	19.544	0.688
Farm work/activities									
Crop farming	0.25	0.432	0.23	0.424	0.26	0.469	-0.029	-0.739	0.140*
Poultry	0.29	0.457	0.33	0.469	0.27	0.443	0.058	1.400	0.005**
Livestock	0.23	0.422	0.29	0.454	0.18	0.381	0.113	2.943	0.000***
Agro-processing	0.22	0.412	0.15	0.354	0.29	0.454	-0.142	-3.816	0.000***

Source: field survey (2022)

Notes: T-test was performed to test differences in socioeconomic characteristics between male and female farm workers; *, **, *** means significance at 10, 5, and 1% respectively.

This was consistent with the results of Tsue et al. (2014), who found that the majority of arable farms have more than 10 years of experience. In addition, *Table 1* shows that 88% of male and 68% of female farm workers for the respective subsample are members of labour unions. A statistically significant difference was observed between male and female farm workers ($p < 0.01$). Further results in *Table 1* showed that the average number of years of residence in the community was 14.51 years for the entire sample. To compare the two groups, 13.2 years was the average length of stay in the community among male farmworkers, while that of their female counterparts was 15.81 years. This difference is also statistically significant at 1%. *Table 1* reveals gender-based disparities in the job status of male and female farm workers, which are statistically significant ($p < 0.1$). Also, statistically significant gender-based disparities are found in some job characteristics. For instance, half of the male farm workers are members on the permanent staff of their respective farms compared to 42% of female farm workers. This gender-based difference suggests that temporary/casual labour is more common among female farm workers. The use of casual labour as observed among the majority of female farm workers is against the International Labour Law. The job skill is also far lower among female farm workers, with about 25% lower than male farm workers who live on farms. Female farm workers were slightly (26%) more involved in crop farming activities than male farm workers (23%), which reflects a significant difference at 0.01. In comparison to male farm workers, female farm workers were less engaged in poultry (27%) and livestock (17%) firms but worked more (29%) in agro-processing farms.

Blinder–Oaxaca decomposition

The results of the Blinder–Oaxaca decomposition are presented in *Table 2* and show the estimated gender difference for our outcome variable (farm wages) and the net explained and unexplained proportions of the measured differences. *Table 2* shows that female farm workers earn ₦9,170.83 less compared to their male counterparts and thus indicate an unadjusted gender gap. The overall percentage of the unadjusted gender gap explained was 10.79%, and most of this gender gap in farm wages can be accounted for by the variables included in our model. In the unexplained gap, our results show that female farm workers earned ₦8,181.33 less in monthly farm wages compared to male farm workers. This unexplained component indicates that some of the gender farm wage gap is due to unmeasured factors and/or discrimination against female workers, while the explained difference may be due to variables included in our model, suggesting that the observed difference might be due to differences in endowments between male and female farm workers. The results of our unexplained gender gap confirm previous findings by other researchers, who observed several reasons underlying the unexplained gap, such

as: Goldin (2014) – women’s greater demand for flexibility at work; Babcock and Laschever (2009) – lower negotiation skills; Niederle and Vesterland (2007) – lower desire for competition.

Table 2. Summary of the results of the Blinder–Oaxaca decomposition

Wage decomposition	Coefficient	Robust Standard Error
Predicted male farm workers’ wage mean	38320.83***	546.939
Predicted female farm workers’ wage mean	29150.00***	335.746
Difference (unadjusted gap)	9170.833***	641.769
Explained gap	989.509	1055.693
% Explained gap (% of total)	10.79	
Unexplained gap	8181.325***	1233.414
% Unexplained gap (% of total)	89.21	

Source: authors’ computation (2022)

Note: *** means statistically significant at 0.001 significance level.

Contributions of Individual Covariates to Explained Gender Gap

The contributions of each covariate included in our model to the explained part of the gender difference in farm wages are shown in *Table 3*, where the positive percentages indicate variables that increase gender inequality, while negative percentages indicate the opposite. In our results, we found that seven variables explained most of the gender difference in farm wages among farm workers. These variables are reflected in socioeconomic (age, marital status, household size, and number of years in the village) and occupational characteristics (occupational status and average hours worked per month). The majority (90%) of the explained gender gap in farm wages shows that female farm workers earn lower wages, have fewer people in their household, and have less farm work experience compared to their male counterparts. In addition, female farm workers work fewer hours and are less involved in farming activities than men.

Our results show that female farm workers are on average 1.78 years younger compared to their male counterparts (*Table 1*), and farmers’ age accounts for about 6.76% of the explained gap (*Table 3*). In addition to socioeconomic differences, 6.96% of the explained gender gap in farm wages is due to female farm workers marrying less often than their male counterparts. In addition, female farm workers have on average fewer family members (*Table 1*) than male farm workers, explaining about 38.94% of the explained gender gap in farm wages (*Table 3*). Female farm workers are most involved in temporary or casual work, meaning they are less permanently employed in farm work compared to their male counterparts, accounting for 12.37% of the declared gender gap in farm wages. *Table 1* shows that female farm workers worked on average 12.47 hours less than their male counterparts,

and this is directly responsible for a large proportion (60.09%) of the explained gender gap in farm wages. Our findings are in line with those of Cha and Weeden (2014), who demonstrated that one major factor contributing to the persistence of the wage gap between men and women was the higher prevalence of long hours for men compared to women, along with a higher profitability for overwork compared to full-time work. As observed in recent studies (Fisher et al., 2021; Kiefer et al., 2020; Fairlie and Robb, 2009), most of the gender difference in outcome variables can be strongly explained by demographic/socioeconomic, human, and physical characteristics.

Table 3. Detailed estimates of the Blinder–Oaxaca decomposition analysis: model variables and their percentage contribution to the explained gap

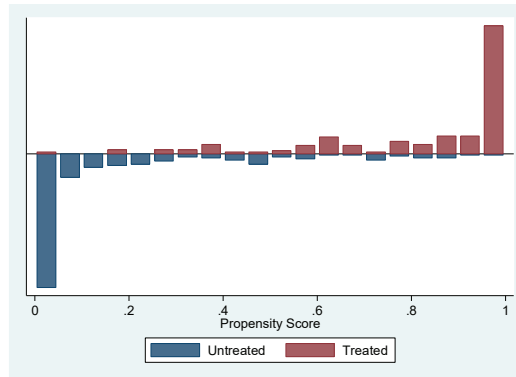
Variable	Coefficient	Standard Error	% Contribution
<i>Socioeconomic characteristics</i>			
Age of farm worker (years)	66.906*	87.701	6.76
Marital status (1 = married, 0 = otherwise)	68.873**	95.293	6.96
Education (years of schooling)	17.752	69.320	1.79
Household size (number)	385.330*	738.573	38.94
Farm work experience (years)	-11.039	48.068	-1.12
Membership of labour union (1 = yes, 0 = otherwise)	-74.564	142.815	-7.54
Number of years of residence in the village	243.690	170.247	24.63
<i>Job characteristics</i>			
Job status (1 = permanent, 0 = otherwise)	122.376***	89.881	12.37
Job skill (1 = skilled, 0 = otherwise)	-319.507**	141.721	-32.29
Lives on farm (1 = yes, 0 = otherwise)	88.017	94.994	8.89
Average work hours (hours/month)	594.606*	574.958	60.09
<i>Farm work/activities</i>			
Crop farming	-0.419***	28.607	-0.04
Poultry	6.767***	57.322	0.68
Livestock	-145.687**	130.134	-14.72
Agro-processing	-53.591*	127.682	-5.42

Source: authors' computation (2022)

Note: *, **, *** mean significant at 10, 5, and 1%, respectively.

Propensity Score Matching

To ensure a consistent and reliable matching, we performed some diagnostic tests before proceeding with our matching and addressing the heterogeneity difficulties that plague the Blinder–Oaxaca method’s parametric assumptions. We also looked at how well the covariate distribution used to forecast the propensity score model was balanced by the matching technique (Rosenbaum and Rubin, 1983). After generating propensity scores for the farm workers in the treatment (female) and control (male) groups, the overall support condition was assessed to confirm that the covariates did not differ (*Figure 2*). The common support graph in *Figure 2* presents the similarities in characteristics between the treatment (female) and control groups (male) of farm workers. This *Figure 2* depicts the distribution of propensity scores and the common support region between female farm workers (upper portion) and male farm workers (lower portion).



Source: authors' computation (2022)

Figure 2. Propensity score matching and common support region between treated and control cases: kernel-based with outcome variable (farm wages)

The computed propensity scores’ distribution reveals that the common support condition is satisfied, as there is a significant overlap in the propensity scores of both treated and untreated. Since selection bias in the treatment group has been addressed due to observed covariates and heterogeneity difficulties, our findings could now attribute any change in farm wage to gender gap. In addition, we further carried out a covariate balancing test for the matching technique to ensure that both treatment (female) and control (male) farm workers are similar under the same characteristics and the quality of common support condition. *Table 4* presents the results of the covariates’ balancing property test. Our results show that none of the covariates are significant after matching, meaning that our quality of matching is satisfactory for all covariates used in the model. Therefore, both female and male agricultural workers exhibited similar characteristics of their covariates.

Table 4. Test of equality of the means of variables before and after matching

Variable	Unmatched Sample				Matched Sample			
	Mean		% Bias	p > t	Mean		% Bias	p > t
	Female (treatment)	Male (control)			Female (treatment)	Male (control)		
Age of the farm worker	38.43	36.65	23.70	0.010***	36.95	36.97	-0.40	0.988
Marital status	1.21	1.11	27.60	0.003***	1.24	1.19	14.90	0.578
Education	7.54	6.34	21.20	0.021**	8.89	8.05	14.80	0.467
Household size	8.13	6.01	191.70	0.000***	6.95	6.92	2.40	0.883
Farm work experience	13.34	12.79	13.40	0.144	14.38	13.84	13.00	0.637
Membership of labour union	0.88	0.68	48.30	0.000***	0.89	1.00	-26.70	0.240
Number of years of residence in the village	13.20	15.81	-43.80	0.000***	13.76	14.14	-6.40	0.812
Job status	0.54	0.42	24.30	0.008***	0.59	0.65	-10.90	0.637
Job skill	0.70	0.53	35.70	0.000***	0.57	0.65	-16.90	0.482
Lives on farm	0.37	0.25	25.40	0.006***	0.27	0.19	17.70	0.414
Average work hour on farm	47.95	35.48	178.40	0.000***	43.65	44.32	-9.70	0.613
Crop farming	0.23	0.26	-6.70	0.46	0.19	0.16	6.20	0.764
Poultry	0.33	0.27	12.80	0.162	0.41	0.54	-29.60	0.250
Livestock	0.29	0.18	26.90	0.003***	0.19	0.22	-6.50	0.776
Agro-processing	0.15	0.29	-34.80	0.000***	0.22	0.11	26.60	0.212

Source: authors' computation (2022)

Note: Levels of significance represented by the symbols *, **, and *** are 10%, 5%, and 1% respectively.

The results of the overall covariate equalization test showing the unaligned (before matching) and the equal (after matching) are shown in *Table 5*. Pseudo- R^2 shows the significance of the explanatory variables in explaining the likelihood of female farm workers earning less wages compared to their male counterparts. The combined importance of equality between the genders of farm workers in the covariate distribution was represented by the p-values of the probability ratio test. In addition, *Table 5* shows a significant reduction in the value of the pseudo- R^2 from 0.946 (94.6%) unmatched to 0.058 (5.8%) matched. A low pseudo- R^2 after matching, according to Caliendo and Kopeinig (2008), does not necessarily indicate systemic changes in the distribution of variables between the treated and untreated groups. Thus, our results show that the matching procedure was able to identify a control group with similar observable characteristics as the treatment group. The p -values from the likelihood ratio test show that the joint significance was accepted for both the unmatched and matched samples (p -value = 0.000). Also, the standardized mean bias for all covariates decreased from 52.8% before matching to 13.5% after matching. Our results show that matching reduces bias by 83.2%. Therefore, the successful balancing of the distribution of covariates between the treatment and control can be seen by the decrease in high overall bias, the insignificant p -values of the likelihood ratio test after matching, the decreased Pseudo- R^2 , and a significant decrease in the mean standardized bias.

Table 5. Indicators of the overall matching quality both before and after matching

Sample	Pseudo- R^2	LR ²	p > (²)	Mean standard bias	Bias	Total % bias reduction
Unmatched	0.946	629.48	0.000***	52.8	328.6	
Matched	0.058	96.81	0.000***	13.5	55.1	83.2

Source: authors' computation (2022)

Note: *** means significance level at 1%.

Results in *Table 6* show the estimated differences in outcome (farm wages) between female and male farm workers. The average treatment effect (ATE) across the two matching methods is reliable for our outcome variable (farm wages). *Table 6* shows that the average treatment effect (ATE) is 9070.833 for nearest neighbour matching (NNM) and 10433.33 for kernel-based matching. The gender gaps/differences estimated with Nearest Neighbour Matching (NNM) is 9.8 percentage point higher (farm wages) and 21.6 percentage points higher with Kernel-Based Matching (KBM) than those measured with the Blinder–Oaxaca decomposition technique. The disparities could be attributed to many factors, and one of the factors contributing to low wages among farm workers is second shift, which is expected to burden rural farm workers disproportionately, as they are likely to have less

flexibility in the workplace and less access to high-quality daycare (Budig, 2014). Therefore, the unexplained component of the gender gap is relatively robust for both parametric and non-parametric approaches used to measure it.

Table 6. *Results of the propensity score matching estimation*

Sample	Average Treatment Effect (ATE)		
	Coefficient	Robust Standard Error	z-statistic
Nearest Neighbour Matching (NNM)	9070.833	759.274	11.95***
Kernel-Based Matching (KBM)	10433.330	1036.411	10.07***

Source: authors' computation (2022)

Note: *** means significance at 1%.

Conclusions

In our study, we estimated and explained the gender differences in farm wages among farm workers in Nigeria using a cross-sectional survey data of agricultural farms. We employed a randomized controlled experiment by randomly allocating farm workers into treatment group (female) and control group (male) with a simple random sampling technique. To measure the size of the gender gaps, we employed both parametric (Blinder–Oaxaca decomposition) and non-parametric (Propensity Score Matching, PSM) approaches to estimate how much of the wage gap is explained by socioeconomic characteristics and various agricultural jobs (farming, livestock, poultry, and agro-processing) and how much is unexplained and could be due to discrimination and other factors. While our study used the Blinder–Oaxaca (Blinder, 1973; Oaxaca, 1973) decomposition to measure the gender wage gap, PSM, which has the advantage of eliminating the Blinder–Oaxaca method's parametric assumptions and addressing the heterogeneity difficulties that plague parametric decomposition methods (Ñopo, 2008), was employed to test for the robustness of the decomposition results, and we found an unexplained gender gap very close to the Blinder–Oaxaca estimate. Our results of the Blinder–Oaxaca decomposition analysis show that female farm workers earn ₦9,170.83 less compared to their male counterparts and thus indicate an unadjusted gender gap. The explained total percentage of the unadjusted gender gap was 10.79%, and most of this gender gap in farm wages is explained by the variables included in our model. The percentage of the gender wage differential, as explained by variables included in our model, would be decreased if female farm workers had the same socioeconomic, job/task, farm characteristics as their male counterparts. With regard to the unexplained gap, our findings show that female farm workers earned ₦8,181.33 less in monthly farm wages compared to male farm workers.

Our matching results indicate that the average treatment effect (ATE) is 9,070.833 for Nearest Neighbour Matching (NNM) and 10,433.33 for Kernel-Based Matching. The gender gaps when estimated with Nearest Neighbour Matching (NNM) were 9.8% points higher (farm wages) and when using Kernel-Based Matching (KBM) were 21.6 percentage points higher than the gaps measured with the Blinder–Oaxaca decomposition technique.

Our policy recommendations are: female farm workers' earnings can be improved by increasing their work hours per month, which have been the main factor contributing to inequalities in farm wages, and this may be due to household responsibilities and childcare. Improving women farm workers' access to affordable, quality childcare and domestic work will increase their labour force participation and experience or lengthen their working hours, making it easier for them to participate on equal terms with men.

In terms of the contribution of individual characteristics (such as the average work hours/month, household size, job status, marital status, and age) to the proportion of the gender difference explained, the role of these variables is therefore noteworthy. Upgrading these variables would reduce gender inequalities in farm wages. Also, since workers' educational attainment is closely linked to labour market possibilities, increased female educational levels would also increase their representation in managerial and farm occupations, which will thus eventually contribute to bridging the gender pay gap over time. Finally, the use of casual labour by agricultural private firms should be discouraged, and labour standards, including strong antidiscrimination laws, need to be promoted in order to close the gender gap in farm wages. Such a legislation would promote equality and a regulation prohibiting discrimination in job positions, salary scales, and criteria for entering the agricultural labour market.

References

- Adam, R. I.; Osano, P.; Birika, J.; Amadi, A. A. N.; Bwisa, H. (2017). The situation of women in the agribusiness sector in Africa. *Development in Practice* 27: 892–898. DOI: 10.1080/09614524.2017.1338670.
- Aderemi, T. A. (2015). Does the wage curve exist in Nigeria? Evidence from a disaggregated labour market. *Journal of Social and Economic Development* 17(2): 184–199.
- Ahmed, S.; Maitra P. (2010). Gender wage discrimination in rural and urban labour markets of Bangladesh. *Oxford Development Studies* 38(1): 83–112.
- Ajah, J. (2012). Gender differentiation in daily farm wage rates in Abuja, Nigeria. *Journal of Agricultural Extension* 16(1). <http://dx.doi.org/10.4314/jae.v16i1.2>.

- Anyanwu, S. O. (2010). Resource productivity and issues of sustainability among low external input technology farmers in Imo State. In: Nmadu, J. N.; Ojo, M. A.; Mohammed, U. S.; Baba., K. M.; Ibrahim, F. D.; Yisa, E. S. (eds.), *Proceedings of the 11th Annual National Conference of the National Association of Agricultural Economists*, 30 November–3 December, FUT Minna, Niger State, Nigeria. 178–182.
- Aromolaran, A. B. (2006). Estimates of Mincerian returns to schooling in Nigeria. *Oxford Development Studies* 34(2): 265–292.
- Babcock, L.; Sara, L. (2009). *Women don't ask: Negotiation and the gender divide*. Princeton, NJ: Princeton University Press.
- Barham, B. L.; Ana, P. M.; Hertz, Thomas. (2020). Earnings, wages, and poverty outcomes of US farm and low-skill workers. *Applied Economic Perspectives and Policy* 42(2): 307–34.
- Blau, F. D.; Lawrence, M. K. (2006). The U.S. gender pay gap in the 1990s: Slowing convergence. *Industrial and Labour Relations Review* 60(1): 45–65.
- (2017). The gender wage gap: Extent, trends, and explanations. *Journal of Economic Literature* 55(3): 789–865.
- Blinder, A. S. (1973). Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources* 8(4): 436–455.
- Bryant, L. (2006). Marking the occupational body: Young women and men seeking careers in agriculture. *Rural Society* 16: 62–79. DOI: 10.5172/rsj.351.16.1.62.
- Budig, M. J. (2014). *The fatherhood bonus and the motherhood penalty: Parenthood and the gender gap in pay*. Third Way.
- Caliendo, M.; Kopeinig, S. (2008). Some practical guidance for the implementation of Propensity Score Matching. *Journal of Economic Surveys* 22(1): 31–72.
- Cha, Y.; Weeden, K. A. (2014). Overwork and the slow convergence in the gender gap in wages. *American Sociological Review* 79(3): 457–484.
- Dehejia, R. H.; Wahba, S. (2002). Propensity Score Matching Methods for non-experimental causal studies. *Rev. Econ. Stat.* 84: 151–161.
- Deutsche Gesellschaft für Internationale Zusammenarbeit. (2013). *Gender and value chains: Division rural development; agriculture; food security*. Bonn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit. Federal Ministry for Economic Cooperation and Development (BMZ).
- Ekerebi E.; Adeola, O. (2017) Estimation of the difference in agricultural yield between male and female farmers in Nigeria. *Feed the Future Innovation Lab for Food Security Policy Research Brief* 28. <https://www.nigeriaagriculturalpolicy.net/2017/10/03/>.
- Enfield, S. (2019). *Gender roles and inequalities in the Nigerian labour market*. K4D Helpdesk Report. Brighton, UK: Institute of Development Studies.
- Enhancing Financial Innovation and Access (EFInA). (2018). *Access to financial services in Nigeria*. Survey. <https://www.efina.org.ng/our-work/research/access/>.

- FAO. (2011). The role of women in agriculture. *ESA Working Paper* No 11-02. Agricultural Economics Division, Food and Agricultural Organization of the United Nations, Rome: FAO. 1–48.
- FAO Regional Office for Africa. (2013). African Youth in Agriculture, Natural Resources and Rural Development. *Nat. Faune* 38: 1–106. Available online at: <http://www.fao.org/3/as290e/as290e.pdf> (accessed on: 12 May 2022).
- Fairlie, R. W.; Alicia, M. R. (2009). Gender differences in business performance: Evidence from the characteristics of business owners' survey. *Small Business Economics* 33(4): 375–395.
- Fapohunda, T. M. (2013). The gender pay gap in Nigeria: Causes and remedies. *Mediterranean Journal of Social Sciences* 4(2). Rome: MCSER–CEMAS–Sapienza University of Rome. DOI: 10.5901/mjss.2013.v4n2p211.
- Fisher, M.; Paul, A. L.; Rynne, P. (2021). Farmworkers and the gender wage gap: An empirical analysis of wage inequality in US agriculture. *Applied Economic Perspectives and Policy* 1–19. <https://doi.org/10.1002/aep.13202>.
- Fontana, M. (2009). Gender dimensions of rural and agricultural employment: Differentiated pathways out of poverty. *FAO–IFAD–ILO Workshop on “Gaps, trends and current research in gender dimensions of agricultural and rural employment: Differentiated pathways out of poverty”*, 31 March–2 April 2009. Rome, FAO.
- Frölich, M. (2004). Finite-sample properties of Propensity Score Matching and weighting estimators. *Rev. Econ. Stat.* 86: 77–90.
- (2007). Propensity Score Matching without conditional independence assumption—with an application to the gender wage gap in the United Kingdom. *The Econometrics Journal* 10(2): 359–407.
- Goldin, C. (2014). A grand gender convergence: Its last chapter. *American Economic Review* 104(4): 1091–119.
- Haruna, U.; Garba, M.; Nasiru, M.; Sani, M. H. (2010). Economics of sweet potato production in Toro Local Government Area of Bauchi State, Nigeria. In: Nmadu, J. N.; Ojo, M. A.; Mohammed, U. S.; Baba., K. M.; Ibrahim, F. D.; Yisa, E. S. (eds.), *Proceedings of the 11th Annual National Conference of the National Association of Agricultural Economists*, 30 November–3 December, FUT Minna, Niger State, Nigeria. 170–174.
- Heckman, J. (1997). Instrumental variables: A study of implicit behavioral assumptions used in making program evaluations. *J. Hum. Resour.* 32: 441–462.
- Heckman, J.; Ichimura, H.; Smith, J.; Todd, P. (1998). Characterizing selection bias using experimental data. *Econometrica* 66: 1017–1098.
- Hertz, T.; Winters, P.; DeLa, A. P.; Campos, O.; Quinones, E. J.; Azzari, C.; Davis, B.; Zezza, A. (2009). Wage inequality in international perspective: Effects of location, sector, and gender. 39. *FAO–IFAD–ILO Workshop on “Gaps, Trends and Current Research in Gender Dimensions of Agricultural and Rural Employment:*

- Differentiated Pathways out of Poverty*”, 31 March–2 April 2009, FAO, Rome, Italy.
- Holmes, R.; Slater, R. (2008). Measuring progress on gender and agriculture in the 1982 and 2008 world development reports. *Gender & Development* 16: 27–40. DOI: 10.1080/13552070701876110.
- Hosny, A. S. (2013). Theories of economic integration: A survey of the economic and political literature. *Int. J. Econ. Manag. Soc. Sci.* 2: 133–155.
- Iheke, O. R.; Nwaru, J. C. (2009). Gender farm size and relative productivity of cassava farms in Ohafia Agricultural Zone of Abia State. *Nigerian Journal of Rural Sociology* 9(1): 69–75.
- International Labour Organisation (ILO). (2009). *An analysis of reasons for the disparity in wages between men and women*. A report by CONSAD Research Corp, U.S. Department of Labor, Employment Standards Administration, 200 Constitution Avenue N.W. Washington, DC. 1–95.
- Jirgi, A. J.; Jirgi, D. J.; Polycarp, I. M.; Tanko, L.; Abubakar, L. Y. (2011). Allocative efficiency of small-scale poultry producers in Bosso Local Government Area, Niger State, Nigeria. *Proceedings of the 45th Annual Conference of the Agricultural Society of Nigeria*.
- Kiefer, K.; Mark, H.; Timothy, L. P. (2020). Does gender still matter? An examination of small business performance. *Small Business Economics* 58: 141–167.
- Kilu, R. H. (2017). Beyond the barriers: Witnessing shifting gender dynamics in multinational mine jobs in Ghana. *Gender, Technology and Development* 21: 206–216. DOI: 10.1080/09718524.2018.1434992.
- Lawal, W. L.; Igele, E. O.; Oboh, V. U. (2008). Technical efficiency of palm oil processing in Obi Local Government Area of Benue State. In: Umeh, J. C.; Obinne, C. P.; Lawal, W. (eds.), *Proceedings of the 22nd Annual National Conference of the Farm Management Association of Nigeria*, 8–11 September 2008, University of Agriculture, Makurdi, Benue State, Nigeria. 281–287.
- Mbilinyi, A. (2016). Analyzing the history of agrarian struggles in Tanzania from a feminist perspective. *Review of African Political Economy* 43: 115–129. DOI: 10.1080/03056244.2016.1219036.
- Meara, K.; Pastore, F.; Webster, A. (2020). The gender pay gap in the USA: A matching study. *Journal of Population Economics* 33(1): 271–305.
- Mensah-Bonsu, A.; Nancy, N. L.; John, K. M. K. (2019). Gender-segregated analysis of the poultry value chain in Ghana. *Gender, Technology and Development* 23(2): 130–164. DOI: 10.1080/09718524.2019.1661611.
- Niederle, M.; Lise, V. (2007). Do women shy away from competition? Do men compete too much? *Quarterly Journal of Economics* 122(3): 1067–1101.
- Ñopo, H. (2008). Matching as a tool to decompose wage gaps. *The Review of Economics and Statistics* 90(2): 290–299.

- Oaxaca, R. (1973). Male–female wage differentials in urban labor markets. *International Economic Review* 14(3): 693–709.
- Ogwumike, F.; Alaba, O.; Alayande, B.; Okojie, C. (2006). Labour force participation, earnings and inequality in Nigeria. *African Economic Research Consortium (AERC)* 3: 29–33.
- Olowa, O.; Adeoti, A. (2014). Effect of education status of women on their labour market participation in rural Nigeria. *American Journal of Economics* 4(1): 72–81. DOI: 10.5923/j.economics.20140401.07. <http://article.sapub.org/10.5923.j.economics.20140401.07.html>.
- Organization for Economic Cooperation and Development (OECD). (2009). *Women's entrepreneurship issues and policies*. Paris: OECD.
- Orr, A.; Kee-Tui, S. H.; Tsusaka, T.; Msere, H.; Thabani, D.; Senda, T. (2016). Are there 'women's crops'? A new tool for gender and agriculture. *Development in Practice* 26: 984–997. DOI: 10.1080/09614524.2016.1226264.
- Peterman, A.; Quisumbing, A.; Behrman, J.; Nkonya, E. (2011). Understanding the complexities surrounding gender differences in agricultural productivity in Nigeria and Uganda. *Journal of Development Studies* 47: 1482–1509. DOI: 10.1080/00220388.2010.536222.
- Rosenbaum, R. P.; Rubin, B. D. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *Am. Stat.* 39: 33–38.
- Tsue, P. T.; Nweze, N. J.; Okoye C. U. (2014). Effects of arable land tenure and use on environmental sustainability in North-Central Nigeria. *Journal of Agriculture and Sustainability* 6(1): 14–38.
- UNDP. (2009). *Human development report 1995*. New York: Oxford University Press.
- USAID. (2011). *Women & agriculture. Improving global food security*. Produced in coordination with the Bureau of Public Affairs, U.S. Department of State.
- Women on Farms Project and Center for Rural and Legal Studies (CRLS). (2009). *Going for broke: A case study of labour brokerage on fruit farms in Grabouw*. Stellenbosch: Centre for Rural Legal Studies.
- World Bank. (2015). *More, and more productive, jobs for Nigeria: A profile of work and workers*. World Bank Group. <http://documents.worldbank.org/curated/en/650371467987906739/More-and-more-productive-jobs-for-Nigeria-a-profile-of-work-and-workers>.
- World Bank Group. (2019). *Profiting from parity: Unlocking the potential of women's business in Africa*. <https://openknowledge.worldbank.org/handle/10986/31421>.
- World Bank/IBRD/IFC. (November 2018). *Nigeria Systematic Country Diagnostic (SCD) transitioning to a middle-class society*. <https://openknowledge.worldbank.org/handle/10986/23099>.



Effect of Crude Oil Revenue on the Oil and Non-oil Sectors in Nigeria

Mohammed Bashir SALAUDEEN

Department of Economics, Faculty of Management and Social Sciences,
Lead City University, Ibadan, Nigeria
e-mail: salaudeenmohammed@gmail.com

Abstract. The debate for oil-rich economies to plough their oil windfalls into real economic activities to spur diversification has become intense due to the deficit fiscal crisis and poor socio-economic profile of resource-abundant nations. Therefore, we use secondary data from the period between 1981 and 2020 to assess the impact of crude oil revenue on the oil and non-oil sector output performance in Nigeria. The study adopts the ARDL (i.e. autoregressive distributed lag) and the augmented Granger causality techniques to analyse the data. The ARDL regressions show that crude oil positively impacts oil sector performance, but the impact is only substantial in the short run. Crude oil revenue exerts a positive and insignificant effect on the short-run non-oil sector output, whereas, over the long run, it has a negative but significant effect. To propel growth, the study recommends using the excess crude oil earnings to develop non-oil sectors such as agriculture, services, and manufacturing.

Keywords: natural resources, diversification, economic growth, economic output, revenue shock

JEL Classification: H27, Q35, O14, O47, N17

1. Introduction

Studies have demonstrated that countries with an abundance of natural resources can either experience significantly high growth rates or low economic growth, depending on how these natural resource rents are harnessed and put to use (Olayungbo and Adediran, 2017; Mesagan and Adenuga, 2020; Abdulaziz et al., 2021; Akinleye et al., 2021). For instance, Norway, Botswana, Malaysia, and Thailand are some economies that have stimulated development through natural resource abundance, thereby enjoying the blessings of nature (Iimi, 2007; Olayungbo and Adediran, 2017; Tabash et al., 2022). But, on the contrary, African

countries such as Nigeria, Ghana, Sudan, Angola, and Gabon, with an abundance of resources, remain stagnated economically with glaring socio-economic problems such as poverty and massive joblessness (Gylfason and Zoega, 2006; Olayungbo, 2019; Mesagan et al., 2022a). These controversial issues have sparked debate in the literature on why resource-rich countries are not on the same pedestal of growth path. In this respect, crude oil is one of the dominant natural resources globally traded. According to the OEC Report (2020), oil is the world's third most valuable exported product in revenue and represents about 3.82 percent of global trade made up of crude oil trade.

Moreover, crude oil exploration, production, and export are a fundamental part of the Nigerian economy. Since the discovery of crude oil in 1956 and the beginning of commercial production, it has become the mainstay of the Nigerian economy (Isola and Mesagan, 2014; Olayungbo, 2019; Eregha and Mesagan, 2017, 2020). For instance, income from crude oil sales accounts for over 90% of gross foreign exchange earnings and 80% of budgetary income, and between 1981 and 2020 it contributed with an average of 11.64% to GDP growth in Nigeria (Mesagan, 2015; Olayungbo and Adediran, 2017; Global Edge Report, 2020; World Development Indicator (WDI), 2021). However, the massive foreign inflow of oil rent and royalties has prompted the government to shift its focus away from non-oil sectors such as agriculture and industry, which were the primary drivers of the economy prior to the discovery of oil towards the oil sector (Okotie, 2018; Oludimu and Alola, 2021). This has propelled investment flow from multinational and domestic companies into the oil sector, thereby enhancing oil sector productivity. According to BP Statistical Review of World Energy (2022), oil production in Nigeria has increased since 1965 from 274 thousand barrels per day (bpd) to about 1,798 thousand bpd in 2020, with the highest production of about 2,533 thousand bpd recorded in 2010. However, the performance of the oil sector has not translated to improve quality of life in Nigeria; rather, it has made the Nigerian economy vulnerable to crude oil revenue shocks (Babatunde, 2015; Omojolaibi et al., 2016a,b; Mesagan and Eregha, 2019).

With the reliance of the Nigerian economy on the oil sector, the non-oil sector has dwindled, and non-oil export production has seriously plummeted (Odularu, 2007; Hammayo, 2020). Before the discovery of oil, agriculture was the Nigerian economy's principal economic driver (Akinleye et al., 2021; Mesagan et al., 2023a,b). However, during the oil boom, agriculture's proportion to GDP declined from 62% in the 1960s to 47.9% in the 1970s (Olayungbo, 2019). The agriculture sector's contribution fell further down to 20% in the 1980s and stagnated till 2015, and it slightly increased to 24.1% by 2020 (World Development Indicator (WDI), 2021). In the same manner, the industrial sector suffers a similar challenge of neglect. The WDI (2021) report shows that during the 1980s oil boom, the manufacturing value contributed to the fact that GDP had started falling,

declining from 20% in 1981 to around 13% in 2020. These demonstrate the poor performance of the non-oil sector since crude oil has become the government's main source of revenue and foreign exchange (FX) earnings. In the view of Aderounmu et al. (2021) and Abdulaziz et al. (2021), the bad performance of the real sector accounts for the high level of unemployment, poverty, and economic stagnation of the country.

However, it is believed that the oil boom can catalyse economic diversification in oil-rich nations (Miamo and Achuo, 2021). The economy can be diversified and made less susceptible to shocks from changes in oil prices by investing extra revenue from the oil sector in non-oil sectors, which raises the economy's overall GDP (Mesagan et al., 2023c). This indicates that earnings from crude oil sales can be ploughed into the economy to stimulate non-oil sector productivity. As the non-oil sector improves, it is expected that it will absorb the mass of unemployed citizens, thereby increasing productivity, per capita income, and total economic progress. Supporting this argument, Riman et al. (2013), Edo (2013), Hassan and Abdullah (2015), Lawrence and Victor (2016), Olayungbo (2019), Abdulaziz et al. (2021), Ammani and Hassan (2021), and Mesagan et al. (2021) show that crude oil rent affects specific sectors' performance such as agriculture, manufacturing, and the service sector. However, there is no consensus in the empirical findings, perhaps due to sample, method, and data series incongruence.

Therefore, it becomes pertinent to interrogate the effect of crude oil revenue on the oil sector and non-oil sector output performance. Unlike previous studies, we analyse the impact of crude oil revenue on oil sector's output performance. Also, the study assesses the effect of crude oil revenue on non-oil sector performance and, lastly, analyses the causal relationship between crude oil revenue, oil sector and non-oil sector output. This study is significant for the Nigerian economy at this time to accelerate the pace of economic diversification by taking advantage of oil windfalls from the upward trend in crude oil prices triggered by the Russia–Ukraine war. Also, the country's debt status and servicing give cause for concern; between 2019 and 2020, the debt servicing to revenue ratio increased from 54.66 to 72 percent. This calls for urgent diversification of revenue channels through non-oil sector investment stimulation, thus making this study important for Nigeria. Also, the study theoretically contributes to the literature by decomposing the output component of Solow's growth model into the oil and non-oil sectors to analyse the sectoral output performance of the Nigerian economy. This is the first time Solow's growth model has been altered, making it an interesting addition to the literature. Regarding the methodology, we use the autoregressive distributed lag model and the novel augmented Granger causality to analyse the secondary data from the period between 1981 and 2020. The analytical techniques are built on robust frameworks to generate sufficient estimates to enhance policy suggestions.

The remainder of this study has the following structure. Section 2 provides a literature review. Section 3 presents the methodology and models employed. Section 4 discusses the empirical analysis, while Section 5 concludes.

2. Literature Review

Numerous empirical pieces of evidence abound in the literature that has shed light on crude oil revenue and output performance. Most of these studies have focused on crude oil revenue and GDP performance. In contrast, some others concentrated on the sector-specific impact of crude oil revenue, i.e. crude oil revenue and agriculture, manufacturing and service sector performance. However, studies that take a closer look into the effect of crude oil earnings on oil and non-oil sector output performance are sparingly available in the literature. In this respect, Nweze and Edame (2016), Olayungbo and Adediran (2017), Tamba (2017), Olojede and Michael (2020), Ologunde et al. (2020), Mohammed et al. (2020), Akinleye et al. (2021), Oludimu and Alola (2021), and Miamo and Achuo (2021) have considered the nexus between crude oil revenue and GDP performance with several empirical outcomes. For example, Nweze and Edame (2016) adopted Johansen's cointegration and the ECM technique for Nigeria and showed the presence of a long-run association between crude oil rent and GDP moves together. Also, the ECM result indicated that in the short run, oil revenue enhanced GDP, while it retarded growth in the long run. Similarly, Olayungbo and Adediran (2017) found a long-run resource curse syndrome for Nigeria, as they revealed that oil rent engendered GDP growth in the short run and reduced GDP performance in the long run between 1984 and 2014, based on ARDL methodology. Tamba (2017) focused on Cameroon and found the absence of causality between crude oil revenue and economic growth between 1977 and 2010.

Again, using the OLS method, Olojede and Michael (2020) found that oil revenue impeded economic growth in Nigeria between 1981 and 2018. Ologunde et al. (2020) captured sustainable development with the human development index and indicated that crude oil revenue negatively affected sustainable development in oil-producing African economies between 1992 and 2017. Further, Mohammed et al. (2020) focused on 86 oil-producing nations and analysed the role of the financial sector on crude oil revenue and GDP nexus. They used the two-step system GMM based on panel data from the period between 1990 and 2015. The study showed that with banking development, crude oil affected GDP positively. However, the study revealed that private crude oil investment through banking development slowed GDP growth. For Nigeria, Akinleye et al. (2021) proxied crude oil revenue with petroleum profit tax between 1981 and 2018 and indicated that petroleum profit tax negatively affected the GDP performance of the nation. Also,

Oludimu and Alola (2021) showed that crude oil revenue negatively impacted economic development in Nigeria, establishing a resource curse hypothesis for the nation. Similarly, Miamo and Achuo (2021) employed the ARDL technique and Toda–Yamamoto (T–D) causality to analyse Cameroon’s situation between 1980 and 2018. The study showed that crude oil prices substantially increased real economic growth in both short and long periods. The T–D causality revealed evidence of a unidirectional causal effect that flowed from real GDP to crude oil prices in Cameroon.

For specific sectors, Riman et al. (2013) used the VAR methodology to study the nexus between crude oil rent, non-oil export, and industrial productivity in Nigeria. They established that crude oil revenue slowed industrial productivity and non-oil export output. In the same vein, Edo (2013) showed that crude oil revenue caused Nigeria’s manufacturing and service sectors to stagnate, as suggested by time series data from the period between 1970 and 2009. Hassan and Abdullah (2015) studied the relationship between oil rent and service sector development in Sudan from 2000 to 2012. They used the OLS and Granger causality techniques to analyse the study, and the evidence suggested that crude oil rent promoted service sector output. The causality result showed a unidirectional causal effect from crude oil to service sector performance in Sudan. Applying a similar analytical method, Lawrence and Victor (2016) indicated that crude oil revenue did not substantially explain agricultural performance in Nigeria. Additionally, they found evidence of no causal effect among the variables.

Furthermore, Olayungbo (2019) assumed a connection between Nigeria’s crude oil revenue and real sector productivity. The study captured the real sector with agricultural and manufacturing sector productivity and used secondary data from the period between 1970 and 2017. The NARDL method was employed, and results showed that crude oil revenue affected the real sectors negatively. Abdulaziz et al. (2021) concentrated on 25 minor and major oil-exporting economies and studied the mediating impact of exchange rates on crude oil revenue and agricultural sector performance between 1974 and 2014. Based on the panel ARDL, they showed that in both the short and long run, crude revenue inhibited agricultural sector growth. Again, they showed that the magnitude of impact is more severe in major oil-exporting nations than in minor exporters. More so, the effect of crude oil for both samples remained the same with mediating effect of exchange rate via the crude oil revenue and agricultural sector nexus. Again, the agricultural industry was broken down into subcomponents by Ammani and Hassan (2021), including animal output, forestry, fisheries, and crop production. They claimed that between 1981 and 2019, oil revenue decreased crop and livestock output in Nigeria while increasing forestry and fisheries productivity. However, concerning crude oil revenue, oil sector and non-oil sector output linkage, Omgba (2011) analysed the oil wealth and non-oil sector in Cameroon between 1980 and 2008. The study

adopted the VAR estimation technique and showed that the deterioration in the non-oil industry that started before the oil boom was halted by oil money.

In conclusion, the review shows that most existing studies in the literature focus on the impact that oil revenue has on the aggregate economic output measured in GDP (see: Nweze and Edame, 2016; Olayungbo and Adediran, 2017; Tamba, 2017; Olojede and Michael, 2020; Ologunde et al., 2020; Mohammed et al., 2020; Akinleye et al., 2021; Oludimu and Alola, 2021; Miamo and Achuo, 2021). Also, other empirical examinations in this area have attempted to analyse crude oil revenue and specific sector performance such as: Riman et al. (2013), Edo (2013), Hassan and Abdullah (2015), Lawrence and Victor (2016), Olayungbo (2019), Abdulaziz et al. (2021), and Ammani and Hassan (2021). However, only Omgba (2011) attempted to study oil rent and non-oil sector output performance. As a result, such studies are scarce in the literature and rarely address Nigeria. This makes the present study imperative for Nigeria at this point of economic diversification and fiscal revenue challenge to suggest policy measures that can drive economic diversification through the oil sector and the non-oil sectors of the economy.

3. Methodology

3.1 Theoretical Framework and Model Specification

The model of this study relies on the Solow neoclassical growth theory suggested by Solow (1965). The theory emphasizes that exogenous factors are the stimulants of economic productivity. Also, the theory lists capital, labour, and technology as required components to promote economic expansion. Therefore, the original functional form of the Solow model is as follows:

$$Y = F(AKL), \quad (1)$$

where Y is the economic output, A represents technology, while K and L capture capital and labour. Eq. (1) shows that the level of technological changes, capital accumulation, and labour productivity determines the size of economic output (Fanti and Manfredi, 2003). However, Cheng et al. (2021), Akinleye et al. (2021), and Mesagan et al. (2023d) pointed out that the technological progress (A) component of the Solow growth model represents exogenous variables that can drive productivity. Therefore, this study replaces the A component with crude oil revenue. This is because windfall from crude oil sales can be invested in the economy, impacting economic output (Mohammed et al., 2020). Also, we break down the output component (Y) into oil sector output ($OSEC$) and non-oil sector output ($NOSEC$). Therefore, the study augments the Solow growth model to capture the functional

relationship between crude oil revenue, oil and non-oil sectors' relationship as follows:

$$Y^* = F(OILR, KP, LB), \quad (2)$$

where Y^* indicates the vector of dependent variables (oil sector and non-oil sector performance), crude oil revenue is represented by $OILR$, and KP and LB denotes capital and labour respectively. We present the econometric version of Eq. (2) in Eq. (3) by adding other possible covariates that can affect the dependent variables:

$$Y_t^* = \alpha_0 + \alpha_1 OILR_t + \alpha_2 KP_t + \alpha_3 LB_t + \alpha_4 FDI_t + \alpha_5 TD + \alpha_6 INF_t + \alpha_7 EXR_t + \varepsilon_t, \quad (3)$$

where α_0 is the regression intercept, and $\alpha_1 - \alpha_7$ are the regression slopes of the explanatory variables. We include control variables in the model to account for possible model specification bias. These variables include foreign direct investment net inflows (FDI), trade openness (TD), inflation rate (INF), and exchange rate (EXR). The parameter ε represents the stochastic disturbance, and t is the time variable.

3.2 Data and Analytical Technique

This study uses yearly time series data from the period between 1981 and 2020 to analyse the impact of crude oil revenue on Nigeria's oil and non-oil sectors. The dependent variables are oil sector output and non-oil sector output. The oil sector captures the performance of the oil and gas industry comprising upstream and downstream activities (Balza and Espinasa, 2015). However, Omgba (2011) posits that the oil sector is volatile to price shock in the international market, which translates into the domestic economy. On the other hand, the non-oil sector is the real productive industry of the economy, which entails the economy's manufacturing, agriculture, and tourism sector output. The oil and non-oil sectors are key components of the Nigerian economy. It is believed that changes in these sectors can affect the general output of the national economy. Also, crude oil revenue is the principal regressor in this study; it is the rent received from crude oil sales (Olayungbo and Adediran, 2017). It is a major source of government revenue to finance fiscal responsibilities. Crude oil revenue can be used to drive further investment in the oil and non-oil sectors to promote sustainable growth and development (Nweze and Edame, 2016; Ologunde et al., 2020).

The control variables are included based on the argument in the literature. For instance, capital and labour are included in the model following the argument of Solow's growth theory that the level of capital accumulation and labour productivity can affect output performance. Additionally, Efanga et al. (2020) noted that the level of foreign direct investment inflow into the oil and non-oil industries can

stimulate the sector's performance. Additionally, trade with other countries can also affect the productivity of the oil and non-oil sectors (Nweze and Edame, 2016). For instance, if Nigeria exports oil and non-oil products, the productivity level of these sectors will rise because of its supply for domestic and international needs. Similarly, the exchange rate policy and the inflation level can impact the economy's output performance (Mohammed et al., 2020). Therefore, we present a summary of the variables, measurement units, and sources in a tabular format in *Table 1*.

Concerning the analytical technique, the study adopts the autoregressive distributed lag (ARDL) and the augmented Granger causality approaches proposed by Pesaran et al. (2001) and Toda and Yamamoto (1995) respectively. The ARDL approach presents several advantages over the traditional time series estimators, i.e. the ordinary least squares. The ARDL method avoids the endogeneity issue in a single-regression equation paradigm by distinguishing between endogenous variables and regressors (Pesaran et al., 2001; Mesagan and Nwachukwu, 2018; Dimnwobi et al., 2022). Secondly, unlike other time series econometrics, the ARDL allows for flexibility of order integration of variables between I(0) and I(1). Moreover, the estimate performs better even in a small sample (Pesaran et al., 2001). Most interestingly, the ARDL estimate yields both short- and long-run evidence that is crucial to guide short- and long-term policies. Despite the suitability of the ARDL method, it has been criticized in recent literature that the ARDL model is sensitive to model specification, including lag length selection and the inclusion or exclusion of key variables (Dimnwobi et al., 2022; Ibekilo and Emmanuel, 2022). The model's specification has a substantial impact on the findings, and improper specifications can lead to skewed and inconsistent estimations (Dimnwobi et al., 2022; Mesagan et al., 2022b). However, we specify the ARDL mathematical function as follows:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^n \alpha_i \Delta y_{t-i} + \sum_{i=0}^n \alpha_i \Delta x_{t-i} + \chi_1 y_{t-1} + \sum_{i=1}^n \chi_i y_{t-i} + \varepsilon_t \quad (4)$$

Eq (4) captures the ARDL short- and long-run model with an error correction term (ECT). In Eq (4), y_t and y_{t-1} represent the dependent and lag of the dependent variable, x_t and y_{t-1} indicate the independent and lag of independent variables, while α_i is the elasticity of the short-run model, and χ_1 indicates the slopes of the ARDL long-run regressors. Also, n indicates the lag length taking the values of $i = 0, 1, 2, \dots, n$.

Further, the augmented Granger causality is the Toda–Yamamoto (T–D) causality, which augments the weakness of the conventional Granger causality proposed by Engel and Granger (1987). The T–D improves on Granger causality by offering a simple method that requires the estimate of an augmented VAR and ensures the asymptotic distribution of the MWald statistics even in the presence of cointegration (Toda and Yamamoto, 1995). Furthermore, the MWald statistics is consistent

with the T–D causality whether a series is 1(0), 1(1), or 1(2), non-cointegrated, cointegrated, or cointegrated of any random order (Aziz et al., 2000). This makes the T–D causality novel by producing robust causality evidence.

Table 1. *Summary of variables*

Variable	Identity	Measurement	Source
OSEC	Oil sector output	The oil sector captures the performance of the oil and gas industry. It is measured with the value of oil output export in billions of Naira.	Central Bank of Nigeria, 2021
NOSEC	Non-oil sector output	Non-oil sector output is the real productive industry of the economy other than oil and gas. It is captured with the total real sector output export value in billions of Naira.	“
OILR	Crude oil revenue	This is the income received from the sale of crude oil. It is measured with oil rent in % GDP.	WDI, 2021
KP	Capital	This is the accumulation of capital, and it is captured with gross fixed capital formation % of GDP.	“
LB	Labour	Labour is the number of people with employment. This is measured with the growth rate of labour.	“
FDI	Foreign direct investment	It is captured with the net inflows of FDI in % of GDP	“
TD	Trade	This is trade openness, and it is measured with trade as a % of the GDP.	“
INF	Inflation rate	The inflation rate is the annual rate of the consumer price index. It is measured with consumer price annual %.	“
EXR	Exchange rate	This is the rate at which local and foreign currency exchange. It is measured with the official exchange rate per \$.	“

Source: authors' compilation

4. Empirical Analysis

4.1 Pre-estimation Analysis

The study conducts a unit root test on the time series to check the stationarity of the trends. This is essential since non-stationarity time series produce biased estimates and incorrect inferences. Therefore, we use the Augmented Dickey–Fuller (ADF) test suggested by Dickey and Fuller (1979) and the Phillips–Perron (PP) test developed by Phillips and Perron (1988). We present the results in *Table 2*.

Table 2. Unit root estimate

Variable	ADF	PP	ADF	PP
	I(0)		I(1)	
<i>OSEC</i>	-1.161	-2.172	-4.550***	-5.914***
<i>NOSEC</i>	-2.336	-3.171	-4.917***	-6.635***
<i>OILR</i>	-1.813	-2.413	-4.478***	-5.731***
<i>KP</i>	-0.799	-0.946	-6.182***	-6.634***
<i>LB</i>	-2.415	-2.378	-7.218***	-8.756***
<i>FDI</i>	-1.339	-1.222	-5.924***	-5.331***
<i>TD</i>	-5.709***	-7.265***	-	-
<i>INF</i>	-4.257**	-3.251	-	-5.595***
<i>EXR</i>	-2.173	-3.648**	-5.733***	-
<i>N</i>	39	39	37	37

Note: ADF and PP represent the Augmented Dickey–Fuller and the Phillips–Perron unit root results, I(0) and I(1) denote the stationarity of the series at level or at first difference, N is the number of observations, ** and *** represent the significance of the ADF and PP statistics at 5% and 1% significant levels, respectively, and all the variables have been log-transformed.

Table 2 illustrates the ADF and PP unit root calculations. The evidence shows that trade openness (TD) is stationary for both ADF and PP at I(0) at a 1% significance level. However, ADF shows that inflation is stationary at I(0), while PP evidence suggests stationarity at I(1). On the contrary, PP reveals that the exchange rate (*EXR*) is stationary at I(0), whereas ADF confirms stationarity at I(1). In addition, the remaining variables are stationary for both tests at I(1) at a 1% significant level. Therefore, we conclude that all our variables are stationary with mixed order of integration. This necessitates estimating the bound cointegration test to determine whether there is a long-run association among the variables of interest.

Table 3. Bound test

Ho: Absence of cointegration		Oil sector model: ARDL (2, 1, 2, 1, 3, 3, 3, 3)	
		Non-oil sector model ARDL (2, 1, 3, 3, 3, 3, 3, 3)	
F-statistic	I(0) bound	I(1) bound	K
5.322***	2.66	3.18	7
4.790***	2.59	3.09	

Note: I(0) and I(1) represent the lower and upper bound of the bound estimates, the number of observation (N) is 37, *** and ** show that the bound F-statistics are significant at 1% and 5% level of significance, ARDL (2, 1, 2, 1, 3, 3, 3, 3) and ARDL (2, 1, 3, 3, 3, 3, 3, 3) show the lag length selection of the model and are selected based on the Akaike Information Criteria (AIC), and K is the degree of freedom.

We show the bound test results in *Table 3* for the oil sector and non-oil sector models. The F-statistics for both models are significant at a 1% critical value, indicating the rejection of the null hypothesis of the absence of cointegration. Hence, at a 1% significance level, the study accepts the alternative hypothesis of the presence

of cointegration among the interest variables. This implies that the variables exhibit a long-run association, showing that the variables move together in the long term. Since there is a cointegration association, the study proceeds further to determine the level of association between the variables to avoid having variables that can stand for each other due to a very strong degree of association. Hence, the study presents a correlation matrix to check the association among the variables in *Table 4*.

Table 4. *Correlation matrix*

	<i>OSEC</i>	<i>NOSEC</i>	<i>OILR</i>	<i>KP</i>	<i>LB</i>	<i>FDI</i>	<i>TD</i>	<i>INF</i>	<i>EXR</i>
<i>OSEC</i>	1.000								
<i>NOSEC</i>	0.567	1.000							
<i>OILR</i>	0.747	0.783	1.000						
<i>KP</i>	-0.729	-0.754	-0.718	1.000					
<i>LB</i>	0.648	0.768	0.641	-0.723	1.000				
<i>FDI</i>	0.346	-0.096	0.157	-0.145	0.017	1.000			
<i>TD</i>	0.771	0.309	0.653	-0.523	0.442	0.431	1.000		
<i>INF</i>	-0.226	-0.343	-0.276	0.203	-0.294	0.538	-0.052	1.000	
<i>EXR</i>	0.792	0.753	0.672	-0.626	0.742	0.202	0.631	-0.201	1.000

Note: The number of observations (N) is 39.

Source: authors' computation

The correlation matrix in *Table 4* reveals a correlation among the series. However, the coefficients of correlations are not in excess of 0.80, which denotes a very high degree of association. This implies that the correlation among the variables is moderate; thus, the models' variables are not strongly associated. Hence, we conclude that there is no multicollinearity issue around our models. Therefore, all the pre-estimation checks conducted are satisfactory and suggest the estimation of the ARDL regression to guide inferences concerning the link between crude oil revenue impact on oil and on non-oil sector output performance.

4.2 ARDL parsimonious regression

The study presents the ARDL short- and long-run results in *tables 5* and *6*. In the same vein, we show the T–D causality evidence between crude oil revenue, oil sector and non-oil sector performance in *Table 7*. Further, *Table 8* presents the diagnostic results to validate the robustness of the regression estimates. Hence, *Table 5* shows that crude oil revenue positively and significantly impacts short-run oil sector performance. The evidence shows that oil sector output performance improves significantly by about 9% as crude oil revenue increases by at least 1%. This shows that crude oil revenue earnings increase the oil sector's productivity in the short run. However, for the non-oil sector, crude oil revenue exhibits a positive effect; such that a 1% rise in crude oil revenue increases short-run oil

sector performance by about 7.2%. However the crude oil revenue impact on non-oil sector output is inconsequential. This shows that crude oil revenue can promote Nigeria’s non-oil sector investment and development in the short run.

Table 5. Parsimonious regression of the impact of crude oil revenue on oil and non-oil sector performance in Nigeria (in the short run)

Explanatory var.	Model I: ARDL (2, 1, 2, 1, 3, 3, 3, 3) Model II: ARDL (2, 1, 3, 3, 3, 3, 3, 3)			
	Oil sector		Non-oil sector	
	Coefficients	Probability	Coefficients	Probability
$\Delta OSEC_{-1}$	0.1832*** (0.0139)	0.0000	-	-
$\Delta NOSEC_{-1}$	-	-	-0.5881*** (0.1115)	0.0008
$\Delta OILR$	0.0908*** (0.0220)	0.0014	0.0727 (0.0881)	0.4331
ΔKP	0.0115*** (0.0020)	0.0001	0.0028*** (0.0008)	0.0093
ΔKP_{-1}	0.0035** (0.0015)	0.0406	0.0074*** (0.0009)	0.0000
ΔKP_{-2}	-	-	0.0033*** (0.0009)	0.0061
ΔLB	-0.0786 (0.0585)	0.1896	1.222** (0.3700)	0.0108
ΔLB_{-1}	-	-	3.8372*** (0.4171)	0.0000
ΔLB_{-2}	-	-	-3.0109*** (0.4657)	0.0002
ΔFDI	0.0049 (0.0081)	0.5536	-0.0119*** (0.0041)	0.0000
ΔFDI_{-1}	-0.0541*** (0.0125)	0.0010	-0.0345*** (0.0048)	0.0002
ΔFDI_{-2}	-0.0249*** (0.0072)	0.0048	-0.0072*** (0.0037)	0.0000
ΔTD	0.0008 (0.0009)	0.4075	0.0002 (0.0004)	0.1203
ΔTD_{-1}	-0.0002 (0.0010)	0.8136	0.0006*** (0.0002)	0.0001
ΔTD_{-2}	-0.0039*** (0.0010)	0.0015	0.0010** (0.0003)	0.0279
ΔINF	0.0004 (0.0006)	0.5434	-0.0012** (0.0003)	0.0199
ΔINF_{-1}	0.0046*** (0.0007)	0.0001	0.0064*** (0.0005)	0.0077
ΔINF_{-2}	0.0051*** (0.0009)	0.0002	0.0048*** (0.0004)	0.0020

Explanatory var.	Model I: ARDL (2, 1, 2, 1, 3, 3, 3, 3) Model II: ARDL (2, 1, 3, 3, 3, 3, 3, 3)			
	Oil sector		Non-oil sector	
	Coefficients	Probability	Coefficients	Probability
ΔEXR	-0.1733*** (0.0275)	0.0000	-0.1347*** (0.0153)	0.0059
ΔEXR_{-1}	-0.1910*** (0.0350)	0.0001	-0.1125*** (0.015)	0.0000
ΔEXR_{-2}	-0.0976*** (0.0287)	0.0053	-0.0683*** (0.0134)	0.0000
ECT_{-1}	-0.5672*** (0.0715)	0.0000	-0.2827*** (0.0213)	0.0000
N	37		37	

Note: Explanatory var. means explanatory variables, the values in parenthesis are the standard error of the regression coefficients, and ECT (-1) captures the short-run error correction model of the ARDL. N is the number of observations. Additionally, ** and *** indicate 5% and 1% significance, ARDL (2, 1, 2, 1, 3, 3, 3, 3) and ARDL (2, 1, 3, 3, 3, 3, 3, 3) show the lag length selection of the model and are selected based on the Akaike Information Criteria (AIC).

The long-run results in *Table 6* reveal that oil revenue positively impacts oil sector performance insignificantly. Results show that if all other variables remain fixed, a 1% change in crude oil revenue causes oil sector performance to rise by 1.4%. The estimates reveal that crude oil revenue weakly drives oil sector development in Nigeria. On the other hand, crude oil negatively but significantly impacts the non-oil sector; such that a 1% increase in oil revenue slows non-oil sector output performance by about 7.8%. The meaning is that in the long run, earnings of crude oil sales discourage non-oil sector performance in Nigeria.

The error correction term (ECT) for the oil sector and non-oil sector models are -0.5672 and -0.2827 respectively. The coefficients of the ECT are significant at a 1% level of significance. This indicates an extremely rapid convergence in the short-run and long-run discrepancies of the models. Moreover, ECT results support the bound test, which confirms the presence of cointegration in the model and thus shows that our ARDL model is robust for policy decisions.

Table 6. Parsimonious regression of the impact of crude oil revenue on oil and non-oil sector performance in Nigeria (in the long run)

Regressors	Oil sector		Non-oil sector	
	Coefficients	Probability	Coefficients	Probability
$OILR$	0.0149 (0.1366)	0.9148	-0.0784** (0.0120)	0.0108
KP	0.0100 (0.0101)	0.3435	-0.0301** (0.0120)	0.0365
LB	-0.4112 (0.6341)	0.5288	0.9589 (1.2561)	0.4671

Regressors	Oil sector		Non-oil sector	
	Coefficients	Probability	Coefficients	Probability
<i>FDI</i>	0.0916 (0.0949)	0.3537	0.1121 (0.0807)	0.2026
<i>TD</i>	0.0081*** (0.0002)	0.0000	-0.0025 (0.0046)	0.6025
<i>INF</i>	-0.0134 (0.0088)	0.1553	-0.0287** (0.0129)	0.0467
<i>EXR</i>	0.0939 (0.0086)	0.3002	-0.1181 (0.1289)	0.3865
<i>Constant</i>	15.4357 (10.8701)	0.1811	-3.0544 (22.7725)	0.8966
<i>N</i>	37		37	

Note: ** and *** indicate 5% and 1% significance levels, respectively, and N is the number of observations.

We present the causality report in *Table 7*. The augmented Granger causality indicates a one-way effect between crude oil revenue, oil sector output, and non-oil sector output, with the direction of association moving from oil revenue. This means that crude oil revenue influences the performance of the oil sector and non-oil sector. Also, results show a one-way causality between the oil and non-oil sectors. The causal effect moves from the oil sector to the non-oil sector. This result denotes that the oil sector influences the performance of the non-oil sector. This may be due to the fact that the non-oil sector depends on the oil sector for energy supplies (i.e. petroleum products) to power plants.

Table 7. Augmented Granger causality

	<i>OILR</i>	<i>OSEC</i>	<i>NOSEC</i>
<i>OILR</i>	-	5.127**	4.451*
<i>OSEC</i>	1.651	-	12.857***
<i>NOSEC</i>	0.869	2.266	-

Note: *, **, and *** indicate 1%, 5%, and 1% significance levels, respectively, and the number of observations (N) is 37.

4.3 Discussion of the Results

The study analyses the impact of crude oil revenue on oil sector and non-oil sector performance. First, the study shows that crude oil revenue positively impacts the oil sector in the short and the long run. However, the short-run effect is significant, whereas in the long run, the effect is weak in driving oil sector output performance. The assumption is that in the short run crude oil revenue substantially spurs investment in the oil industry in Nigeria, thereby engendering

the sector's growth. The short-run findings point to the fact that after the discovery of oil in commercial production in Nigeria in the late 1950s, the government allowed several international oil companies (IOCs) to invest in the oil and gas industry (Steyn, 2009; Statista, 2022). Moreover, by the late 1980s, the federal government had had a huge direct investment in the oil industry to produce more output and earn excess revenue. According to Metz (1991), approximately 96% of the oil that Nigeria produced in 1988 came from firms where Nigeria National Petroleum Corporation (NNPC) owned at least 60% of the equity and where 75% of all investments in petroleum were made by the NNPC. These scenarios may account for the positive and significant impact of crude oil revenue on oil sector performance in the short run. However, in the long run, the impact is positive, but the effect is weak. This shows that over the long run, the earnings from oil sales were not able to drive the oil sector performance. This can be attributable to constant oil price shocks and supply control by OPEC and oil theft in the Niger Delta region. Hamilton (2011) shows that oil prices around 1990-1991 and 2007-2008 seriously affected oil net exporters. For instance, oil prices plummeted from a peak of \$147 in July 2008 to a low of \$32 in December 2008 (Gastautor, 2020). However, the oil market also witnessed a severe downtrend orchestrated by the COVID-19 pandemic in 2020. However, oil theft and oil and gas infrastructure vandalism in the Niger Delta region has substantially affected oil production and revenue, which has triggered a reduction in investment in the sector and the decommissioning of assets by the IOCs. For example, Olawoyin (2022) noted that Nigeria loses 470,000 bpd of crude oil worth \$700 million each month to oil theft. These scenarios account for the possible implications of the long-run evidence causing the oil revenue to have an insignificant effect on the sector's performance.

For the non-sector model, in the short term, crude oil revenue has a positive but insignificant impact on the non-oil sector, whereas in the long term it exerts a negative but significant effect on the non-oil sector output. The short-run evidence indicates that crude oil revenue has the potential to promote non-sector investment in Nigeria. This means that if crude oil revenue is channelled towards the development of agriculture, manufacturing, and other productive sectors, it can expedite the increase in the economic output of the non-oil sector. However, the long-run evidence reveals the negligence of Nigeria's non-oil sector development. Since crude oil production is in commercial quantity, Nigeria has neglected non-oil sectors such as agriculture, manufacturing, and service, thereby making the nation a mono-economy (Olayungbo, 2019; Akinleye et al., 2021). This has affected the performance of the sector and the revenue the country generates from this sector. According to Dambatta (2022), less than 15% of Nigeria's foreign exchange revenues come from non-oil sector output exports. Hence, the evidence reflects the economic reality of the nation. Interestingly, the long-run finding is similar to Omgba's (2011) evidence for Cameroon. However, Olayungbo (2019) obtained similar results for Nigeria, focusing on real sector productivity.

Concerning the causal effect between crude oil revenue, oil, and non-oil sector output performance, crude oil revenue has a causal effect on the performance of the oil sector and non-oil sector performance. This denotes that oil revenue influences the oil sector and non-oil sector development. The unidirectional causal effect between crude oil revenue and the non-oil sector is similar to the evidence from Hassan and Abdullah (2015) that showed a one-way causal nexus between crude oil and service sector output for Sudan. Moreover, the study also reveals that the oil sector has a causal relationship with the non-oil sector. The reason is that the non-oil sector depends on the oil sector for the supply of energy resources to fire production. Hence, if the oil sector grows, it will affect the non-oil sector's performance.

4.4 Diagnostics

We conduct a series of diagnostic tests to check for the robustness of our models and the efficiency of our estimates to inform policy decisions. The diagnostic test results are presented in *Table 8*.

Table 8. Diagnostic test results

Oil sector				
	Statistics	Probability	Null hypothesis	Decision
BG Serial correlation	2.695	0.237	No serial correlation	Do not reject
BPG Heteroscedasticity test	1.039	0.492	Homoscedasticity	Do not reject
JB Normality check	1.139	0.566	Model is normally distributed	Do not reject
F-stat	31.24***	0.000	Regressors are not significant	Reject
Functional form	4.362**	0.725	Model specification is bias	Reject
R-squared	0.895			
Adj. R-squared	0.815			
Non-oil sector				
BG Serial correlation	2.540	0.263	No serial correlation	Do not reject
BPG Heteroscedasticity test	0.402	0.963	Homoscedasticity	Do not reject
JB Normality check	0.125	0.940	Model is normally distributed	Do not reject
F-stat	1341***	0.000	Regressors are not significant	Reject
Functional form	9.454***	0.663	Model bias	Reject
R-squared	0.953			
Adj. R-squared	0.898			

Note: BG Serial Correlation is the Breusch–Godfrey serial correlation, BPG Heteroscedasticity test means Breusch–Pagan–Godfrey heteroscedasticity test, JB Normality denotes the Jarque–Bera normality test,

F-stat indicates F-test statistic, and Adj. R-squared is the adjusted R-squared. The number of observations (N) is 39. Also, ** and *** are significant at 5% and 1% critical region respectively.

Table 8 reveals that diagnostic reports are satisfactory. For instance, the BG Serial Correlation, BPG Heteroscedasticity, and JB Normality accept the hypothesis of no serial correlation, homoscedasticity, and normality of the model and result to draw inference and policy decisions. Further, the F-statistic and the functional form test reject the null hypothesis, which indicates that all the regressors are significant determinants of the dependent variables and that the model is well fitted. The R-squared and Adjusted R-squared for both models are above 80%, indicating a strong predictive power and the best fit of our model to guide policy formulation. Also, we present a stability test in figures 1–3 based on the recursive cumulative sum (CUSUM) and recursive cumulative sum square (CUSUM-SQ) tests.

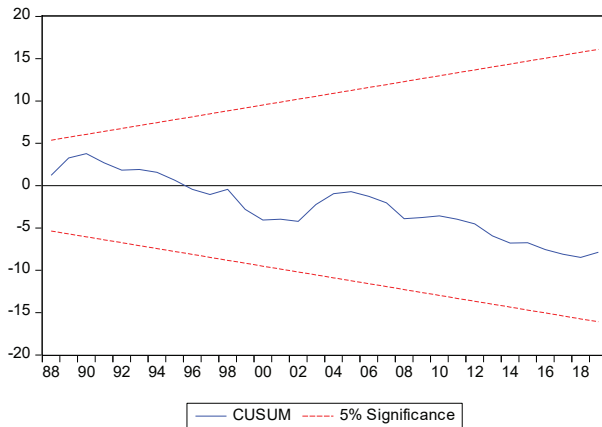


Figure 1. CUSUM (oil sector)

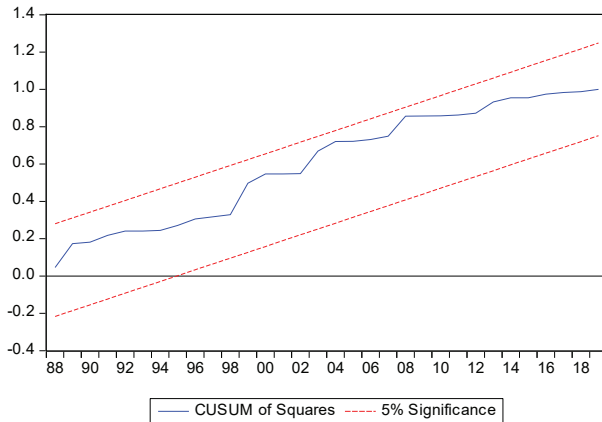


Figure 2. CUSUM-SQ (oil sector)

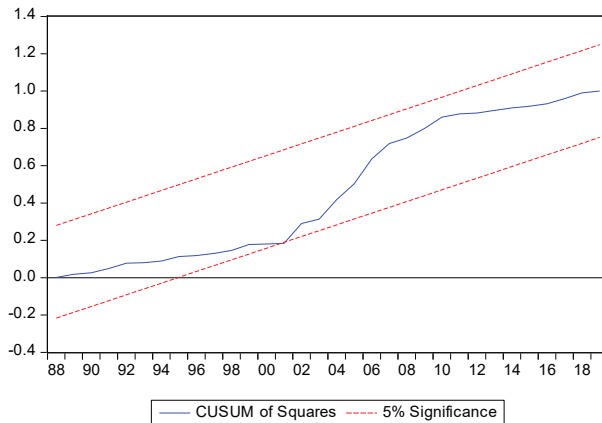


Figure 3. CUSUM-SQ (non-oil sector)

The CUSUM and CUSUM of square measurements in figures 1–3 demonstrate the stability test of the estimates, which demonstrates the stability and dependability of the estimates. The diagnostic reports show that our results are solid and reliable for policy inferences.

5. Conclusions

This study assesses the impact of crude oil revenue on oil and non-oil sector performance. The study focused on Nigeria and collected periodic data for analysis from the period between 1981 and 2020. We use the ARDL and the Toda–Yamamoto causality techniques to perform analyses in the study. The study shows that crude oil revenue promotes oil sector performance in the short and long run. However, the long-run effect is insignificant. This means that in the short term, crude oil revenue substantially engenders output productivity in the oil sector, but the effect becomes weak over the long term. Furthermore, the study reveals that crude oil revenue has a positive effect on the non-oil sector. However, in the long run, the impact on the non-oil sector is negative. Although the short-run effect is insignificant, the long-term impact is significant. It denotes that crude oil revenue can promote non-oil productivity, but the effect on the sector in the long run is contractionary due to the neglect of the sector. Regarding the causal evidence, the evidence shows a unidirectional causal nexus moving from crude oil revenue towards the oil and non-oil sectors. This indicates that crude oil revenue influences these sectors' trends. Additionally, the study identifies a one-way causal relationship between oil sector performance and non-oil sector productivity. This means that the oil sector influences the non-oil sector.

The empirical findings provide insights for stimulating Nigeria's oil and non-oil sector development, as crude oil revenue significantly improves oil sector performance in the short run but insignificantly in the long run. The government should address the issue of oil theft and oil and gas infrastructural vandalism in the country's oil regions to improve oil production quantity, which will enhance earnings and further reinvestment in the sector in the long run. Also, since crude oil revenue has a short-run potential to drive non-oil sector performance, the government should take advantage of the oil rent to better the non-oil sector. For instance, when oil prices are high, the Nigerian government should make it a point to allocate or invest the extra funds into worthwhile projects and industries, fully aware that a period of low oil prices is unavoidable. However, aside from direct investment, oil revenue spending should be channelled towards capital overheads that encourage investments in agriculture, manufacturing, tourism, etc. This will not only promote the non-oil sector but also boost real economic growth, push government revenue above expenditures, and reduce the fiscal deficits of the nation. The policy implication is that as real investment rises as a result of reinvestment of excess crude oil earnings, real sector investment is expected to increase domestic production and absorb the unemployed population, which will translate into improved economic growth and overall welfare advancement. Also, the policy implications of sectoral diversification from the oil sector to the non-oil sector will enable the Nigerian domestic economy to be resilient against price shocks in the international oil market.

References

- Abdulaziz, R. A.; Naseem, N. A. M.; Slesman, L. (2021). Oil revenue and agriculture value-added in oil-exporting countries: Does the role of real exchange rate matter? *International Journal of Energy Sector Management* 16(1): 171–190.
- Aderounmu, B.; Azuh, D.; Onanuga, O.; Oluwatomisin, O.; Ebenezer, B.; Azuh, A. (2021). Poverty drivers and Nigeria's development: Implications for policy intervention. *Cogent Arts & Humanities* 8(1): 1927495.
- Akinleye, G. T.; Olowookere, J. K.; Fajuyagbe, S. B. (2021). The impact of oil revenue on economic growth in Nigeria (1981–2018). *Acta Universitatis Danubius. Œconomica* 17(3): 317–324.
- Ammani, A. A.; Hassan, A. A. (2021). Oil revenue and the performance of the Nigerian agriculture sector (1981–2019). *Journal of Agripreneurship and Sustainable Development* 4(4): 99–104.
- Aziz, M. A.; Habibullah, M. S.; Azman-Saini, W. N. W.; Azali, M. (2000). Testing for causality between taxation and government spending: An application of Toda–

- Yamamoto approach. *Pertanika Journal of Social Science and Humanities* 8(1): 45–50.
- Babatunde, M. A. (2015). Oil price shocks and exchange rate in Nigeria. *International Journal of Energy Sector Management* 9(1): 2–19.
- Balza, L.; Espinasa, R. (2015). Oil sector performance and institutions: The case of Latin America. *IDB Technical Note* 724(61): 1–61.
- BP Statistical Review of World Energy (2022). *Statistical review of world energy*. Data accessible at: <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html>. Accessed on: 8 October 2022.
- Central Bank of Nigeria (CBN). (2021). *Central Bank of Nigeria Annual Statistical Bulletin*. Available at: <https://www.cbn.gov.ng/documents/Statbulletin.asp>. Accessed on: 3 October 2022.
- Chang, C. C.; Mendy, M. (2012). Economic growth and openness in Africa: What is the empirical relationship? *Applied Economics Letters* 19(18): 1903–1907.
- Cheng, C. Y.; Chien, M. S.; Lee, C. C. (2021). ICT diffusion, financial development, and economic growth: An international cross-country analysis. *Economic Modelling* 94: 662–671.
- Dambatta, N. (2020). CBN Intervention and non-oil foreign exchange. Article available at: <https://guardian.ng/opinion/cbn-intervention-and-non-oil-foreign-exchange/>. Accessed on: 8 October 2022.
- Dickey, D. A.; Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association* 74(366a): 427–431.
- Dimnwobi, S. K.; Madichie, C. V.; Ekesiobi, C.; Asongu, S. A. (2022). Financial development and renewable energy consumption in Nigeria. *Renewable Energy* 192: 668–677.
- Edo, S. E. (2013). Crude oil discovery and exploitation: The bane of manufacturing sector development in an oil-rich country, Nigeria. *OPEC Energy Review* 37(1): 105–124.
- Efanga, U. O.; Ugwuanyi, G. O.; Ogochukwu, C. O. (2020). Analysis of the impact of oil revenue on economic growth of Nigeria between 1981 and 2018. *IOSR Journal of Economics and Finance* 11(2): 25–34.
- Engle, R. F.; Granger, C. W. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica: Journal of the Econometric Society* 55(2): 251–276.
- Eregha, P. B.; Mesagan, E. P. (2017). Energy consumption, oil price and macroeconomic performance in energy dependent African countries. *Applied Econometrics* 46: 74–89.

- (2020). Oil resources, deficit financing and per capita GDP growth in selected oil-rich African nations: A dynamic heterogeneous panel approach. *Resources Policy* 66: 101615.
- Fanti, L.; Manfredi, P. (2003). The Solow's model with endogenous population: A neoclassical growth cycle model. *Journal of Economic Development* 28(2): 103–116.
- Gastautor, M. G.; (2020). Long-term investment trends: The crude oil boom in the 2000s. Article available at: <https://www.lgt.com/en/magnet/financial-markets/long-term-investment-trends-the-crude-oil-boom-in-the-2000s/#button2>. Accessed on: 8 October 2022.
- Gylfason, T.; Zoega, G. (2006). Natural resources and economic growth: The role of investment. *World Economy* 29(8): 1091–1115.
- Hamilton, J. D. (2013). Historical oil shocks. In: Parker, Randall; Whaples, Robert (eds.), *Routledge handbook of major events in economic history*. Routledge. 258–284. <http://www.nber.org/papers/w16790>.
- Hammayo, A. (2020). Crude oil price shocks and agricultural productivity in Nigeria (1987–2020): Evidence from non-linear autoregressive distributed lag and Granger causality analysis. *Journal of Agripreneurship and Sustainable Development* 3(4): 26–44.
- Hassan, K.; Abdullah, A. (2015). Effect of oil revenue and the Sudan economy: Econometric model for services sector GDP. *Procedia – Social and Behavioral Sciences* 172: 223–229.
- Ibekilo, B.; Emmanuel, P. M. (2022). Revisiting the resource curse syndrome: The role of technology in resource-rich African countries. *IUP Journal of Applied Economics* 21(3): 7–24.
- Iimi, A. (2007). Escaping from the resource curse: Evidence from Botswana and the rest of the world. *IMF Staff Papers* 54(4): 663–699.
- Isola, W. A.; Mesagan, P. E. (2014). Impact of oil production on human condition in Nigeria. *West African Journal of Monetary and Economic Integration* 14(1): 84–102.
- Lawrence, U. E.; Victor, E. O. (2016). A dynamic analysis of oil revenue and the performance of the agricultural sector in Nigeria. *Journal of Economics and Public Finance* 2(1): 203–219.
- Mesagan, E. P. (2015). Economic growth and environment nexus: The role of foreign direct investment. *A Research Journal on Contemporary Issues and Development* 4(3): 44–52.
- Mesagan, E. P.; Adenuga, I. J. (2020). Efficiency of oil resource endowment, natural gas and agriculture output: Policy options for inclusive growth. *BizEcons Quarterly* 8: 15–34.

- Mesagan, E. P.; Adewuyi, T. C.; Olaoye, O. (2022). Corporate finance, industrial performance and environment in Africa: Lessons for policy. *Scientific African*. <https://doi.org/10.1016/j.sciaf.2022.e01207>.
- Mesagan, E. P.; Charles, A. O.; Vo, X. V. (2023). The relevance of resource wealth in output growth and industrial development in Africa. *Resources Policy* 82: 103517. <https://doi.org/10.1016/j.resourpol.2023.103517>.
- Mesagan, E. P.; Eregha, P. B. (2019). Political economy of oil resources management in Nigeria: Lessons from other countries. In: Dauda, R. O. S.; Akinleye, S. O.; Balogun, E. D. (eds.), *Leading issues in macroeconomic stabilisation and financial development*. Lagos, Nigeria: Unilag Press & Bookshop Ltd. 251–263.
- Mesagan, E. P.; Kushimo, D. K.; Umar, D. I. (2021). Do fluctuations in exchange rate hinder non-oil export? An analysis of agriculture and manufacturing in Nigeria. *SN Business & Economics* 1(11): 1–23. <https://doi.org/10.1007/s43546-021-00156-4>.
- Mesagan, E. P.; Nwachukwu, M. I. (2018). Determinants of environmental quality in Nigeria: Assessing the role of financial development. *Econometric Research in Finance* 3(1): 55–78.
- Mesagan, E. P.; Osuji, E.; Agbonrofo, H. (2022). Comparative analysis of the growth impact of pollution and energy use in selected West African nations. *Environmental Science and Pollution Research*. <https://doi.org/10.1007/s11356-022-20532-3>.
- Mesagan, E. P.; Vo, X. V. (2023a). Does natural resource rent and consumption interplay worsen Africa's pollution? Heterogeneous panel approach with cross-sectional dependence. *Resources Policy* 82: 103562. <https://doi.org/10.1016/j.resourpol.2023.103562>.
- (2023b). The importance of economic complexity in the resource-growth discourse: Empirical evidence from Africa. *Journal of the Knowledge Economy*. <https://doi.org/10.1007/s13132-023-01227-7>.
- Mesagan, E. P.; Vo, X. V.; Emmanuel, P. M. (2023). The technological role in the growth-enhancing financial development: Evidence from African nations. *Economic Change and Restructuring* 56(1): 657–680. <https://doi.org/10.1007/s10644-022-09442-z>.
- Metz, H. C. (1991). Oil and gas. Article available at: <http://countrystudies.us/nigeria/65.htm>. Accessed on: 8 October 2022.
- Miamo, C. W.; Achuo, E. D. (2021). Crude oil price and real GDP growth: An application of ARDL bounds cointegration and Toda–Yamamoto causality tests. *Econ. Bull.* 41(3): 1615–1626.
- Mohammed, J. I.; Karimu, A.; Fiador, V. O.; Abor, J. Y. (2020). Oil revenues and economic growth in oil-producing countries: The role of domestic financial markets. *Resources Policy* 69: 101832.

- Nweze, N. P.; Edame, G. E. (2016). An empirical investigation of oil revenue and economic growth in Nigeria. *European Scientific Journal* 12(25): 271–294.
- Odularu, G. O. (2007). Crude oil and the Nigerian economic performance. *Oil and Gas Business* 2007: 1–29.
- OEC Report, (2020). Crude petroleum. Article available at: <https://oec.world/en/profile/hs/crude-petroleum>. Accessed on: 8 October 2022.
- Okotie, S. (2018). The Nigerian economy before the discovery of crude oil. In: Ndimele, Prince E. (ed.), *The political ecology of oil and gas activities in the Nigerian aquatic ecosystem*. Academic Press. 71–81. <https://doi.org/10.1016/B978-0-12-809399-3.00005-7>.
- Olawoyin, O. (2022). *Oil theft: Nigeria loses \$700 million monthly – Official*. Article available at: <https://www.premiumtimesng.com/news/more-news/553541-oil-theft-nigeria-loses-700-million-monthly-official.html#:~:text=An%20official%20lamented%20that%20pipeline,refineries'%20operations%2C%20among%20others.&text=The%20Nigerian%20National%20Petroleum%-20Company,monthly%20due%20to%20oil%20theft>. Accessed on: 8 October 2022.
- Olayungbo, D. O. (2019). Asymmetric effects of oil revenue shocks on government spending composition and productive sectors: New evidence from Nigeria. *OPEC Energy Review* 43(3): 241–258.
- Olayungbo, D. O.; Adediran, K. A. (2017). Effects of oil revenue and institutional quality on economic growth with an ARDL approach. *Energy and Policy Research* 4(1): 44–54.
- Ologunde, I. A.; Kapingura, F. M.; Sibanda, K. (2020). Sustainable development and crude oil revenue: A case of selected crude oil-producing African countries. *International Journal of Environmental Research and Public Health* 17(18): 6799.
- Olojede, A. A.; Michael, N. F. (2020). Oil revenue and Nigerian economic growth from 1981–2018: A resource curse. *International Journal of Management Studies and Social Science Research* 2(4): 291–296.
- Oludimu, S.; Alola, A. A. (2021). Does crude oil output aid economy boom or curse in Nigeria? An inference from “Dutch disease”. *Management of Environmental Quality: An International Journal* 33(2): 185–201.
- Ongba, L. D. (2011). Oil wealth and non-oil sector performance in a developing country: Evidence from Cameroon. *Oxford Development Studies* 39(4): 487–503.
- Omojolaibi, J. A.; Mesagan, P. E.; Oladipupo, T. D. (2016). The dynamics of electricity consumption and private investment in Nigeria. *Economic Issues* 21(2): 33–51.
- Omojolaibi, J. A.; Unukpo, L. A.; Mesagan, P. E. (2016). Energy security and electricity infrastructure in Nigeria. *Caleb Journal of Social and Management Sciences* 2(2): 42–77.

- Phillips, P. C.; Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika* 75(2): 335–346.
- Riman, H.; Akpan, E. S.; Offiong, A. I.; Ojong, C. M. (2013). Nexus between oil revenue, non-oil export and industrial output in Nigeria: An application of the VAR model. *International Journal of Financial Economics* 1(2): 48–60.
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics* 70(1): 65–94.
- Statista. (2022). *Oil industry in Nigeria – Statistics & facts*. Article available at: <https://www.statista.com/topics/6914/oil-industry-in-nigeria/#:~:text=Oil%20was%20discovered%20in%20Nigeria,to%20become%20a%20global%20giant.> Accessed on: 8 October 2022.
- Steyn, P. (2009). Oil exploration in colonial Nigeria, c. 1903–58. *The Journal of Imperial and Commonwealth History* 37(2): 249–274.
- Tabash, M. I.; Mesagan, E. P.; Farooq, U. (2022). Dynamic linkage between natural resources, economic complexity, and economic growth: Empirical evidence from Africa. *Resources Policy* 78: 102865.
- Tamba, J. G. (2017). Crude oil production and economic growth: Evidence from Cameroon. *Energy Sources, Part B: Economics, Planning, and Policy* 12(3): 275–281.
- Toda, H. Y.; Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics* 66(1–2): 225–250.
- World Development Indicator (WDI). (2021). *Databank world development indicator*. Database available at: <https://databank.worldbank.org/source/world-development-indicators>. Accessed on: 5 October 2022.



Deciphering Financial Health and Risk: Hierarchical Relationships and Interdependencies among Key Factors

Mayank JAIN,^{*,1} Taniya MALIK,² Sakshi MALIK³

¹ Vellore Institute of Technology, Vellore, India; mayank.jain202001@gmail.com

² KPMG Global Services Private Limited, Gurugram, India; maliktaniya58@gmail.com

³ KPMG Global Services Private Limited, Gurugram, India; sakshimalik8may@gmail.com

Abstract. This study examines the hierarchical relationships and interdependencies of financial factors impacting companies' health, using Total Interpretive Structural Modelling and Matrice d'Impacts Croisés Multiplication Appliquée à un Classement analyses. It identifies key financial factors and their influences. Findings reveal credit risk as a pivotal factor with substantial impact on other parameters. Solvency, capital adequacy, and Tier 1 capital ratios are also key determinants of financial health. The study further categorizes factors into independent, linkage, autonomous, and dependent categories. This research offers valuable insights for managers, policymakers, and investors aiding decision-making.

Keywords: financial health, credit risk, TISM, MICMAC, interdependent financial factors

JEL Classification: G32, G33, M10

1. Introduction

A company's financial health is crucial for its overall performance, long-term viability, and sustainability (Altman, 2000). A myriad of factors, such as credit risk management (Berger and DeYoung, 1997; Ranjita and Nishant, 2020), solvency (Vodová, 2011), liquidity (Mishra and Aspal, 2011), and profitability (Olson and Zoubi, 2008), significantly influence a company's financial well-being and might even lead to bankruptcy, which makes it very important to model the financial failure and equity failure of the companies and markets as done in previous research (Jitender, 2021). Despite the extensive literature on these individual factors, the complex hierarchy and interdependence among various financial factors impacting companies have not yet been adequately explored.

In the field of bankruptcy prediction studies, there has been a multitude of models developed since Altman's influential work. The study by Bellovary et al. (2007) traces the evolution of bankruptcy prediction studies from the 1930s to the present and examines the different methods, factors, and specific uses of models. The analysis of 165 bankruptcy prediction studies published from 1965 to the present reveals trends in model development, showing a shift from discriminant analysis to logit analysis and neural networks as the primary methods. Interestingly, the study finds that the number of factors utilized in models has varied over time but tends to average around 10 overall. Furthermore, the accuracy analysis suggests that multivariate discriminant analysis and neural networks are the most promising methods for bankruptcy prediction, indicating that higher model accuracy is not necessarily guaranteed with a greater number of factors.

In the domain of business failure prediction, classical statistical methodologies have been extensively applied, particularly through cross-sectional methods such as multivariate discriminant models and logit models (Balcaen and Ooghe, 2006). However, the application of these methods has not been comprehensively analysed in relation to the diverse problems encountered in corporate failure prediction. Balcaen and Ooghe (2006) discuss various issues related to the classical paradigm of failure prediction, including the definition of failure, non-stationarity and data instability, sampling selectivity, and the choice of optimization criteria. They also highlight the neglect of the time dimension of failure and the limited focus on failure prediction modelling. Moreover, the paper addresses problems associated with the use of linear classification rules, reliance on annual account information, and the oversight of the multidimensional nature of failure. By integrating insights from the bankruptcy prediction and business failure prediction literature, this study fills the gap in research on financial health and risk analysis. It employs the unique methodology of Total Interpretive Structural Modelling (TISM) and Matrice d'Impacts Croisés Multiplication Appliquée à un Classement (MICMAC) analyses to explore the hierarchical relationships and interdependencies among key factors. This unique approach offers a comprehensive understanding of the influences and interactions among financial factors, contributing to the development of effective strategies for financial management and decision-making.

The gap in the literature regards the hierarchical relationships and interdependencies between the financial factors that affect companies' financial health (Kosmidou, 2008). A comprehensive understanding of these relationships and their implications is indispensable for managers, policymakers, and investors, who must make well-informed decisions to ensure organizational stability and growth.

The primary objective of this study is to examine the hierarchical relationships and interdependencies between financial factors affecting companies' financial health. To achieve this goal, the study employs the TISM and MICMAC analyses,

which enable the identification of key financial factors and the understanding of their mutual influences. TISM enhances ISM by utilizing expert opinions to identify hierarchical relationships and determine the strength and direction of relationships (Gahlot et al., 2023), as ISM provides a systematic and comprehensive method but at the same time was found to be inflexible (Watson, 1978). Additionally, the MICMAC analysis aids in recognizing the most significant factors that affect a system and comprehending their interdependencies (Azadnia et al., 2021).

In this research study, several key research questions are addressed to explore the factors that significantly impact a company's financial health. Firstly, the study aims to identify the critical financial factors that have a substantial influence on a company's financial well-being. Secondly, it investigates the interrelationships among these financial factors and examines how they form a hierarchical structure that ultimately affects a company's financial health. Lastly, the research delves into the classification of financial factors into independent, linkage, autonomous, and dependent categories, aiming to enhance our understanding of a company's financial health by employing this categorization framework.

By addressing these research questions, this study aims to contribute to the existing literature on financial health by providing a comprehensive understanding of the hierarchical relationships and interdependencies between financial factors. Through a novel approach of combined TISM and MICMAC analysis, this study aims to augment the existing financial health literature by unravelling the intricate hierarchical relationships and interdependencies among financial factors. While prior studies (Horobet et al., 2021; SpuchlÁková et al., 2015; Arora, 2021; Banu et al., 2021) have shed light on the individual power of these factors in assessing a company's credit risk capabilities, a comprehensive framework that integrates all these factors to evaluate risk is lacking. Therefore, this study endeavours to provide a hierarchical framework that systematically assesses the credibility of a company while establishing interrelationships and interactions among these factors. The practical implications of the study's findings extend to managers, policymakers, and investors, empowering them to make informed decisions by prioritizing critical factors such as credit risk, solvency, and liquidity. Furthermore, the results of this study serve as a foundation for developing effective financial management strategies and policies, facilitating better risk assessment and management in various organizational contexts.

This paper is structured to provide a detailed analysis. It commences with Section 1, the *Introduction*, setting the stage and emphasizing the importance of the study. Section 2, the *Theoretical Background*, has two components: a literature review that amalgamates existing research and forms the theoretical basis and a segment establishing the connections between principal variables. Section 3,

Methodology, details the research approach. In Section 4, the results are showcased. Finally, Section 5 showcases *Discussions and Conclusions* and also includes the limitations and *Further Research*.

2. Theoretical Background

A company's financial health is a complex and multifaceted construct that requires a thorough understanding of the various financial factors and their interrelationships. Several theories and frameworks have been proposed to provide insights into these factors and their relationships. This study draws upon four relevant theories and frameworks to understand companies' financial health better.

Firstly, financial ratio analysis, a fundamental tool for evaluating a company's performance and financial position, identifies the key factors affecting companies' financial health. This approach enables the comparison of different companies within the same industry and facilitates the identification of strengths and weaknesses in a firm's financial performance (Rhyne and Brigham, 1979).

Secondly, credit risk management theory emphasizes managing risk exposure to ensure financial stability (Berger and DeYoung, 1997). The study incorporates this theory as an independent and pivotal factor, highlighting its importance in financial management. Effective credit risk management can reduce potential losses due to defaults and improve the company's overall financial health. Thirdly, the resource-based view (RBV) theory underscores the role of tangible and intangible resources in determining a firm's competitive advantage and performance (Barney, 1991). In the context of this study, the effective management of resources, including assets and capital, plays a crucial role in a company's financial health. Companies that can efficiently allocate and utilize resources are more likely to achieve better financial outcomes.

Lastly, the agency theory emphasizes the importance of financial performance measures, such as return on assets and equity, indicators of managerial performance, and aligning the interests of managers and shareholders (Jensen and Meckling, 1976). By using these performance measures, companies can assess the effectiveness of their management and ensure that managers are working towards the company's and its shareholders' best interests.

By drawing upon these theories and frameworks, this study provides a comprehensive understanding of the financial factors and their relationships, enabling effective financial management practices and contributing to the stability and success of companies and draws upon the conceptual framework depicted in *Figure 1*.

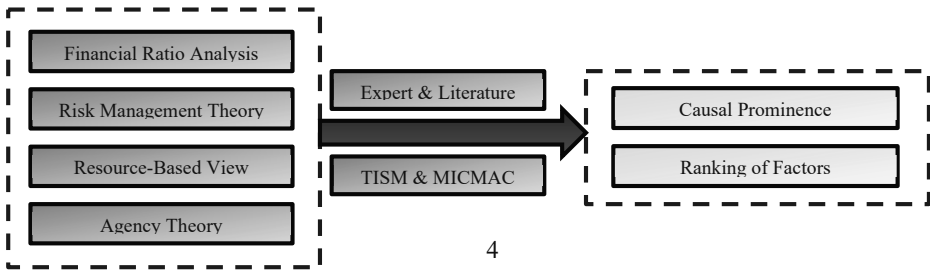


Figure 1. *Conceptual framework*

2.1. Literature Review

A considerable body of literature underscores the significance of credit risk management in promoting companies' financial stability. Berger and DeYoung (1997) maintain that credit risk, which arises from potential defaults on loans or other financial obligations, constitutes a critical factor that influences a company's financial health. Managing credit risk exposure to minimize potential losses and maintain stability is particularly pertinent to financial institutions. Altman et al. (2017) posit that effective credit risk management practices can contribute to an organization's overall risk management strategy, safeguarding its financial well-being. In this regard, the literature emphasizes the interconnectivity of long-term solvency and short-term liquidity in shaping a company's financial health. Vodová (2011) argues that an organization must strike an adequate balance between long-term obligations and short-term liquidity to ensure financial stability. Rajan and Zingales (1995) contend that companies must manage their capital structure, including solvency and liquidity ratios, to optimize their financial performance and minimize the risk of insolvency. Additionally, the Basel Committee on Banking Supervision (2012) highlights the significance of capital adequacy and solvency ratios for banks, emphasizing their role in promoting financial stability.

Several studies have explored the relationship between profitability measures and other financial parameters. Olson and Zoubi (2008) demonstrate that profitability measures, such as Return on Assets (ROA) and Return on Equity (ROE), are contingent upon a company's efficiency and liquidity position. Naceur and Omran (2011) corroborate these findings by showing that higher operating efficiency and optimal liquidity management can lead to improved profitability. Moreover, Kosmidou (2008) emphasizes the importance of linkage factors, which mutually influence one another and significantly impact a company's financial well-being. These factors include Operating Efficiency Ratio (OER), Funding Structure (FS), Capital Adequacy Ratio (CAR), Tier 1 Capital Ratio (T1CR), and Solvency Ratio (SR). By examining the interrelationships between these factors, researchers can better understand the dynamics of a company's financial health and provide

valuable insights for financial management practices. Deloof (2003) investigates the role of autonomous factors, such as Asset Turnover Ratio (ATR), in determining a company's financial health. Autonomous factors independently influence financial health and are not substantially affected by other financial parameters. Conversely, Mishra and Aspal (2011) identify Liquidity Ratio (LR) as a dependent factor, suggesting that it is an outcome of various other financial parameters and a key indicator of short-term financial stability. In summary, these studies underscore the significance of a comprehensive approach to financial management that considers multiple factors and their interrelationships in promoting financial stability and success.

The paper has employed an extensive literature review of various literature published in the context of credit risk in the databases of Scopus, Web of Science, and DOAJ using the PRISMA method (*Figure 2*). The study employs TISM and MICMAC analyses to formulate the relationships and drive and dependence power of each factor to form a Causal Prominence of factors and ranking of factors (Vimal et al., 2022). One expert from the industry was also asked to help to validate the formation of this initial reachability matrix. The reachability matrix was accepted after the study only following expert review. *Table 1* presents the factors identified and their definitions.

Table 1. *Definition of the factors*

S. no	Factor	Definition
D1	Credit Risk Indicator (CRI)	A measure of the likelihood of a borrower defaulting on loan obligations, considering credit history and financial position.
D2	Funding Structure (FS)	A company's mix of debt and equity used to finance its operations and growth.
D3	Liquidity Ratio (LR)	A metric to assess a company's ability to meet short-term obligations by converting assets into cash.
D4	Solvency Ratio (SR)	A financial ratio evaluating a company's long-term stability by measuring its ability to meet long-term debt obligations.
D5	Asset Turnover Ratio (ATR)	A measure of a company's efficiency in using its assets to generate revenue.
D6	Operating Efficiency Ratio (OER)	A financial ratio comparing a company's operating expenses to its net income to evaluate operational efficiency.
D7	Return on Assets (ROA)	A measure of a company's profitability relative to its total assets, indicating asset use effectiveness.

S. no	Factor	Definition
D8	Return on Equity (ROE)	A financial ratio measuring a company's profitability relative to shareholder's equity, indicating equity use effectiveness.
D9	Capital Adequacy Ratio (CAR)	A financial metric evaluating a bank's ability to absorb losses and meet capital requirements.
D10	Tier 1 Capital Ratio (T1CR)	A financial ratio measuring a company's core capital relative to its total risk-weighted assets, indicating financial strength.

2.2. Establishing Relationships

2.2.1. Driver 1 – Credit Risk Indicator

The interdependence between CRI and various financial factors, such as FS, LR, SR, CAR, and T1CR, is crucial for financial stability and risk management in companies. Research highlights that an organization's FS affects its credit risk and credit rating (Kosmidou, 2008; Kanno, 2014), while credit risk influences funding structure (Hagelmayer, 1994; Harasztosi and Kátay, 2020). The relationship between CRI and LR is evident as firms with higher credit risk struggle to maintain liquidity due to funding constraints (Vodová, 2011), and adequate credit risk management helps maintain liquidity levels (Wang and Zhang, 2023).

Higher credit risk is associated with lower solvency ratios due to increased financial leverage (Berger and DeYoung, 1997), while solid solvency positions signal lower default likelihood (Olson and Zoubi, 2008). The relationship between CRI and CAR is significant, as banks with higher capital adequacy ratios exhibit lower credit risk (Kosmidou, 2008), and maintaining adequate capital levels enhances financial stability (Altman, 2000). Similarly, the link between CRI and T1CR is established, with banks having higher Tier 1 capital ratios showing lower credit risk (Kosmidou, 2008) and a strong Tier 1 capital position ensuring long-term stability (Altman, 2000).

2.2.2. Driver 2 – Funding Structure

The financial literature extensively investigates the interdependence among funding structure, credit risk indicators, and liquidity ratio. The funding structure, comprising a company's debt and equity, is crucial for determining financial stability and risk exposure (Brusov et al., 2022). A diversified funding structure minimizes financial risk and enhances a company's resilience during economic uncertainties (Frank and Goyal, 2008). The CRI reflects the default probability and

loss exposure in a company's lending activities (Berger and DeYoung, 1997). Higher values indicate a greater likelihood of default and negative impacts on profitability and stability (Jarrow and Turnbull, 2000). A company's funding structure and credit risk indicator are interdependent, as increased leverage raises the default probability and credit risk indicator (Giesecke and Kim, 2011). The liquidity ratio, measuring a company's capacity to fulfil short-term financial obligations, indicates better financial health (Chaudhury, 2020; Vodová, 2014). A robust liquidity position reduces credit risk by providing a buffer against unforeseen financial shocks (Diamond and Rajan, 2001).

2.2.3. Driver 3 – Liquidity Ratio

The interconnectedness between liquidity ratios and factors like funding structure and credit risk indicators is evident in financial studies. A company's mix of debt and equity influences its vulnerability to risks (Brusov et al., 2022). Companies with a diversified funding strategy are better positioned during economic fluctuations (Frank & Goyal, 2008). Credit risk indicators highlight the potential for default in a firm's credit operations (Berger & DeYoung, 1997). Elevated values in these indicators can affect profitability and stability (Jarrow & Turnbull, 2000), with increased leverage escalating the probability of default (Giesecke & Kim, 2011).

Central to this is the liquidity ratio, which gauges a firm's ability to meet short-term financial commitments (Chaudhury, 2020). Superior liquidity ratios indicate good financial health (Vodová, 2011), and a strong liquidity position can counteract credit risk (Diamond & Rajan, 2001).

Studies have examined the interdependence between funding structure, credit risk indicator, and liquidity ratio. Diamond and Rajan (2001) argue that firms with higher leverage and credit risk require higher liquidity ratios for financial stability. Fama and French (2002) find that firms with higher credit risk indicators tend to have lower liquidity ratios, indicating challenges in meeting short-term financial obligations. Additionally, Gertler and Kiyotaki (2010) suggest that firms heavily relying on short-term debt may face higher credit risk due to rollover risk and possible liquidity crises, incentivizing them to maintain higher liquidity ratios to mitigate credit risk to ensure financial stability.

2.2.4. Driver 4 – Solvency Ratio

The financial literature has extensively examined the interdependence between liquidity ratio, funding structure, and solvency ratio, critical factors determining a company's financial health and stability. The liquidity ratio, reflecting a company's ability to meet short-term obligations, is linked to funding structure, as it represents the composition of capital sources (Chaudhury, 2020). Firms with

higher proportions of short-term debt may face liquidity challenges (Diamond and Rajan, 2001), while those reliant on debt financing can encounter refinancing risks impacting liquidity (Gatev and Strahan, 2006).

Solvency ratio measures a company's ability to meet long-term obligations. Its relationship with liquidity ratio is significant, as higher solvency ratios often correlate with better short-term liquidity management (Vodová, 2011; Acharya et al., 2007). Solvency ratio is also associated with funding structure, as firms balancing debt financing benefits and costs can affect solvency (Modigliani and Miller, 1958). Companies with higher long-term debt proportions will likely have higher solvency ratios (Frank and Goyal, 2008).

The interdependence between the solvency ratio and other financial ratios, such as liquidity ratio, ROA, ROE, CAR, and Tier 1 capital ratio, is crucial for understanding financial stability, performance, and resilience. Firms with higher solvency ratios tend to maintain higher liquidity ratios (Vodová, 2011), better profitability performance (Olson and Zoubi, 2008), and improved reputations (Jensen and Meckling, 1976). Additionally, the literature reports strong relationships between solvency ratio and CAR (Kosmidou, 2008) and between solvency and Tier 1 capital ratios (Demirgüç-Kunt et al., 2013), indicating that companies with more substantial capital positions maintain higher solvency ratios.

2.2.5. Driver 5 – Asset Turnover Ratio

The financial literature has investigated the interdependence between asset turnover ratio, operating efficiency ratio, and return on assets (ROA). The asset turnover ratio measures a company's ability to generate sales revenue from its assets and is a crucial determinant of firm performance (Deloof, 2003). The operating efficiency ratio, reflecting resource utilization efficiency in generating revenue, is closely related to asset turnover ratio (Kallberg and Liu, 2000). Studies show that firms with higher operating efficiency ratios have higher asset turnover ratios, indicating effective asset use for sales generation (Liu and Hung, 2006; Kosmidou, 2008).

ROA, a widely used profitability metric, measures a company's efficiency in generating profits from its assets (Olson and Zoubi, 2008). Higher asset turnover ratios suggest better asset utilization, increasing profitability as measured by ROA (Chen and Shimerda, 1981). A positive association between asset turnover ratio and ROA has been observed, indicating that firms with efficient asset management tend to exhibit higher profitability (Zhang, 2017).

2.2.6. Driver 6 – Operating Efficiency Ratio

The interdependence between Operating Efficiency Ratio and financial ratios, such as Asset Turnover Ratio, Return on Assets, and Return on Equity, has been

extensively studied in corporate finance to gain an improved understanding of the factors influencing a company's financial performance and their relationships. A well-established link between OER and ATR exists, with higher OER associated with higher ATR, suggesting that efficient operations contribute to effective asset utilization (Deloof, 2003; Lazaridis and Tryfonidis, 2006).

Similarly, numerous studies have demonstrated the connection between OER and ROA, highlighting the importance of efficient operations in enhancing overall profitability (Olson and Zoubi, 2008; Sufian and Habibullah, 2009). Lastly, the literature has documented the relationship between OER and ROE, indicating that higher operational efficiency leads to improved company performance and higher equity returns (Kosmidou, 2008; Athanasoglou et al., 2006).

2.2.7. Driver 7 – Return on Assets

The financial literature has extensively discussed the interdependence between return on assets and various financial ratios, such as funding structure, solvency ratio, operating efficiency ratio, return on equity, capital adequacy ratio, and Tier 1 capital ratio. ROA measures the efficiency with which a company generates profits from its assets (Olson and Zoubi, 2008).

Studies suggest that firms with an optimal balance of debt and equity tend to exhibit higher ROA levels (Rajan and Zingales, 1995; Titman and Wessels, 1988). Companies with higher solvency ratios generally have better financial health and higher ROA (Vodová, 2011; Kosmidou, 2008). A positive relationship exists between the operating efficiency ratio and ROA, indicating better asset utilization and profitability (Kallberg and Liu, 2000; Liu and Hung, 2006).

ROA and ROE have also established a positive relationship, two key profitability measures (Olson and Zoubi, 2008). Although the relationship between capital adequacy ratios, Tier 1 capital ratios, and ROA is less direct, banks with higher capital adequacy ratios tend to exhibit higher ROA levels, as they can better manage risks and maintain profitability (Kosmidou, 2008; Basel Committee on Banking Supervision, 2010).

2.2.8. Driver 8 – Return on Equity

The literature widely explores the interdependence between Return on Equity and other financial ratios, providing insights into a company's financial performance and stability. Optimal funding structures are crucial for maximizing ROE while minimizing financial risk (Goddard et al., 2004; Frank and Goyal, 2009). Solvent firms with higher solvency ratios tend to have higher ROE due to more favourable borrowing terms (Vodová, 2019; Kosmidou, 2008).

Efficient asset utilization, as measured by the asset turnover ratio, can lead to higher profitability and ROE (Deloof, 2003). The operating efficiency ratio is also essential for enhancing a company's profitability, including ROE, with firms having lower operating expenses than their revenue-generating higher ROE (Sufian and Habibullah, 2009; Athanasoglou et al., 2008).

A strong correlation exists between Return on Assets and ROE, as the efficient use of assets contributes to both profitability ratios (Olson and Zoubi, 2008; Sufian and Habibullah, 2009). Well-capitalized banks with higher capital adequacy ratios and Tier 1 capital ratios tend to have higher ROE, as adequate capital buffers help maintain investor confidence and absorb losses (Berger, 1995; Demirgüç-Kunt and Huizinga, 1999).

2.2.9. Driver 9 – Capital Adequacy Ratio

The interdependence between financial ratios, such as Return on Equity (Goddard et al., 2004), Solvency Ratio (Vodová, 2011), Return on Assets (Olson and Zoubi, 2008), and Tier 1 Capital Ratio (Berger, 1995), is crucial for understanding a company's financial health and performance. A positive association exists between ROE and Solvency Ratio, as higher solvency indicates better capital management and financial strength, ultimately leading to higher shareholder returns (Athanasoglou et al., 2006). A consistently positive correlation has been observed between ROA and ROE in the literature, with higher asset efficiency typically resulting in increased overall profitability (Sufian and Habibullah, 2009).

Analysing the dynamics of ROE, influenced by factors such as company size, industry, and macroeconomic conditions (Frank and Goyal, 2009), provides valuable insights into factors driving changes in a company's profitability. The relationship between the Tier 1 Capital Ratio and ROE has been confirmed in various studies, emphasizing the importance of maintaining an adequate capital buffer to ensure sustainable growth and profitability (Kosmidou, 2008).

2.2.10. Driver 10 – Tier 1 Capital Ratio

The Tier 1 Capital Ratio is a critical indicator of a bank's financial strength and stability, reflecting its ability to absorb losses and maintain operations during adverse economic conditions (Basel Committee on Banking Supervision, 2010). Studies have found positive relationships between T1CR and various financial performance measures, including

solvency ratio (Berger, 1995; Goddard et al., 2004), return on assets (Sufian and Habibullah, 2009; Athanasoglou et al., 2006), and capital adequacy ratio (Sufian and Habibullah, 2009).

The interdependence between T1CR and return on equity is more complex, with some researchers arguing that higher T1CR leads to lower ROE due to reduced leverage (Frank and Goyal, 2009), while others have found a positive association between the two variables, suggesting that well-capitalized banks are better positioned to maximize shareholder value (Goddard et al., 2004).

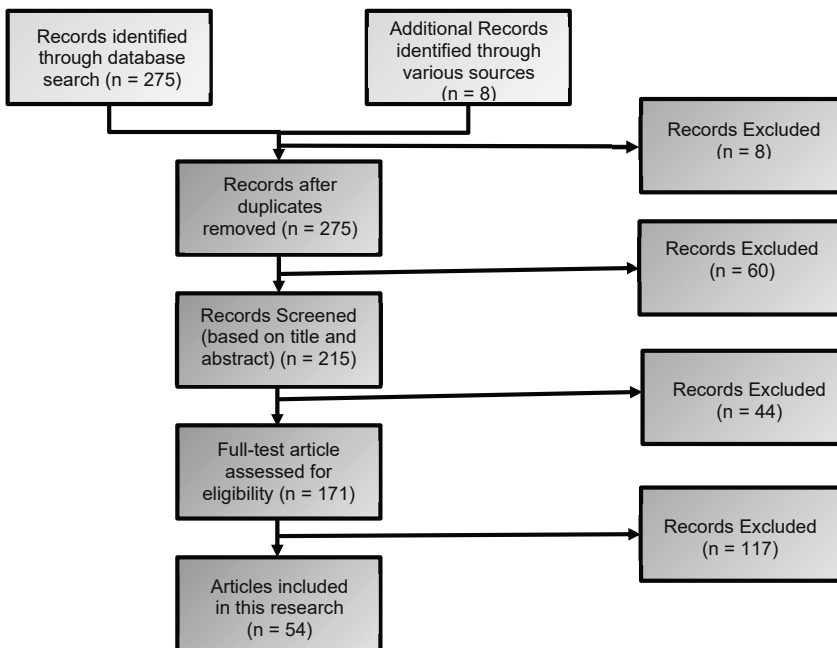


Figure 2. PRISMA Analysis

3. Methodology

The Total Interpretive Structural Modelling and Matrice d'Impacts Croisés Multiplication Appliquée à un Classement analyses are employed in this study. These are used to examine the hierarchical relationships and interdependencies between financial factors affecting companies' financial health.

3.1. Interpretive Structural Modelling (TISM)

Total Interpretive Structural Modelling is a methodical approach to analysing intricate relationships among factors within a system (Janes, 1988). TISM is an extension of the Interpretive Structural Modelling (ISM) technique that integrates expert opinions and interpretations to construct a hierarchical model of the factors under scrutiny. The TISM process involves the following steps:

Firstly, a comprehensive literature review was conducted to identify the critical financial factors influencing a company's financial health. This identification of financial factors was then validated through expert opinions from professionals in the field of finance, leading to the identification of ten factors. Secondly, an expert was consulted to establish the contextual relationships between the identified financial factors. These relationships were expressed using binary relations, and the identified factors were validated as relevant to the study.

Thirdly, the relationships between the financial factors were represented in the Initial Reachability Matrix (IRM), with entries in the matrix representing the influence of one factor on another. This matrix represented relationships derived from the literature with the help of the expert and then validated by the expert. *Table 2* presents the Initial Reachability Matrix.

Table 2. *Initial Reachability Matrix*

Driver	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
D1	1	1	1	1	0	0	0	0	1	1
D2	1	1	1	0	0	0	0	0	0	0
D3	0	1	1	1	0	0	0	0	0	0
D4	0	0	1	1	0	0	1	1	1	1
D5	0	0	0	0	1	1	1	0	0	0
D6	0	0	0	0	1	1	1	1	0	0
D7	0	1	0	1	0	1	1	1	1	1
D8	0	1	0	1	1	1	1	1	1	1
D9	0	0	0	1	0	0	1	1	1	1
D10	0	0	0	1	0	0	1	1	1	1

Fourthly, the Final Reachability Matrix was created and checked for transitive links. Transitive and significant transitive links were formed in this step, identifying three significant transitive relationships and 32 transitive links. *Table 3* presents the final reachability matrix. (*) signifies transitive link and (**) signifies a significant transitive link.

Table 3. Final Reachability Matrix

Driver	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
D1	1	1	1	1	0	0	1**	1**	1	1
D2	1	1	1	1**	0	0	1*	1*	1*	1*
D3	0	1	1	1	0	0	1*	1*	1*	1*
D4	0	1*	1	1	1*	1*	1	1	1	1
D5	0	1*	0	1*	1	1	1	1*	1*	1*
D6	0	1*	0	1*	1	1	1	1	1*	1*
D7	1*	1	1*	1	1*	1	1	1	1	1
D8	1*	1	1*	1	1	1	1	1	1	1
D9	0	1*	1*	1	1*	1*	1	1	1	1
D10	0	1*	1*	1	1*	1*	1	1	1	1

The Binary Interaction Matrix was constructed using direct and significant transitive links. This matrix formed the basis for the level partitioning step of TISM and also the input matrix for MICMAC analysis. *Table 4* presents the Binary Interaction matrix.

Table 4. Binary Interaction Matrix

Driver	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
D1	1	1	1	1	0	0	1	1	1	1
D2	1	1	1	1	0	0	0	0	0	0
D3	0	1	1	1	0	0	0	0	0	0
D4	0	0	1	1	0	0	1	1	1	1
D5	0	0	0	0	1	1	1	0	0	0
D6	0	0	0	0	1	1	1	1	0	0
D7	0	1	0	1	0	1	1	1	1	1
D8	0	1	0	1	1	1	1	1	1	1
D9	0	0	0	1	0	0	1	1	1	1
D10	0	0	0	1	0	0	1	1	1	1

Sixthly, the Binary Interaction Matrix was used for level partitioning, where the factors were assigned levels based on their dominance over other factors and their importance. *Table 5* presents the Level Partitioning, which was performed using Knime Data Analytics Software.

Table 5. Level Partitioning

Driver	Reachability Set	Antecedent set	Intersection Set	Level Assigned
D1	Credit Risk Indicator	1,2,3,4,7,8,9,10	1,2	V
D2	Funding Structure	1,2,3,4	1,2,3,7,8	I

Driver	Reachability Set	Antecedent set	Intersection Set	Level Assigned	
D3	Liquidity Ratio	2,3,4	1,2,3,4	2,3,4	III
D4	Solvency Ratio	3,4,7,8,9,10	1,2,3,4,7,8,9,10	3,4,7,8,9,10	IV
D5	Asset Turnover Ratio	5,6,7	5,6,8	5,6	I
D6	Operating Efficiency Ratio	5,6,7,8	5,6,7,8	5,6,7,8	III
D7	Return on Assets	2,4,6,7,8,9,10	1,4,5,6,7,8,9,10	4,6,7,8,9,10	II
D8	Return on Equity	2,4,5,6,7,8,9,10	1,4,6,7,8,9,10	4,6,7,8,9,10	II
D9	Capital Adequacy Ratio	4,7,8,9,10	1,4,7,8,9,10	4,7,8,9,10	IV
D10	Tier 1 Capital Ratio	4,7,8,9,10	1,4,7,8,9,10	4,7,8,9,10	IV

Seventhly, the Initial Relationship Diagram was constructed using level partitioning, and the diagram was checked for any bottom-up links. *Figure 3* presents the initial reachability digraph.

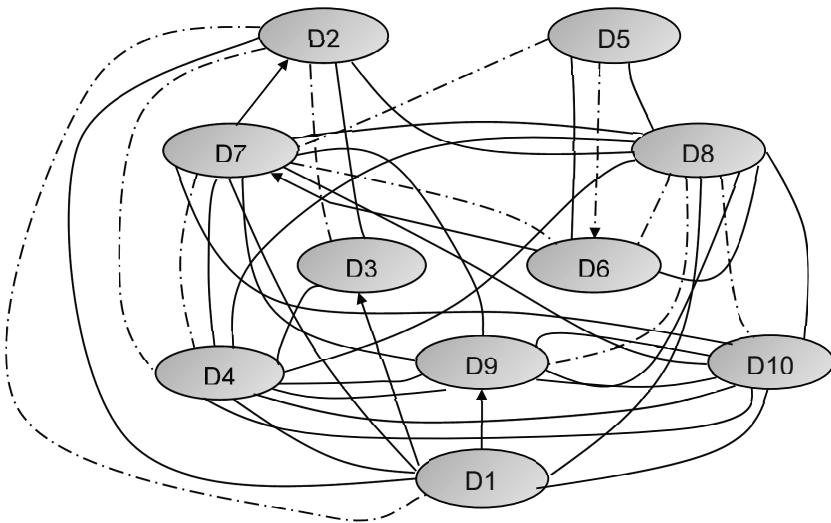


Figure 3. Initial digraph of drivers

Finally, the TISM Relationship Diagram was constructed by eliminating the 19 bottom-up links and mirror links found (e.g. links 4-7 and 7-4 are mirror links, only one of them being kept in the final TISM model), as the TISM methodology nullifies any bottom-up link if found. However, these links are considered for the MICMAC analysis. *Figure 4* presents the TISM relationship diagram.

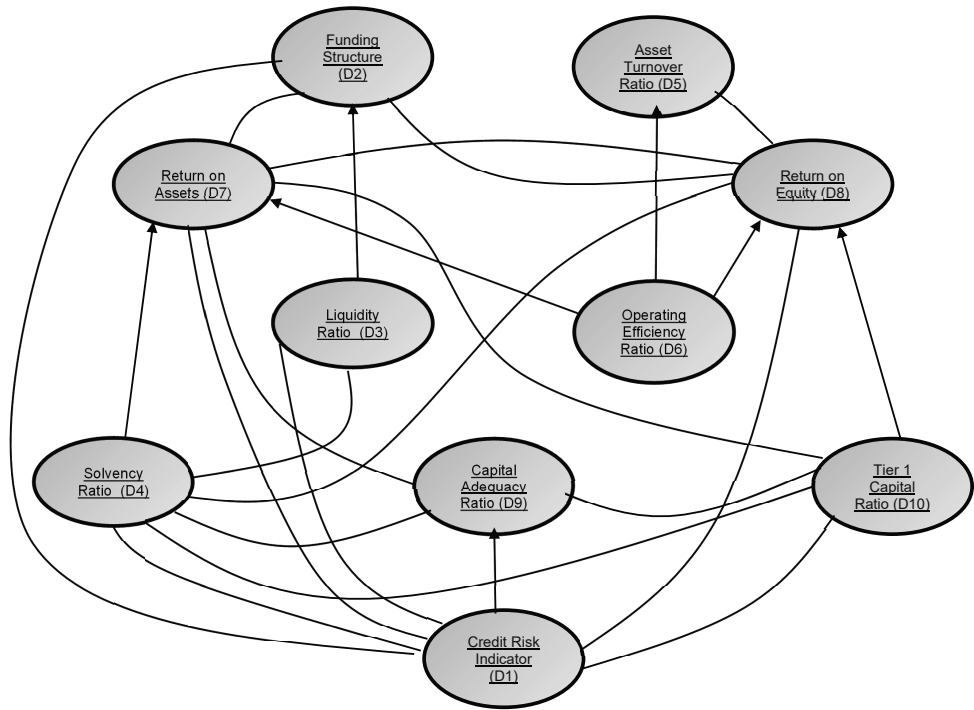


Figure 4. Validated Total Interpretive Structure Model

3.2. MICMAC Analysis

Table 6. Driving and dependence powers

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
DRIVING POWER	8	4	3	6	3	4	7	8	5	5
DEPENDENCE POWER	2	5	4	8	3	4	8	7	6	6

The MICMAC analysis is a cross-impact matrix technique that classifies factors into four categories: independent, linkage, autonomous, and dependent (Ahmad et al., 2019). The analysis helps to identify the driving forces and dependencies among the factors under investigation. It divides the factors into 4 categories, as depicted in Figure 5, using the driving and dependence powers obtained from the Binary Interaction Matrix, as depicted in Table 6.

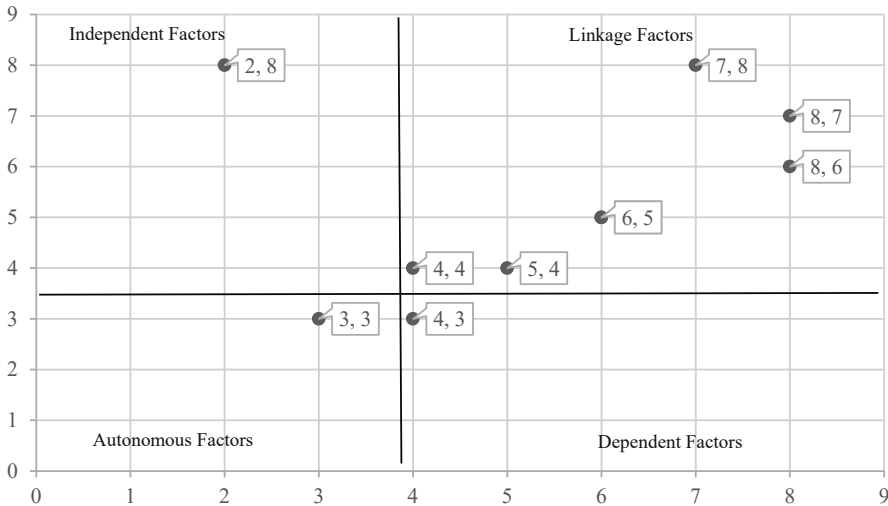


Figure 5. MICMAC analysis

Autonomous factors in the bottom-left quadrant have low driving and dependence power, with minimal relation to other factors. Dependent factors in the bottom-right quadrant possess strong dependence but weak driving power. Linkage factors, occupying the top-right quadrant, are crucial for analysis due to their high driving and dependence power, influencing and being influenced by other factors. Independent factors in the top-left quadrant have low dependence power but high driving power.

The TISM and MICMAC analyses provide a comprehensive understanding of the hierarchical relationships and interdependencies between financial factors, enabling the investigation of the research questions posed in this study. The results of these analyses are presented in the section below.

4. Results

The outcomes of the TISM and MICMAC analyses unravel the sophisticated hierarchy and interdependence among diverse financial determinants influencing companies. The findings underscore that credit risk, embodied by the Credit Risk Indicator (D1), surfaces as a paramount, independent factor that considerably impacts other financial aspects while remaining relatively unswayed by them (Berger and DeYoung, 1997). This accentuates the necessity for organizations to assiduously manage their credit risk to

guarantee stability and strong performance. At the financial hierarchy's bedrock, Solvency Ratio (D4), Capital Adequacy Ratio (D9), and Tier 1 Capital Ratio (D10) emerge as cardinal determinants of a company's financial health, signifying their capacity to fulfil long-term obligations (Basel Committee on Banking Supervision, 2010). These factors substantially shape Operating Efficiency Ratio (D6) and Liquidity Ratio (D3), demonstrating the interrelation between enduring financial stability and short-term liquidity management (Vodová, 2011).

Within the hierarchy, profitability measures, such as Return on Assets (D7) and Return on Equity (D8), hinge upon the efficacy and liquidity stance of the companies (Olson and Zoubi, 2008). Subsequently, Asset Turnover Ratio (D5) and Funding Structure (D2) are influenced by the company's profitability, emphasizing the role of asset utilization and proficient funding management in revenue generation (Chen and Shimerda, 1981).

The MICMAC analysis exposes the classification of financial determinants into four distinct categories: independent, linkage, autonomous, and dependent. Factors such as Operating Efficiency Ratio (D6), Funding Structure (D2), Capital Adequacy Ratio (D9), Tier 1 Capital Ratio (D10), Return on Equity (D8), Return on Assets (D7), and Solvency Ratio (D4) are pinpointed as linkage factors, underscoring their reciprocal influence and importance in moulding a company's financial well-being (Kosmidou, 2008). Asset Turnover Ratio (D5) surfaces as an autonomous factor, suggesting its relatively independent bearing on the company's comprehensive financial health (Deloof, 2003). Lastly, Liquidity Ratio (D3) emerges as a dependent factor, intimating that it is a crucial indicator of short-term financial stability and a consequence of numerous other financial parameters.

5. Discussions and Conclusions

5.1. Theoretical Implications

The TISM and MICMAC analyses have yielded valuable insights into financial management and offer theoretical implications for understanding the financial health of companies. The study reveals credit risk as a central factor, emphasizing the significance of credit risk management in organizational stability and performance. The hierarchical relationships among long-term and short-term financial stability parameters indicate their interdependence. The study also highlights the dependency of profitability measures on efficiency and liquidity positions, underscoring the need to consider the interrelationships with other financial factors. Identifying linkage factors in the MICMAC analysis highlights

their mutual influence and significance. Additionally, categorizing Asset Turnover Ratio as an autonomous factor and Liquidity Ratio as a dependent factor provides insights into their roles in a company's financial health. Overall, these findings contribute to the existing body of knowledge on financial management and offer several theoretical implications for developing comprehensive financial management frameworks.

5.2. Managerial/Practical Implications

The TISM and MICMAC analyses have provided valuable insights into the financial factors affecting companies, with implications for both theoretical understanding and practical application. Specifically, managers can leverage these findings to improve their financial management practices by focusing on credit risk management, balancing long-term solvency and short-term liquidity, enhancing profitability through efficiency and liquidity management, leveraging linkage factors for financial well-being, and understanding the role of autonomous and dependent factors. Credit risk management is pivotal, and managers should prioritize regular assessment, robust credit policies, and risk mitigation techniques. Balancing long-term solvency and short-term liquidity requires adequate capital buffers and effective cash management practices. Enhancing profitability involves improving efficiency and maintaining optimal liquidity levels. Managers should also consider linkage factors and regularly review financial policies. Recognizing the distinct roles of autonomous and dependent factors, such as Asset Turnover Ratio and Liquidity Ratio, can inform better decision-making related to financial management practices.

5.3. Conclusions

This study explored the intricate hierarchy and interdependence among various financial factors impacting companies by employing TISM and MICMAC analyses. The findings revealed the pivotal role of credit risk as an independent factor and emphasized the importance of long-term solvency and short-term liquidity management. Furthermore, the study uncovered the interrelationships between profitability measures, linkage factors, and other financial parameters, ultimately offering valuable insights into the financial health of companies.

These insights can assist managers, policymakers, and investors in making well-informed decisions and develop comprehensive financial management strategies. By understanding the hierarchical relationships and interdependencies between financial factors, stakeholders can focus on vital factors such as credit risk, solvency, and liquidity to ensure organizational stability and robust performance.

5.4. Limitations and Further Research

This study has identified certain limitations that suggest several avenues for further research. Firstly, researchers could expand the scope of financial factors under investigation by including additional parameters that may influence a company's financial health. This approach would provide a more comprehensive understanding of the financial dynamics. Finally, future research could investigate the impact of macroeconomic factors and market conditions on the relationships between financial factors, providing insights into how external conditions shape a company's financial health.

References

- Acharya, V. V.; Almeida, H.; Campello, M. (2007). Is cash negative debt? A hedging perspective on corporate financial policies. *Journal of Financial Intermediation* 16(4): 515–554. <https://doi.org/10.1016/j.jfi.2007.04.001>.
- Ahmad, M.; Tang, X.-W.; Qiu, J.-N.; Ahmad, F. (2019). Interpretive structural modeling and MICMAC analysis for identifying and benchmarking significant factors of seismic soil liquefaction. *Applied Sciences* 9(2): 233. <https://doi.org/10.3390/app9020233>.
- Altman, E. I. (2017). Predicting financial distress of companies: Revisiting the Z-Score and ZETA® models. *Handbook of Research Methods and Applications in Empirical Finance* 428–456. <https://doi.org/10.4337/9780857936097.00027>.
- Arora, R. (2021). Driving excellence in credit risk management practices in commercial lending – An empirical analysis of Indian public sector banks. *International Journal of Business Continuity and Risk Management* 11(1): 1. <https://doi.org/10.1504/ijbcm.2021.10036616>.
- Athanasoglou, P. P.; Brissimis, S. N.; Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money* 18(2): 121–136. <https://doi.org/10.1016/j.intfin.2006.07.001>.
- Athanasoglou, P. P.; Delis, M.; Staikouras, C. (2006). Determinants of bank profitability in the South Eastern European region. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4163741>.
- Azadnia, A. H.; Onofrei, G.; Ghadimi, P. (2021). Electric vehicles lithium-ion batteries reverse logistics implementation barriers analysis: A TISM-MICMAC approach. *Resources, Conservation and Recycling* 174: 105751. <https://doi.org/10.1016/j.resconrec.2021.105751>.

- Balcaen, S.; Ooghe, H. (2006). 35 years of studies on business failure: An overview of the classic statistical methodologies and their related problems. *The British Accounting Review* 38(1): 63–93. <https://doi.org/10.1016/j.bar.2005.09.001>.
- Banu, Mst. H.; Sayaduzzaman, Md.; Sil, S. C. (2021). The impact of credit risk management indicators on profitability attributes: Evidence from the state-owned commercial banks in Bangladesh. *American Journal of Trade and Policy* 8(3): 215–224. <https://doi.org/10.18034/ajtp.v8i3.576>.
- Belas, J.; Kocisova, K.; Gavurova, B. (2019). Determinants of cost efficiency: Evidence from banking sectors in EU countries. *Acta Polytechnica Hungarica* 16(5): 101–123. <https://doi.org/10.12700/aph.16.5.2019.5.7>.
- Bellovary, J. L.; Giacomino, D. E.; Akers, M. D. (2007). A review of bankruptcy prediction studies: 1930 to Present. *Journal of Financial Education* 33: 1–42. <https://doi.org/10.2307/41948574>.
- Berger, A. N. (1995). The relationship between capital and earnings in banking. *Journal of Money, Credit and Banking* 27(2): 432. <https://doi.org/10.2307/2077877>.
- Berger, A. N.; DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance* 21(6): 849–870. [https://doi.org/10.1016/s0378-4266\(97\)00003-4](https://doi.org/10.1016/s0378-4266(97)00003-4).
- Brusov, P.; Filatova, T.; Orekhova, N. (2022). Capital structure: Modigliani–Miller theory. In: *Generalized Modigliani–Miller Theory. Contributions to Finance and Accounting*. Springer. https://doi.org/10.1007/978-3-030-93893-2_2.
- Chaudhury, N. J. (2020). The efficacy of liquidity management of Bangladeshi commercial banks: Does liquidity underscore bank profitability. *International Journal of Financial Services Management* 10(3): 268. <https://doi.org/10.1504/ijfsm.2020.111107>.
- Chen, K. H.; Shimerda, T. A. (1981). An empirical analysis of useful financial ratios. *Financial Management* 10(1): 51. <https://doi.org/10.2307/3665113>.
- Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? *Journal of Business Finance & Accounting* 30: 573–588. <https://doi.org/10.1111/1468-5957.00008>.
- Demirguc-Kunt, A.; Detragiache, E.; Merrouche, O. (2013). Bank capital: Lessons from the financial crisis. *Journal of Money, Credit and Banking*. 45(6): 1147–1164. <https://doi.org/10.1111/jmcb.12047>.
- Demirguc-Kunt, A.; Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence. *The World Bank Economic Review* 13(2): 379–408. <https://doi.org/10.1093/wber/13.2.379>.
- Diamond, D. W.; Rajan, R. G. (2001). Liquidity risk, liquidity creation, and financial fragility: A theory of banking. *Journal of Political Economy* 109(2): 287–327. <https://doi.org/10.1086/319552>.

- Fama, E. F.; French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of Financial Studies* 15(1): 1–33. <https://doi.org/10.1093/rfs/15.1.1>.
- Frank, M. Z.; Goyal, V. K. (2008). Trade-off and pecking order theories of debt. In: Eckbo, B. E. (ed.), *Handbook of Empirical Corporate Finance*. Elsevier. <http://dx.doi.org/10.1016/b978-0-444-53265-7.50004-4>.
- (2009). Capital structure decisions: Which factors are reliably important? *Financial Management* 38(1): 1–37. <https://doi.org/10.1111/j.1755-053x.2009.01026.x>.
- Gahlot, N. K.; Bagri, G. P.; Gulati, B.; Bhatia, L.; Barat, S.; Das, S. (2023). Analysis of barriers to implement green supply chain management practices in Indian automotive industries with the help of ISM model. *Materials Today: Proceedings* 82: 330–339. <https://doi.org/10.1016/j.matpr.2023.02.146>.
- Gatev, E.; Strahan, P. E. (2006). Banks' advantage in hedging liquidity risk: Theory and evidence from the commercial paper market. *The Journal of Finance* 61(2): 867–892. <https://doi.org/10.1111/j.1540-6261.2006.00857.x>.
- Gertler, M.; Kiyotaki, N. (2010). Financial intermediation and credit policy in business cycle analysis. In: Friedman, B. M.; Hahn, F. H. (eds.), *Handbook of Monetary Economics*. Elsevier. 547–599. <http://dx.doi.org/10.1016/b978-0-444-53238-1.00011-9>.
- Giesecke, K.; Kim, B. (2011). Systemic risk: What defaults are telling us. *Management Science* 57(8): 1387–1405. <https://doi.org/10.1287/mnsc.1110.1375>.
- Goddard, J.; Molyneux, P.; Wilson, J. O. S. (2004). The profitability of European banks: A cross-sectional and dynamic panel analysis. *The Manchester School* 72(3): 363–381. Wiley Online. <https://doi.org/10.1111/j.1467-9957.2004.00397.x>.
- Hagelmayer, I. (1994). T. Bácskai et al. (eds.), *A Magyar Nemzeti Bank Története, I. Az Osztrák Nemzeti Banktól a Magyar Nemzeti Bankig 1816–1924 / The History of the National Bank of Hungary, I. From the National Bank of Austria to the National Bank of Hungary 1816–1924* (Budapest: Közgazdasági és Jogi Könyvkiadó Rt, 1993. 594 pp.). *Financial History Review* 1(2): 206–207. DOI: 10.1017/S0968565000001141.
- Harasztosi, P.; Kátay, G. (2020). Currency matching by non-financial corporations. *Journal of Banking & Finance* 113: 105739. <https://doi.org/10.1016/j.jbankfin.2020.105739>.
- Horobet, A.; Curea, S. C.; Smedoiu Popoviciu, A.; Botoroga, C.-A.; Belascu, L.; Dumitrescu, D. G. (2021). Solvency risk and corporate performance: A case study on European retailers. *Journal of Risk and Financial Management* 14(11): 536. <https://doi.org/10.3390/jrfm14110536>.
- Janes, F. R. (1988). Interpretive structural modelling: A methodology for structuring complex issues. *Transactions of the Institute of Measurement and Control* 10(3): 145–154. <https://doi.org/10.1177/014233128801000306>.

- Jarrow, R. A.; Turnbull, S. M. (2000). The intersection of market and credit risk. *Journal of Banking & Finance* 24(1–2): 271–299. [https://doi.org/10.1016/s0378-4266\(99\)00060-6](https://doi.org/10.1016/s0378-4266(99)00060-6).
- Jensen, M. C.; Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3(4): 305–360. [https://doi.org/10.1016/0304-405x\(76\)90026-x](https://doi.org/10.1016/0304-405x(76)90026-x).
- Jitender. (2021). Value-at-risk estimation of equity market risk in India. *Acta Universitatis Sapientiae, Economics and Business* 9(1): 1–24. <https://doi.org/10.2478/auseb-2021-0001>.
- Kallberg, J. G.; Liu, C. L.; Trzcinka, C. (2000). The value added from investment managers: An examination of funds of REITs. *The Journal of Financial and Quantitative Analysis* 35(3): 387. <https://doi.org/10.2307/2676210>.
- Kanno, M. (2014). An assessment of systemic risk in the Japanese banking sector. *Global Credit Review* 04(01): 1–15. <https://doi.org/10.1142/s2010493614500019>.
- Kosmidou, K. (2008). The determinants of banks' profits in Greece during the period of EU financial integration. *Managerial Finance* 34(3): 146–159. <https://doi.org/10.1108/03074350810848036>.
- Liu, Y.-C.; Hung, J.-H. (2006). Services and the long-term profitability in Taiwan's banks. *Global Finance Journal* 17(2): 177–191. <https://doi.org/10.1016/j.gfj.2006.03.001>.
- Mishra, S. K.; Aspal, P. K. (2011). Management and control of non-performing assets (NPA) in Indian public sector banks. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2875378>.
- Naceur, S. B.; Omran, M. (2011). The effects of bank regulations, competition, and financial reforms on banks' performance. *Emerging Markets Review* 12(1): 1–20. <https://doi.org/10.1016/j.ememar.2010.08.002>.
- Olson, D.; Zoubi, T. A. (2008). Using accounting ratios to distinguish between Islamic and conventional banks in the GCC region. *The International Journal of Accounting* 43(1): 45–65. <https://doi.org/10.1016/j.intacc.2008.01.003>.
- Rajan, R. G.; Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance* 50(5): 1421–1460. <https://doi.org/10.1111/j.1540-6261.1995.tb05184.x>.
- Rhyne, R. G.; Brigham, E. F. (1979). Fundamentals of financial management. *The Journal of Finance* 34(5): 1277. <https://doi.org/10.2307/2327254>.
- Simon, G. (2012). Part I. The elements of bank financial supervision, 4 Basel III. In: *International Regulation of Banking*. Oxford University Press. <http://dx.doi.org/10.1093/law/9780199643981.003.0004>.
- SpuchlÁková, E.; Valašková, K.; Adamko, P. (2015). The credit risk and its measurement, hedging and monitoring. *Procedia Economics and Finance* 24: 675–681. [https://doi.org/10.1016/s2212-5671\(15\)00671-1](https://doi.org/10.1016/s2212-5671(15)00671-1).

- Sufian, F.; Habibullah, M. S. (2009). Bank-specific and macroeconomic determinants of bank profitability: Empirical evidence from the China banking sector. *Frontiers of Economics in China* 4(2): 274–291. <https://doi.org/10.1007/s11459-009-0016-1>.
- Titman, S.; Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance* 43(1): 1–19. <https://doi.org/10.1111/j.1540-6261.1988.tb02585.x>.
- Vimal, K.; Churi, K.; Kandasamy, J. (2022). Analysing the drivers for adoption of Industry 4.0 technologies in a functional paper – cement – sugar circular sharing network. *Sustainable Production and Consumption* 31: 459–477. <https://doi.org/10.1016/j.spc.2022.03.006>.
- Vodová, P. (2013). Determinants which affect liquid asset ratio of Czech and Slovak commercial banks. *Financial Assets and Investing* 4(1): 25–41. <https://doi.org/10.5817/fai2013-1-2>.
- (2014). Liquidity risk sensitivity of Czech commercial banks. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis* 62(2): 427–436. <https://doi.org/10.11118/actaun201462020427>.
- Wang, L.; Zhang, W. (2023). A qualitatively analysable two-stage ensemble model based on machine learning for credit risk early warning: Evidence from Chinese manufacturing companies. *Information Processing & Management* 60(3): 103267. <https://doi.org/10.1016/j.ipm.2023.103267>.
- Watson, R. H. (1978). Interpretive structural modeling—A useful tool for technology assessment? *Technological Forecasting and Social Change* 11(2): 165–185. [https://doi.org/10.1016/0040-1625\(78\)90028-8](https://doi.org/10.1016/0040-1625(78)90028-8).
- Zhang, X. (2017, June 1). Trends in working capital management and its impact on firms' performance – An analysis of SMEs. *Research on Modern Higher Education*. <http://dx.doi.org/10.24104/rmhe/2017.03.01008>.



Towards Sustainability on a Sea of Eco-Labels. Leading or Misleading?

Katalin NAGY-KERCSCÓ

University of Debrecen, “Ihrig Károly” Doctoral School of Management and Business
(Hungary)

e-mail: kercsokatalins@gmail.com

Abstract. Eco-labels help consumers navigate and promote environmental initiatives and curb greenwashing. The paper presents the eco-labels used in Romania by the government, companies, and consumers. The paper finds that Romania’s activities related to eco-labels, especially EU eco-labels, are lagging behind other developed countries. This is evidenced by the government’s inadequate communication, the online communication of economic players related to the topic, and consumers’ inadequate knowledge of eco-labels.

Keywords: eco-labels, greenwashing, consumer behaviour, sustainability

JEL Classification: Q56, D12

1. Introduction

Despite the current economic and wartime situation, climate change and sustainability continue to receive significant attention from political decision-makers, businesses, and society (Zakeri et al., 2022; Zhao et al., 2022). Consumers’ interest in sustainable products is increasing, and several research shows that consumers are willing to spend more money on environmentally conscious products (Kang et al., 2012; Namkung-Jang, 2017; Li-Kallas, 2021). However, consumers’ scepticism about the authenticity of products and services poses a challenge (Albayrak et al., 2013; Golob et al., 2018; Shabbir Husain, 2022). Increasingly, companies are incorporating key terms, colours, and sounds that encourage environmentally conscious behaviour into their marketing communication (Hammed et al., 2021). Nevertheless, greenwashing continues to be prevalent among businesses, hindering the advancement of sustainability (Nishitani et al., 2021). This is why consumers need real solutions that contribute to reducing environmental damage (Vivanti Sigit, Fauziah, and Heryanti, 2017) and provide

easily accessible information about the chosen product's reliability with minimal time investment.

In recent years, hundreds of sustainability measures have been implemented in Romania (Ministerul Mediului, 2021). Several studies have shown that while Romania lags behind more developed EU countries in terms of sustainability and consumer attitudes towards the subject, interest in it has increased significantly, especially in the last ten years (Constantin et al., 2013; Lakatos et al., 2018; Radulescu et al., 2021; Muresan et al., 2022; Jităreanu et al., 2022). Eco-labels played a significant role in this increase.

Greenwashing is an intersection: one side is the weak or non-existent environmental performance and the other is the communication of this activity's positive environmental impact (Delmas-Burbano, 2011). Greenwashing carries several problems, including obstructing sustainability, ethical concerns (Szabo-Webster, 2021), and consumer mistrust (Chen-Chang, 2013). To help consumers identify greenwashing practices more efficiently, TerraChoice (2010) released a study that lists the seven sins of greenwashing. The current study focuses on a specific type of greenwashing: questionable certifications and labels. 1. To examine and present the eco-labels officially recognized in Romania. 2. To present the online marketing activities of companies with EU eco-label certification. 3. To assess the knowledge of consumers from Romania related to eco-labels.

The study found that there was a gap between legislation, economic players, and consumers regarding EU eco-label knowledge. Being supported by the government, the use of EU eco-label is encouraged, but the associated information provided for both companies and consumers is inconsistent and incomplete. Additionally, there is a lack of further information and communication regarding eco-labelling. On the corporate side, businesses holding the EU eco-label certification must effectively highlight its advantages or presence to consumers in their online communication. As for the surveyed consumers, it is evident that they are interested in environmentally friendly products and are willing to pay more for them. However, there is still considerable confusion and uncertainty in their minds regarding this matter. These results will contribute to the promotion of environmental awareness through the application of the knowledge and benefits of eco-labels, as well as to the related literature that underpins the impact of eco-labelling.

The rest of the paper is structured as follows. Section 2 provides a brief theoretical overview, offering insight into greenwashing and key concepts related to eco-labels, particularly the EU eco-label. Section 3 describes the methodology used for the research. Section 4 presents the legal environment of eco-labels in Romania, the situation of businesses' online activities registered with the EU eco-label, and a brief presentation of eco-label awareness among Hungarian consumers living in Romania. Finally, Section 5 formulates the most important conclusions of the study.

2. Literature Review

2.1. Greenwashing (Causes and Types)

Jay Westerveld drew attention to the phenomenon of greenwashing in 1986 (Pearson, 2010). The importance of the topic is demonstrated by the large number of peer-reviewed studies related to it. Numerous terms have emerged regarding its definition, all of which indicate misleading communication from companies to consumers (de Freitas Netto, 2020). According to Delmas-Burbano (2015), three important influencing factors that lead to greenwashing by companies must be distinguished: external, organizational, and individual influences. External influences can be seen as inadequately structured and formulated legislation (Lyon-Montgomery, 2015; Rajesh, 2023), tension created by market pressures (Delmas-Burbano, 2015), or expectations from institutional regulations like SDG (Sustainable Development Goals) (Lashitew, 2021; Nishitani et al., 2021). The tension arising from serving consumer needs and maintaining an advantage over competitors can be interpreted as an organizational driving force. Poor or inadequate communication between management, communication units, and/or organizational production can also lead to greenwashing (Delmas-Burbano, 2015). Unrealized green actions, also known as greenwashing, are considered an individual-level factor.

In the case of greenwashing, a distinction must be made between greenwashing made at the corporate level and greenwashing that can be found at the product or service level. Within these categories, different types of greenwashing exist. These include claim-based greenwashing, such as the use of false eco-labels or communication that emphasizes misleading or unrealistic benefits, and execution greenwashing such as the sound of a storm, pictures from nature, and colours (Delmas-Burbano, 2015; Parguel et al., 2015; de Freitas Netto et al., 2020).

These categories contribute to the transparency of greenwashing. Within these categories, it is worth highlighting the list of “seven sins of greenwashing” created by TerraChoice (2010), which aimed to help consumers navigate among greenwashing practices. The seventh item on the list refers to the sin of engaging in the worship of false labels. This involves the utilization of labels or certifications that falsely imply the involvement of a non-existent third party (certification body).

2.2. Eco-Labels

The inception of the first eco-label programme in Europe occurred in Germany in 1978, and it was named Blue Angel (Dinu et al., 2012). The introduction of eco-labelling was partly driven by the insufficient information offered by manufacturers

concerning the environmental attributes of their products. Several studies have demonstrated that many consumers lack trust in environmental claims made by manufacturers, and they often feel bewildered by the multitude of claims in the market (Cope and Winward, 1991). The widespread lack of trust in environmental claims has prompted lawmakers to advocate for third-party labelling schemes (Wood, 1994).

Eco-labels are indicative of the overall environmental performance of a product or service (Rashid et al., 2009). They are a visual tool that designates a service/product based on predetermined standards and criteria with positive environmental benefits throughout the life cycle of the product or service (Delmas-Lessem, 2017). The eco-label identifies environmentally superior products in the same category compared to other products based on the product's environmental impact assessment (Grimmer-Bingham, 2013). An eco-label is a symbol or label that indicates that the product has undergone an environmental impact assessment process and is made from environmentally friendly materials (Crespi and Marette, 2005). Eco-labels are commonly granted by an independent third-party organization, ensuring the certificate's credibility for consumers (Castka-Corbet, 2016; Cai et al., 2017; Nilsson et al., 2004). These labels can be grouped into two main categories. One category is when the label's creation is financed by government support, and the other one is the result of private initiatives (Dinu et al., 2012). Most of these labels can be classified according to ISO 14024:2018, specifically under Type I Environmental Labelling Standards (<https://www.iso.org/standard/72458.html>). ISO 14024:2018 has already approved several eco-label certificates, which may differ by category and appearance (Horne, 2009). The European Union has also created a reliable certificate for consumers in Member Countries, called the EU Eco-Label, to promote environmental efforts. In addition, each country can freely create environmentally conscious certificates that meet the standards. For example, in Hungary, there is the *Környezetbarát Termék Védjegy* (Environmentally Friendly Product Trademark), in the Czech Republic the *Ekologicky Setrany Vyrodek*, in the Scandinavian countries the *Nordic Swan Label*, etc. These certificates can be classified into three different categories (Gallastegui, 2002).

1. Type 1 labels certified by third parties enable consumers to evaluate and compare products within the same category, as they are assessed based on specific criteria and are environmentally preferable throughout their life cycle. Most voluntary certifications, including the EU Eco-label and most national labels, fall into this category, and this is the type of label that the study focuses on.
2. Type 2 claims based on self-declarations: these are environmental assertions put forward by manufacturers, importers, or distributors about their products. Nevertheless, they are not independently verified, do not use predetermined and accepted reference criteria, and are unquestionably the least informative of the three types of environmental labels.

3. Type 3 environmental product declarations are generated using life cycle assessment (LCA) and are independently verified by third-party organizations. They provide quantified environmental information about a product's entire life cycle, utilizing verified LCA data, life cycle inventory data, and, in some cases, additional environmental information.

Also, it should be noted that single-issue labels, such as Fairtrade, Forest Stewardship Council (FSC), or Energy Star, are not included in the above three types of categories and are industry-specific.

2.3. Ecological Labelling in the European Union

The European Commission introduced the EU eco-label system for all Member States in 1992 as part of the fifth environmental action programme, which focused on sustainability (Erskine-Collins, 1997). The goal was to establish an eco-label system that minimizes adverse effects on the environment, health, climate, and natural resources resulting from consumption and production practices. Products falling under this category are mandated to be founded on the highest environmental performance criteria (Iraldo-Barberio, 2017). The eco-label requirements must be clear and comprehensible, grounded in scientific evidence, and consider the most recent technological advancements. To prevent the proliferation of different eco-label systems and to increase environmental performance in sectors where the impact on the environment influences consumer choices, the applicability of the EU eco-label should be extended. When establishing the criteria for the EU eco-label, a scientific foundation is essential, and the entire life cycle of the products must be considered. In doing so, the following factors must be considered: a) minimizing the most significant environmental impacts, b) substituting hazardous substances with safer ones, c) health and safety considerations, d) where necessary, social and ethical considerations, and e) reducing animal testing (European Commission, April 2023).

The European Commission registered 21,301 EU eco-label products in 2010, a number that increased to 88,045 by March 2023. Spain (18.35%) and Italy (15.00%) have the most EU eco-label products, while Luxembourg (0.01%), Malta (0.01%), and Slovakia (0.01%) have the least. Among the different product groups, the most popular in terms of the number of products are as follows: outdoor and indoor paints and varnishes (41%), tissue paper and tissue products (17%), textiles (10%), and hard surface cleaners (8%) (European Commission, April 2023).

3. Materials and Methods

The investigation of the topic was based on secondary and primary research. In terms of secondary research, it relied primarily on Internet databases. For these, it has made use of the webpage of the Ministry of Environment, Water and Forests (<http://www.mmediu.ro>) and the webpage for the EU eco-label operated by the European Commission (<https://environment.ec.europa.eu/>); additionally, several related Internet portals and journals have been reviewed.

In the case of the second part of the research, defining a problem is essential to any research. Exploratory research is crucial in enhancing our comprehension of a problem and defining its parameters (Stebbins, 2001). The objective of this study is to present Hungarian native-speaker consumers living in Romania with knowledge concerning eco-labels. To achieve this, direct research was conducted through an online survey, utilizing a structured questionnaire tailored to the research's purpose and objectives.

The study was carried out in April 2023, involving a sample of 165 respondents. Web-based surveys are known for their effectiveness in collecting data quickly and at a minimal cost (Schonlau et al., 2002; Greenlaw and Brown-Welty, 2009; Loomis-Paterson, 2018). The convenience sampling method was adopted for the sampling process, and the questionnaire was distributed to contacts from Facebook™ online social networks. The questionnaire consisted of 14 questions, comprising five socio-demographic and nine subject-specific inquiries, all in Hungarian language. The research targeted Hungarian native speaker consumers living in Romania. Although neither the sample size nor the socio-demographic variables may be considered representative, researchers emphasize that online questionnaires present a relatively affordable, swift, and widely adopted approach for exploratory research (Leiner, 2017; Schonlau-Couper, 2017; Lehdonvirta, 2021). The responses received from this survey can offer valuable insights and lay a solid groundwork for future research in this area. The questionnaires were shared in Facebook Groups, and consumers in Romania were reached through these groups.

The final sample has the following socio-demographic characteristics:

- Gender: female 55.4%, male 44.6%;
- Age: average years: 33, lowest age: 14, highest age: 65;
- Place of residence: urban: 71.7%, rural: 28.3%;
- Occupation: employee (full- or part-time): 51.8%, student: 7.8%, employer: 16.3%, other (parental or maternity leave, unemployed, homemaker, retired): 24.1%;
- Education: primary school: 6%, vocational school: 9.6%, high school: 20.5%, university: 42.8%, postgraduate education: 21.1%.

4. Discussion

4.1. Secondary Research – Ecological Labelling in Romania

4.1.1. *The Legal Environment of the Eco-Labels*

The eco-labelling process and the determination of individual requirements for different product and service groups allow consumers to choose services that reduce the impact on the environment and receive information on the environmental characteristics of eco-labelled products. Eco-labels are complementary tools for implementing environmental policies alongside traditional regulations and other market-based instruments. In addition to voluntary agreements, environmental taxes, and trade permits, they belong to the “new environmental instruments” category.

According to <http://www.ecolabelindex.com>, a total of 24 recognized eco-labels are in use in Romania. According to the website of the Romanian Ministry of Environment, Water, and Forests (<http://www.mmediu.ro/>), the EU eco-label corresponds to the tool that measures environmental performance. Romania creates no other official eco-labels, nor does it designate any labels created by other countries as accepted. Since there is no official regulation regarding which eco-label certificates are accepted or supported by the government, Romanian businesses that want to have an eco-label must go through the verification process of either the EU eco-label certificate or other third-party certificates recognized and created by others to obtain the label, choosing from several options.

The Government Decree 189/2002 of the Romanian legislation defines the eco-label as “a graphic symbol or brief textual product description, which can be applied on products or found in other informative documents and presents up to three environmental impacts of the product or service” (Albu-Chitu, 2012). The eco-label, in conjunction with control and certification procedures resulting from long expertise, increases demand for recyclable and sustainable products. The ecological label, or “eco-label certificate” has become the identifier for environmentally friendly products and services.

The competent authority for requesting the eco-label is the Ministry of Environment and Water Management (Ministerul Mediului și Gospodăririi Apelor), which, together with specialized institutes and a committee dealing with the awarding of the national eco-label, makes the decision on awarding the label. Therefore, the National Eco-Label Committee (Comisia Națională pentru Acordarea Etichetei Ecologice) was established as an advisory body with a role in making decisions related to the eco-label and supporting the work of the Ministry of Environment, Water Management and Forestry in Romania (Moraru, 2015).

If the decision on the application is positively evaluated, it will be announced on the European Union Eco-Label website. The fee for the application ranges from 300 to 1,300 euros. After obtaining the label, economic players are obliged to pay an annual fee for using it. Following the obtaining of the European eco-label, the competent authority establishes a contractual agreement with the economic operator in accordance with regulation 661/2011, which sets out the conditions of use (Dinu et al., 2012). In the event of a change in the product or service, the competent authority must be informed, even if these changes do not affect compliance with the criteria on which the eco-label was obtained. If these changes affect compliance with the eco-label criteria, a new application must be submitted to gain the eco-label.

To ensure that the product continues to meet the requirements of the European eco-label, the competent authority – the Romanian Ministry of Environment, Water and Forests, including authorized representatives – is entitled to carry out regular inspections of the beneficiaries. They check whether the beneficiary complies with the criteria for the product group and usage conditions, as well as the provisions of the contract concluded. The ecological criteria for individual products are reviewed every 3-5 years. Therefore, the eco-label is only awarded for the duration of the validity of the criteria, after which the application must be renewed (<https://infocons.ro/>, 26 April 2023). Duraziv S.R.L. was the first company in Romania to receive the EU eco-label in 2015, and as of March 2023, 99 products and services in total had the EU eco-label. Romanian products and services are found in 8 out of 11 defined categories, with a total of 16 companies involved (<http://www.mmediu.ro/>, 25 April 2022).

4.1.2. EU Eco-Labeling of Products

Compared to the database of the Ministry of Environment and the EU eco-label, out of the 99 registered products, 55 products have the right to use the active label provided by 11 companies in 5 categories. This is shown in *Table 1*. This also means that several companies did not renew their right to use the label. The reason for this may be that they still need to meet the requirements or expectations associated with it. Examining the websites and marketing activities of companies currently having the EU eco-label, the following can be observed.

SC Axax Roteal S.R.L. has its own website and Facebook page. On the website, they indicate five different product families, two of which are relevant to this topic: the Ecolit and Herbaris product families. The Ecolit product family is presented as environmentally friendly products with EU eco-label, while Herbaria products are labelled as natural products. One slider on their website provides information about this, but there is no related information on their social media page. What is noteworthy about the Herbaris category is the packaging of the products. Upon

closer inspection of the product labelling, a bio logo was placed, which does not indicate the presence of a third party that is not linked to any of the certificates listed by Ecolabel Index.

S.C. Don Pedro S.R.L. currently has 13 EU eco-labelled products in the personal care product category. This company also has a website and Facebook page, which shows that they have 5 product families, but it is not evident from their website or social media page that they have environmentally-friendly products in any of the categories. The only hint is a post related to the topic on their Facebook page, but it provides little information.

Table 1. *List of certified Romanian EU eco-label products*

Category	Romanian products/ services	Company name	Number of products/ services
Cleaning	Hand dishwashing detergent	S.C. Axa Roteal S.R.L.	1
		S.C. Fabi Total Grup S.R.L.	1
		S.C. Ekomax International S.R.L.	2
	Hard-Surface Cleaning	S.C. Eurototal Comp S.R.L.	7
		S.C. Axa Roteal S.R.L.	3
		S.C. Fabi Total Grup S.R.L.	3
		S.C. Thomas Maister S.R.L.	2
Paper Products	Tissue Paper and Tissue Products	S.C. Sofidel Romania S.A.	2
Coverings			
Lubricants			
Electronic equipment			
Gardening			
Personal care products	Absorbent hygiene	S.C. Mg Tec Industry S.R.L.	6
		S.C. Don Pedro S.R.L.	13
	Cosmetic products	S.C. Ekomax International S.R.L.	1
		S.C. Eurototal Comp S.R.L.	1
		S.C. Thomas Maister S.R.L.	1
Clothing and textiles		S.C. Sofitex S.R.L.	1
Do-it-yourself		S.C. PPG România S.A.	9
		S.C. Köber S.R.L.	2

Source: own edition based on www.mmediu.ro

According to the EU eco-label catalogue, *S.C. Ekomax International S.R.L.* has three eco-labelled products. They prominently display this certification along with other authentic ones on their website and Facebook page, where they detail the benefits of these products in several posts. It should also be noted that even though the EU eco-label catalogue currently lists only 3 of their products as having an authentic certification, they have 12 products labelled as eco-labelled in the eco-label category. *S.C. Fabi Total Grup S.R.L.* also has a website, which only provides information on their services and collaborations with other manufacturers. However, there is no information about their products sold under the name Higeea, which has an EU eco-label. They are not present on social media. *S.C. Eurototal Comp S.R.L.* has eight products with EU eco-label. However, their online communication only provides information about their services, which strive for environmental consciousness. However, there is no mention of the products they have that are eco-labelled and used in their services. *S.C. Köber S.R.L.* is one of the companies that has two products certified with the EU eco-label. Köber's products are perhaps one of the best known among Romanian companies with EU eco-label. There is no information on the company's website about the EU eco-label, only a slider highlighting the environmental friendliness of the Ecolux products. Only by browsing through the catalogue available on the website can one find information on which product is certified with the EU eco-label. In their communication on Facebook, as well as on their website, they emphasize the environmental friendliness of the Ecolux product certified with the EU eco-label. On Instagram, they highlight Köber as a product that cares about consumers' homes and the environment thanks to the EU eco-label, but they do not specify whether this applies to all the company's products. *S.C. Mg Tec Industry S.R.L.* has eight products certified with EU eco-label. Their website is currently under development, and they do not have a social media presence. *S.C. PPG Romania S.R.L.*'s Oskar product line has nine products with EU eco-label. Although they obtained the certification in February 2023, there is no information about it on the company's or the product line's website or on their Facebook page. *S.C. Sofidel Romania S.A.* is an international company that has two products manufactured in their Romanian factory with an EU eco-label. The homepage of their international website presents the diversity of the company's certificates, including the EU eco-label, but does not provide specific information on which products are manufactured in Romania and which ones have the corresponding certification. Their Facebook page applies not only to Romania but to their entire market, and only two posts have been made on the subject without going into detail. *S.C. Softex S.R.L.* manufactures polyester fleece, but no further information is available about the company. *S.C. Thomas Maister S.R.L.* has three products in total with an EU eco-label in two categories, but their website does not provide any information on this, and they are also absent from social media. *Table 2* summarizes this information.

Table 2. List of companies' online communication activities regarding EU eco-label

Company name	Webpage	Social media management		
		Activity regarding EU eco-label	Facebook™	Activity regarding EU eco-label
S.C. Axa Roteal S.R.L.	+ missing	+	no communication	-
S.C. Don Pedro S.R.L.	+ missing	+	no communication	-
S.C. Ekomax International S.R.L.	+ active	+	active communication	-
S.C. Eurototal Comp S.R.L.	+ missing	-	-	-
S.C. Fabi Total Grup S.R.L.	+ missing	-	-	-
S.C. Köber S.R.L.	+ missing	+	some reference	+
S.C. Mg Tec Industry S.R.L.	+ missing	-	-	-
S.C. PPG România S.A.	+ missing	+	-	-
S.C. Sofidel Romania S.A.	+ active	+	+	-
S.C. Softex S.R.L.	- missing	-	-	-
S.C. Thomas Maister S.R.L.	+ missing	-	-	-

Source: own collection

In summary (*Table 2*), only a tiny percentage of companies mention having the EU eco-label, and even those that do tend to give little emphasis to it in their communication or do so in an incomplete manner. Several studies have shown that companies that actively and appropriately use eco-labels in their communication have positive outcomes in terms of the perception of their businesses and the pricing of their products (Galarraga Gallastegui, 2002; Yenipazarli, 2015; Fanasch, 2019).

4.1.3. Eco-Labeling of Services

In the case of services in Romania, there are currently two eco-tourism certification systems for tourism services: first is the EU eco-label designated for accommodations, and the second is the eco-tourism label of the Association of Eco-Tourism in Romania (AER) for small accommodations and tours. In previous years, two accommodations in Romania had EU eco-labels, but currently no accommodation has a valid certificate.

This can be explained by the lack of interest and knowledge of Romanian hotel owners regarding eco-certification. This justifies further environmental education for accommodation operators and the need to promote the European eco-label (Constantin et al., 2013).

The AER certification system targets two different categories: small accommodations located in rural and natural areas and eco-tourism programmes/tours offered by travel organizers. Currently, there are 37 accommodations and tours that have received the AER eco-label and are located in rural areas with unique natural values (AER, 2023). Since this study primarily focuses on the EU eco-label and there are currently no accommodations in Romania with this certification, accommodations with AER certification are not the subject of analysis.

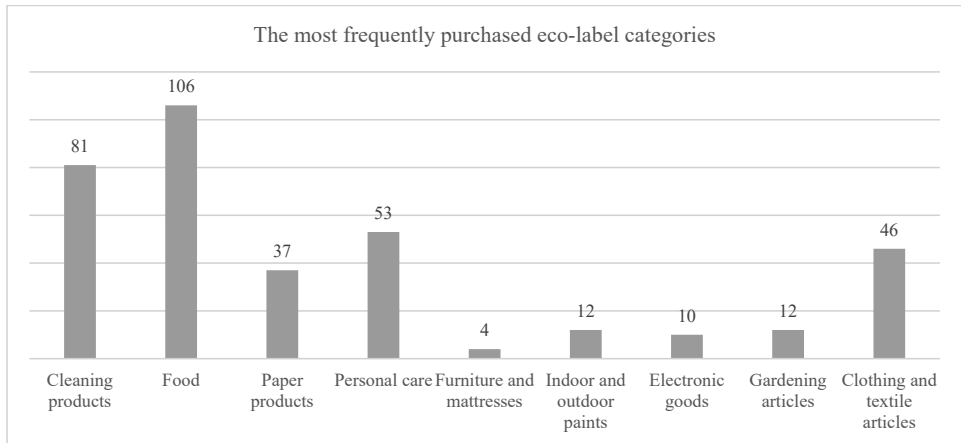
As a summary of secondary research, which primarily focuses on the use of the EU eco-label, it can be said that Romania faces shortcomings both in registered products and services compared to more developed countries, as well as in the related communication, which is often incomplete, misleading, and, most importantly, not present. Improper use and dissemination of eco-labels can be a tool for greenwashing, but their proper use is an important tool for preventing it. Environmentally-friendly manufacturing processes that are verified can help protect the environment, and raising people's awareness towards products and services that genuinely take into account natural and environmental factors is important in the long run to protect the Earth. The primary tool for this in the European Union is the EU eco-label, but there are also other officially recognized third-party-certified labels that have been accepted within Romania even though they are not officially documented by the Romanian Ministry of Environment, Water and Forestry.

4.2. Consumers' Knowledge Regarding Eco-Labels

The third objective of the study is to demonstrate the level of eco-label knowledge among consumers living in Romania. To achieve this, an online survey was conducted using convenience sampling, with a sample size of 165 respondents. Based on the data obtained, 99.4% of the respondents had heard of environmentally friendly products, and 91% had already purchased such products. In this sense, the concept can be considered familiar among consumers in Romania.

Regarding the question of whether they had heard of eco-labels, 77.1% of the respondents answered "yes", and 22.9% answered "no". Of those who had heard of eco-labels, 75.9% reported purchasing products with such labels. In terms of product categories, consumers mostly purchase food (as shown in *Figure 1*) with eco-labels, as well as cleaning products, beauty products, and clothing, while furniture, mattresses, and electronics are the least likely to have eco-labels. It is

important to note that the European Commission has implemented two certificates: the EU organic logo, which is awarded explicitly to products from controlled farming, mostly organic food products found in stores, and the EU eco-label, which is the focus of this study and can be awarded to products and services within the 11 categories. The EU eco-label catalogue also includes many products within the same product categories, as indicated by the results obtained (European Commission, 29 April 2023).





















Source: own edition

Figure 1. *If you buy eco-labelled products or services, in which category do you buy them?*

Nearly half of the respondents (48.2%) think that products and services provided with eco-labels are environmentally friendly and healthy, 11.4% believe that it is just good marketing, and 5.5% think that they are both environmentally friendly and healthy but also a good marketing tool.

Consumer knowledge linked to labels was measured as follows. Fourteen logos were offered as a choice, and the respondent had to choose which ones they believed to be authentic certificates. 5 of the 14 logos were also included in Internet image editing programs and were freely available to anyone, meaning they were not authentic certificates. This is shown in *Table 3*. The logos framed in the first column are not genuine certificates, while the nine logos in the second column are authentic certificates (from left to right: EKO energy, EU Organic Agriculture, EU Eco-Label Austrian Bio Garantie, Eco Cert, FSC, Global Organic Textile Standard, Nature Cosmetic, Fairtrade).

Table 3. List of optional logos

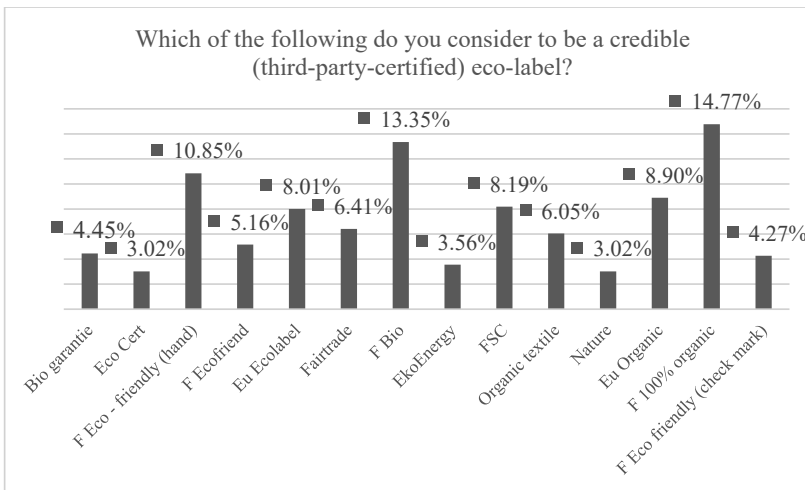
False eco-labels (downloaded from the Canva editor program)	Certified, third-party approved eco-labels
Eco Friendly – Check mark 	EKO energy 
Bio 	EU organic logo 
Eco Friendly - Hand 	EU Eco-label 
Eco Friend Nature 	Bio Garantie 
100% organic 	ECO CERT 
	FSC 
	Organic Textile 
	Nature 
	Fairtrade 

Source: own edition

Answers given to this question (Which of the following do you consider to be a credible (third-party-certified) eco-label?) are shown in *Figure 2*. The concept of “certified” was not conceptualized in the questionnaire, based on the extent to which they know the meaning of the symbols they see on the packaging (authentic

or false eco-labelled). The fake eco-labels were taken from the Canva editor program (labels that anyone can use in their marketing communications at any time, whether they cover real green actions or not). The selected authentic eco-labels are those that are used in Romania (Ecolabel Index) and are internationally recognized certificates. This was a multiple-choice question: the percentages shown in *Figure 2* reveal the percentage distribution of the responses received related to eco-labels, and the eco-labels marked with the letter F indicate fake labels.

The figure shows that respondents mainly selected three logos as genuine certifications that are actually not authentic. This is followed by three genuine certifications: the EU Eco-Label, EU Organic Agriculture, and FSC. Consumers least frequently considered Eco Cert and Nature as genuine eco-label certifications.



Source: own edition

Figure 2. The proportion of eco-labels that is considered to be authentic

The knowledge of the labels is also related to the fact that respondents believe that they encounter 100% organic, bio logos and the FSC certification when making purchases. This can also be elucidated by the fact that on the product packaging the bio, eco inscriptions and signs are placed on the front side while certifications are usually placed on the back side of products, next to the ingredients.

However, to the question as to whether they are willing to pay more for a product or service with an eco-label, 81.3% of respondents answered positively, confirming the results of other studies (Laroche et al., 2001; Kang et al., 2012; Namkung-Jang, 2017; Wei et al., 2018; Li-Kallas, 2021), which also highlights the benefits of businesses investing in eco-labels because consumers are willing to pay more for products or services with eco-labels.

5. Conclusions

To increase ecological performance, achieve sustainable goals, and prevent greenwashing, Romania should prioritize the spread and importance of eco-labelling. Research shows that economic players in Romania do not show great interest in eco-labelling systems, especially the EU eco-label, and those who do show interest do not know how to utilize its advantages properly. This may be due to the voluntary nature of the eco-label and the general misconception that its application increases the cost of products or services, leading to reduced consumer interest. Results also indicate that Romanian economic players need to understand the benefits of the eco-labelling systems and how they can contribute to the growth of demand for eco-friendly products and services.

Both the quantity of Romanian eco-labels and the communication of businesses with the EU eco-label, as well as the responses of those filling out the questionnaire, demonstrate that there is a significant gap in awareness and education. Making use of the opportunities presented by eco-labels is essential to educate consumers about what authentic eco-labels are and how to recognize them. Eco-labels, backed by both non-governmental organizations and the government, play a crucial role in educating consumers about products that adhere to specific environmental standards. Political decision-makers and non-governmental organizations should work together as much as possible to centralize eco-labelling in order to boost the credibility of eco-labels and the associated knowledge. Since customers have a limited understanding of the differences between such labels, companies should be encouraged to use individually alleged eco-labels or logos, such as already established third-party eco-labels, on their products. Standardizing and rationalizing eco-labels would improve consumer recognition and understanding, thereby reducing the possibility of greenwashing. To achieve this, clear communication is primarily needed from responsible government agencies on which labels are accepted at the Romanian level among the eco-labels appearing on the market. It is also important to raise awareness among consumers on the one hand and to promote activities related to this by economic organizations on the other.

The primary objective of this research was to explore and present the eco-labelling system in Romania. In this case, it turned out that the officially recognized eco-certificates in Romania are the EU eco-label, EMAS, and the EU organic agriculture logos. The study focused on using the EU eco-label, which revealed that Romania lags far behind other, mainly developed countries both in terms of products and services with EU eco-labels and in educating businesses and consumers.

The second objective was to present the online marketing activities of enterprises using the EU eco-label. It is evident that the online marketing activities of businesses are primarily poor, and when they do appear, they are not clearly defined. The information could be clearer to consumers about which products the EU eco-label

applies to. In terms of services, Romania is struggling with a complete lag since there is currently no accommodation with an EU eco-certificate.

The third and last objective was to evaluate the knowledge of consumers related to eco-labels. In this case, it has been revealed that Romanian consumers in this segment are aware of the eco-label concept but are not actually aware of which certificates are authentic. However, they indicated their willingness to pay a higher price for products with such certifications. An important conclusion in this regard is that there is consumer interest in environmentally-responsible behaviours and purchasing environmentally-friendly products, but the associated knowledge to help navigate and avoid possible greenwashing is lacking.

Although the three aims have been addressed, further research is required to identify and address the gaps mentioned above and to explore opportunities for making suggestions to businesses and the government. For an improved understanding, this topic can be better explored with a representative sample size and by including multiple counties or countries. It is also important to conduct research that delves into specific details and involves in-depth analysis through personal interviews. Understanding the government's perspective on the use of eco-labels and the underlying strategy is crucial. Additionally, it is essential to examine the positive and negative factors that companies associate with the use of eco-labels. From a consumer perspective, several questions need clarification such as the availability of eco-labelled products and services in the local market and how different consumer segments perceive these products.

Acknowledgements

The author is grateful to the anonymous reviewers for their comments and suggestions that helped to improve the manuscript. Thanks go to her friend, Botond Dániel, PhD, for his valuable help and support during the research.

References

- Albayrak, Tahir; Aksoy, Şafak; Caber, Meltem. (2013). The effect of environmental concern and scepticism on green purchase behaviour. *Marketing Intelligence & Planning* 31(1): 27–39.
- Arora, Naveen Kumar; Mishra, Jitendra. (2020). COVID-19 and importance of environmental sustainability. *Environmental Sustainability* 3(2): 117–19.
- Association of Eco-Tourism in Romania / *Asociația de Ecoturism Din România*. Available at: <https://asociațiaer.ro/en/certified-products/>. Retrieved on: 28 April 2023.

- Cai, Zhen; Xie, Yi; Aguilar, Francisco X. (2017). Eco-label credibility and retailer effects on green product purchasing intentions. *Forest Policy and Economics* 80: 200–208.
- Castka, Pavel; Corbett, Charles J. (2016). Governance of eco-labels: Expert opinion and media coverage. *Journal of Business Ethics* 135(2): 309–326.
- Chen, Yu-Shan; Chang, Ching-Hsun. (2013). Greenwash and green trust: The mediation effects of green consumer confusion and green perceived risk. *Journal of Business Ethics* 114(3): 489–500.
- Constantin, Cristinel Petrisor; Ispas, Ana; Candrea, Adina Nicoleta. (2013). Identifying tourists interested in eco-certified accommodation units from Brasov, Romania. *Management Dynamics in the Knowledge Economy* 1(3): 521–542.
- de Freitas Netto, Sebastião Vieira; Sobral, Marcos Felipe Falcão; Ribeiro, Ana Regina Bezerra; da Luz Soares, Gleibson Robert. (2020). Concepts and forms of greenwashing: A systematic review. *Environmental Sciences Europe* 32(1): 19.
- Delmas, Magali A.; Burbano, Vanessa Cuerel. (2011). The drivers of greenwashing. *California Management Review* 54(1): 64–87.
- Delmas, Magali A.; Lessem, Neil. (2017). Eco-premium or eco-penalty? Eco-labels and quality in the organic wine market. *Business & Society* 56(2): 318–356.
- Dimitrieska, Savica; Stankovska, Aleksandra; Efremova, Tanja. (2017). The six sins of greenwashing. *Economics and Management* 13(2): 82–89.
- Dinu, Vasile; Schileru, Ion; Atanase, Anca. (2012). Attitude of Romanian consumers related to products' ecological labelling. *Amfiteatru Economic* 14(31): 8–24.
- Ekomax International S.R.L. *Produse românești certificate ECOLABEL*. EKOMAX INTERNATIONAL S.R.L. Available at: <https://detergenti-curatenie.ro/13-produse-certificate-ecolabel>. Retrieved on: 30 April 2023.
- Erskine, Camilla C.; Collins, Lyndhurst. (1997). Eco-labelling: Success or failure? *Environmentalist* 17(2): 125–33.
- Eticheta Ecologică Europeană | Ministerul Mediului. Available at: <http://www.mmediu.ro/categorie/eticheta-ecologica-europeana/30>. Retrieved on: 25 April 2023.
- EU Eco-Label – Home. Available at: https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel-home_en. Retrieved on: 25 April 2023.
- Fanasch, Patrizia. (2019). Survival of the fittest: The impact of eco-certification and reputation on firm performance. *Business Strategy and the Environment* 28(4): 611–28.
- Filip, Bondaș. (2018). Eticheta ecologică europeană. *InfoCons*. Available at: <https://infocons.ro/eticheta-ecologica-europeana/>. Retrieved on: 28 April 2023.
- Galarraga Gallastegui, Ibon. (2002). The use of eco-labels: A review of the literature. *European Environment* 12(6): 316–31.

- Golob, Ursa; Koklic, Mateja Kos; Podnar, Klement; Zabkar, Vesna. (2018). The role of environmentally conscious purchase behaviour and green scepticism in organic food consumption. *British Food Journal* 120(10): 2411–2424.
- Gökirmaklı, Çağlar; Bayram, Mustafa; Tigan, Eugenia. (2017). Behaviours of consumers on EU eco-label: A case study for Romanian consumers. *Bulgarian Journal of Agricultural Science* 23(3): 512–517.
- Greenlaw, Corey; Brown-Welty, Sharon. (2009). A comparison of web-based and paper-based survey methods: Testing assumptions of survey mode and response cost. *Evaluation Review* 33(5): 464–480.
- Grimmer, Martin; Bingham, Timothy. (2013). Company environmental performance and consumer purchase intentions. *Journal of Business Research* 66(10): 1945–1953.
- Hameed, Irfan, Hyder, Zeeshan; Imran, Muhammad; Shafiq, Kashif. (2021). Greenwash and green purchase behavior: An environmentally sustainable perspective. *Environment, Development and Sustainability* 23(9): 13113–13134.
- Horne, Ralph E. (2009). Limits to labels: The role of eco-labels in the assessment of product sustainability and routes to sustainable consumption. *International Journal of Consumer Studies* 33(2): 175–182.
- Iraldo, Fabio; Barberio, Michele. (2017). Drivers, barriers and benefits of the EU eco-label in European companies perception. *Sustainability* 9(5): 751.
- Jitäreanu, A. Felix; Mihăilă, Mioara; Robu, Alexandru-Dragoș; Lipșa, Florin-Daniel; Costuleanu, Carmen Luiza. (2022). Dynamic of ecological agriculture certification in Romania facing the EU organic action plan. *Sustainability* 14(17): 11105.
- Kang, Kyung Ho; Stein, Laura; Heo, Cindy Yoonjoung; Lee, Seoki. (2012). Consumers' willingness to pay for green initiatives of the hotel industry. *International Journal of Hospitality Management* 31(2): 564–572.
- Krurup, Signe; Russell, Clifford S. (2005). *Environment, information and consumer behaviour*. Edward Elgar Publishing.
- Lakatos, Elena Simina; Cioca, Lucian-Ionel; Dan, Viorel; Ciomos, Alina Oana; Crisan, Oana Adriana; Barsan, Ghita. (2018). Studies and investigation about the attitude towards sustainable production, consumption and waste generation in line with circular economy in Romania. *Sustainability* 10(3): 865.
- Laroche, Michel; Bergeron, Jasmin; Barbaro-Forleo, Guido. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *Journal of Consumer Marketing* 18(6): 503–520.
- Lashitew, Addisu A. (2021). Corporate uptake of the sustainable development goals: Mere greenwashing or an advent of institutional change? *Journal of International Business Policy* 4(1): 184–200.
- Lehdonvirta, Vili; Oksanen, Atte; Räsänen, Pekka; Blank, Grant. (2021). Social media, web, and panel surveys: Using non-probability samples in social and policy research. *Policy & Internet* 13(1): 134–155.

- Leiner, Dominik J. (2017). Our research's breadth lives on convenience samples a case study of the online respondent pool "SoSci Panel". *SCM Studies in Communication and Media* 5(4): 367–396.
- Leire, Charlotte; Thidell, Åke. (2005). Product-related environmental information to guide consumer purchases – A review and analysis of research on perceptions, understanding and use among Nordic consumers. *Journal of Cleaner Production* 13(10): 1061–1070.
- Li, Shanshan; Kallas, Zein. (2021). Meta-analysis of consumers' willingness to pay for sustainable food products. *Appetite* 163: 105239.
- Loomis, David K.; Paterson, Shona. (2018). A comparison of data collection methods: Mail versus online surveys. *Journal of Leisure Research* 49(2): 133–149.
- Lyon, Thomas P.; Montgomery, A. Wren. (2015). The means and end of greenwash. *Organization & Environment* 28(2): 223–249.
- Moraru, Ana-Maria. (2015). Considerații privind sistemul etichetării ecologice în plan național și European [Considerations on the eco-labelling system at the national and European level]. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2664981.
- Muresan, Iulia C.; Harun, Rezhen; Brata, Anca Monica; Brata, Vlad Dumitru; Chiciudean, Daniel I.; Tirpe, Olivia Paula; Porutiu, Andra; Dumitras, Diana E. (2022). Factors affecting food consumers' behavior during COVID-19 in Romania. *Foods* 11(15): 2275.
- Namkung, Young; Jang, Soocheong (Shawn). (2017). Are consumers willing to pay more for green practices at restaurants? *Journal of Hospitality & Tourism Research* 41(3): 329–356.
- Nilsson, Helen; Tunçer, Burcu; Thidell, Åke. (2004). The use of eco-labeling initiatives on food products to promote quality assurance—Is there enough credibility? *Journal of Cleaner Production* 12(5): 517–526.
- Nishitani, Kimitaka; Nguyen, Thi Bich Hue; Trinh, Trong Quy; Wu, Qi; Kokubu, Katsuhiko. (2021). Are corporate environmental activities to meet sustainable development goals (SDGs) simply greenwashing? An empirical study of environmental management control systems in Vietnamese companies from the stakeholder management perspective. *Journal of Environmental Management* 296: 113364.
- Nunez, Diego. (n. d.). CERTIFICATION QUICKFINDER | Tourism2030. Available at: <https://destinet.eu/resources/tools/certification-quickfinder>. Retrieved on: 30 April 2023.
- Pearson, Jason. (2010). Are we doing the right thing? Leadership and prioritisation for public benefit. *The Journal of Corporate Citizenship* (37): 37–40.
- Prieto-Sandoval, Vanessa; Alfaro, José A.; Mejía-Villa, Andrés; Ormazabal, Marta. (2016). Eco-labels as a multidimensional research topic: Trends and opportunities. *Journal of Cleaner Production* 135: 806–818.

- Radulescu, Violeta; Cetina, Iuliana; Cruceru, Anca Francisca; Goldbach, Dumitru. (2021). Consumers' attitude and intention towards organic fruits and vegetables: Empirical study on Romanian consumers. *Sustainability* 13(16): 9440.
- Rajesh, R. (2023). An introduction to grey influence analysis (GINA): Applications to causal modelling in marketing and supply chain research. *Expert Systems with Applications* 212: 118816.
- Rashid, Nik Ramli Nik Abdul; Jusoff, Kamaruzaman; Kassim, Kamsol Mohamed. (2009). Eco-labeling perspectives amongst Malaysian consumers. *Canadian Social Science* 5(2): 1–10.
- Schonlau, Matthias; Couper, Mick P. (2017). Options for conducting web surveys. *Statistical Science* 32(2): 279–292.
- Schonlau, Matthias; Fricker, Ronald D., Jr; Elliott, Marc N. 2002. *Conducting research surveys via e-mail and the web*. Rand Corporation.
- Seele, Peter; Gatti, Lucia. (2017). Greenwashing revisited: In search of a typology and accusation-based definition incorporating legitimacy strategies. *Business Strategy and the Environment* 26(2): 239–252.
- Shabbir Husain, R. V. (2022). Green offering: More the centrality, greater the scepticism. *International Review on Public and Nonprofit Marketing* 19(4): 819–834.
- Shahrin, Ruzanna; Quoquab, Farzana; Jamil, Rossilah; Mahadi, Nomahaza; Mohammad, Jihad; Salam, Zarina; Hussin, Nazimah. (2017). Green “eco-label” or “greenwashing”? Building awareness about environmental claims of marketers. *Advanced Science Letters* 23(4): 3205–3208.
- Sharma, Nagendra Kumar; Kushwaha, Gyaneshwar Singh. (2019). Eco-labels: A tool for green marketing or just a blind mirror for consumers. *Electronic Green Journal* 1(42).
- Sigit, Diana Vivanti; Fauziah, Rizky; Heryanti, Erna. (2017). The impact of eco-label knowledge to purchase decision of green production biology students. *AIP Conference Proceedings* 1868(1): 100009.
- Stebbins, Robert A. (2001). *Exploratory research in the social sciences*. SAGE.
- Szabo, Szerena; Webster, Jane. (2021). Perceived greenwashing: The effects of green marketing on environmental and product perceptions. *Journal of Business Ethics* 171(4): 719–739.
- Taufique, Khan; Chamhuri, Siwar; Talib, Basri Abdul; Sarah, Farah. (2013). Does eco-label work for consumers? A quest for identifying the determinants of consumers' understanding and perception of eco-labels. In: *Proceeding of the Seventh Biennial Conference: Global change, ecosystems, sustainability*. Indian Society for Ecological Economics (INSEE).
- Testa, F.; Iraldo, F.; Vaccari, A.; Ferrari, E.. (2015). Why eco-labels can be effective marketing tools: Evidence from a study on Italian consumers. *Business Strategy and the Environment* 24(4): 252–265.

- Wei, Shuqin; Ang, Tyson; Jancenelle, Vivien E. (2018). Willingness to pay more for green products: The interplay of consumer characteristics and customer participation. *Journal of Retailing and Consumer Services* 45: 230–238.
- Yenipazarli, Arda. (2015). The economics of eco-labeling: Standards, costs and prices. *International Journal of Production Economics* 170: 275–286.
- Zakeri, Behnam; Paulavets, Katsia; Barreto-Gomez, Leonardo; Echeverri, Luis Gomez; Pachauri, Shonali; Boza-Kiss, Benigna; Zimm, Caroline; Rogelj, Joeri; Creutzig, Felix; Ürge-Vorsatz, Diana; Victor, David G.; Bazilian, Morgan D.; Fritz, Steffen; Gielen, Dolf; McCollum, David L.; Srivastava, Leena; Hunt, Julian D.; Pouya, Shaheen. (2022). Pandemic, war; Global energy transitions. *Energies* 15(17): 6114.



Demand for Kerala's International Tourism by the Top Three Source Markets: A Comparative Analysis

Muhammed Salim ANAPPATTATH,¹ Shiby M. THOMAS²

¹ MES Mampad College (Autonomous), Mampad, Kerala-India, PIN: 676542
e-mail: salimkodalipoyil@gmail.com

² St. Joseph's College (Autonomous) Devagiri, Calicut, Kerala-India, PIN: 673008
e-mail: shibymthomas@gmail.com

Abstract. The study examines the role of economy, the environment, and the source country's tourism seasonality in driving the inflow of tourists into Kerala from the top three source countries, viz. the United Kingdom (UK), the United States (US), and France. The methodology employed is the double-log regression technique. It was found that the income of the source countries was merely moderately and selectively related to the predicted variable, while environmental factors, viz. rainfall of the origin countries and the relative temperature, play a decisive role in shaping Kerala's international tourism. At the same time, relative prices were relevant in explaining Kerala's international tourism demand. We conclude that Kerala receives more foreign tourists (especially from the advanced economies in Europe and North America) not because the nominal income of the source markets rises but because Kerala's destinations remain competitive for the tourists from the top three source markets. While climatic factors provide a background for tourism seasonality, it is argued that lower relative prices remain the primary and active force of tourist arrivals.

Keywords: foreign tourist arrivals in Kerala, economic factors, environmental factors, tourism seasonality, double-log regression

JEL Classification: Z3

1. Introduction

Kerala has become the first state in India in 1986 to declare tourism as an industry (Nair and Dhanuraj, 2018). It clearly shows how important the tourism sector is for this South Indian state, which is endowed with various diverse tourism resources. Moreover, the relevance of tourism industry in Kerala is specifically evident from its significant contribution in terms of generation of employment and income. The tourism sector has become a significant contributor to Kerala's economy, as

it contributed a whopping 10% of the state income in 2018–19 as per *Economic Review 2020* (Kerala State Planning Board, Government of Kerala, 2022), and a total of \$6.4 billion was generated in 2019, out of which \$1.5 billion were foreign exchange earnings as per *Kerala Tourism Statistics 2019* (Department of Tourism, Government of Kerala, 2022). Since tourism has largely been labour-intensive, the development of tourism generates direct, indirect, and induced employment opportunities in the state. It provides employment to 1.5 million people directly in the state (Department of Tourism, Government of Kerala, 2022). Tourism is explicitly an economic activity, as tourists are consumers of goods and services directly or indirectly related to tourism (Bunghez, 2016). Generally, tourism makes a positive impact on economic growth and the development indicators of the destinations, according to Ivanov and Webster (2007). Li et al. (2006) in their study found that tourism has become a significant contributor to the economy of Hong Kong in terms of foreign exchange earnings and contribution to the GDP.

The United Kingdom (UK), the United States (US), and France remained the top three origin countries of foreign tourists who visited Kerala during the 2003–2019 period, with an annual average share of 18.4%, 8.77%, and 8.44%, respectively, as per the data presented in *Kerala Tourism Statistics* published by The Department of Tourism, Government of Kerala (2022). These countries were sending their nationals to Kerala on a consistent basis throughout the mentioned period, unlike the only recently observed phenomenal surge in arrivals of tourists in Kerala from Saudi Arabia, Oman, Russia, the United Arab Emirates (UAE), Malaysia, Canada, and Australia. The present study not only helps identify the determinants of Kerala's international tourism demand from the top three origin markets but also provides a comparative analysis of the determining factors of Kerala's international tourism demand. For the sake of this analysis, we included five variables, viz. income of the source countries, relative prices, Kerala's rainfall, relative temperature, and the source countries' tourism seasonality. There are both economic and non-economic variables on this list. Income and relative prices are the economic variables and mostly used predictors in the tourism demand models. Other variables are environment- and tourism-seasonality-based factors that are important in developing tourism demand models when tourist arrivals are used to proxy tourism demand, as pointed out by Zamparini et al. (2017). These are rainfall levels of the destination, relative temperature, and the source country's tourism seasonality, which are presumed to have a negative effect on tourism demand (see Section 3 for details). The destination's rainfall level is presumed to disrupt the free movement of tourists, so it could affect foreign tourist arrivals negatively. People come (especially from the Arctic countries) to Kerala to experience its relatively stable climate. Hence, the relative temperature will also affect tourism demand negatively. The source country's tourism seasonality is another factor that may affect arrivals from the Arctic countries, where extreme winter is characteristic of a

longer period, from November to March. Kerala records nearly 60% of the arrivals in the same period (of 5 months); advanced economies from Europe and North America remain the major markets as per the data obtained from the Department of Tourism, Government of Kerala (2022).

The current study contributes to the literature by including relative temperature and the source country's tourism seasonality along with the destinations' rainfall levels and other basic economic predictors in developing Kerala's international tourism demand models with respect to the top source countries. The study could contribute to tourism demand literature in the Indian context where tourism econometric studies are not abundantly available. Moreover, tourism demand studies are scarce in Kerala's context as per the review of tourism demand literature. Region-based studies on tourism demand bear great significance, as tourism demand determinants could vary from region to region. The study by Shafiulla et al. (2019) shows that the main determinants of Australia's tourism demand vary from state to state. There are studies in which the standard economic determinants of tourism demand were shown to be insignificantly related (e.g. Garau-Vadell and De-Juar-Vigaray, 2017). Apart from the geographical differences, the present study approaches the source countries' tourism seasonality as a potential determinant in addition to climatic and economic factors.

The paper is organized as follows: Section 2 presents some theoretical considerations; Section 3 discusses the variables used in the literature; Section 4 presents the methodology used; Section 5 discusses the results; Section 6 presents the conclusions.

2. Theoretical Considerations and Literature on Tourism Demand

The present study aims to estimate the international tourism demand of Kerala with respect to tourist arrivals in the state from the top three source markets, i.e. the UK, the US, and France. Tourist arrival data are taken as the proxy to estimate tourism demand based on three factors, viz. tourist arrivals, tourist expenditure, and tourist overnight stays. A large number of studies have been conducted on tourism demand (e.g. Narayan, 2004; Papatheodorou and Song, 2005; Naude and Saayman, 2005; Alegre et al., 2011; Marcussen, 2011; Kim et al., 2011; Vu and Turner, 2006; Gani and Clemes, 2017; Song et al., 2003). We attempt to assess Kerala's international tourism demand from the top three source markets, viz. the UK, the US, and France, using log-linear regression models. All potential variables are grouped into three categories: origin-based variables, destination-based variables, and origin-and-destination-based variables.

Aside from price and income, several other factors could influence meeting this demand. Since the present study looks into the factors responsible for the choices of Kerala destinations by tourists from the top three source countries, the demand function was used to find the determinants of quantity demanded of tourism goods and services. Tourism demand is defined in line with “demand” in economics as the amount of tourism goods and services that tourists are willing and able to purchase at a given price over a certain period of time. Tourism demand can be measured by estimating tourist arrivals, overnight stays, and tourism expenditure. Studies on tourism demand use either of the three segments in most cases. International tourism demand is often measured in terms of the number of tourist arrivals, tourism expenditure, or the number of overnight stays in the destination country, according to Ouerfelli (2008). As per the studies reviewed, many factors are found responsible for fluctuations in the tourism demand of various countries and regions in the world. The determinants may vary from destination to destination, from country to country, from region to region, and even from researcher to researcher. However, international tourism demand is generally measured in the body of research so far as a function of certain standard variables such as income of the tourists, the country of origin, relative tourism prices, exchange rates, transportation cost and distance, and a number of dummy variables (Song et. al., 2003; Naude and Saayman, 2005; Algieri, 2006; Marcussen, 2011; Kim et al., 2011; Alegre et al., 2011; Daniel et. al., 2012; Gani and Clemes, 2017). Relative tourism prices, relative real exchange rates, transportation costs, and air distance can be alternatively proxied for price of tourism that could inversely affect tourism demand as per the demand theory. Though all of the above variables are cost-related, they were used as different predictor variables in the tourism economics literature (Uysal and Crompton, 1984).

In estimating the tourism demand, the constant elasticity demand function is applied in the present research, as it remains a widely accepted measure of estimating the demand function. In order to identify how much of the demand for tourism services responds to changes in price and income, price and income elasticities of tourism service need to be measured (Samuelson and Nordhaus, 2002). The present study measures the degree of responsiveness of quantity demanded of tourism services due to percentage change in tourism prices and income of the tourists in line with the price and income elasticities of demand. Constant elasticities are often useful to work with isoelastic demand curve although there is no reason to expect elasticities of demand to be constant, according to Pindyck et al. (2022). The log-linear demand function can be written as follows:

$$\log(Q) = a - b \log(P) + c \log(I),$$

where $\log(Q)$ is the logarithmic demand function, and a , b , and c are the constants in the demand function. The slope of the log-linear demand function is determined

by b , which is the price elasticity of demand, and c , which is the income elasticity of demand (Pindyck et al., 2022).

3. Variables in the Study and Tourism Demand Literature

Being the mostly cited and commonly used variables in tourism economics literature, income and relative prices are used as the primary independent variables (e.g. Nguyen, 2021; Downward and Lumsdon, 2003; Uysal and Crompton, 1984; Daniel and Rodrigues, 2012; Gani and Clemes, 2017; Narayan, 2004; Zamparini et al., 2017). While income is an origin-based variable, relative price is an origin-and-destination-based variable. Gani and Clemes (2017) and Zamparini et al. (2017) found a positive and significant impact of per capita GDP on the tourism demand of New Zealand and Italy. Nguyen (2021) and Narayan (2004) also confirmed the positive role of income in tourism demand. At the same time, there are also studies that failed to confirm this expected positive relation (Dhariwal, 2005; Xie, 2020). According to Dhariwal (2005) and Xie (2020), income has not been significant in influencing tourism demand, although positively related.

Kerala's rainfall and relative temperature are the climatic factors in the model, as both factors can make a stronger impact on tourist arrivals for multiple reasons. As argued by Hamilton and Lau (2004) and Ridderstat et al. (2014), climate is seen as the third most important predictor of tourism demand right after economic variables. The effect of rainfall and temperature in Aruba were significant in measuring tourism demand, according to Sookram (2011). The climate of both the destination and the country of origin was significant in affecting tourism demand in major cities in China (Li et al., 2016). Rainfall and temperature are two typical climatic factors of tourism demand (Butler, 1998; Zhang et al., 2016). Gani and Clemes (2017) used some non-economic variables that are quite different from Zamparini et al. (2017), who used environmental quality and stability of weather as predictor variables and found them significantly related to the arrivals of tourists in various provinces of Italy. Moreover, non-economic factors should also be included in tourism demand models when tourist arrivals or tourist overnight stays are used to proxy tourism demand. According to Zamparini et al. (2017), tourism expenditure is the right measure of tourism demand when only economic variables are treated. Rainfall was the only destination-based variable used in this study, while relative temperature (temperature of the source markets/destinations) was another climatic data belonging to the origin-and-destination-based variables (Xie, 2020; Alegre et al., 2011). Another predictor variable, viz. seasonality of the source markets, belongs to the origin-based variables (Corluka, 2018; Andriotis et al., 2007). This variable was included in the model, as tourist arrivals can be shaped by the seasonality of the origin country besides the destination's season. It is presumed that the seasonality of Kerala's

top three source markets can be negatively related to visitor arrivals, as the source countries are Arctic countries in the West, and the destination state has a more stable climate. This is in line with Kim (1999), who observes that tourist departures from Australia were strongly affected by its seasonality. In addition, it was observed that the top three source countries (the UK, the US, and France) of Kerala's international tourism enjoy peak tourism season (during June–August) when Kerala records low arrival numbers. On the other hand, Kerala registers high arrival numbers during the period from November to February, when its top source countries, which are Arctic countries in the West, have off-season (Thomas Cook, 2023a–c). Therefore, the tourism seasonality of the origin country can be a factor driving tourist arrivals in Kerala from the so-called Arctic countries.

The classification of variables into origin-based, destination-based, and origin-and-destination-based variables is similar to the categorization of Gani and Clemes (2017), who classified the variables as standard demand factors, destination attributes, and other variables. It is true that all the studies on tourism demand adopted both economic and non-economic variables. While income and prices remained the mostly cited economic variables, the destination's environment- and the source country's tourism-seasonality-based factors are also included in the present study.

Based on this discussion, we can formulate the following hypothesis: while income is the only predictor which is expected to impact tourism demand positively, all other predictors in the model are expected to affect tourism demand negatively in all three models (the UK model, the US model, and the France model), with equal impact.

4. Analytical Method and Framework

Log-log regression was run to estimate Kerala's international tourism demand from the top three source markets (the UK, the US, and France) in line with Gani and Clemes (2017). There are several other studies too that have adopted stationarity-adjusted data on tourism demand using several other techniques (e.g. Narayan, 2004; Dhariwal, 2005). Narayan estimated Fiji's tourism demand in the short and long run using auto-regressive distributed lagged (ARDL) approach. Dhariwal, in an attempt to analyse the impact of domestic disorders on tourist arrivals in India, applied regression using stationarity-adjusted dataset. Vector correction models and simultaneous equation models were applied by Daniel and Rodrigues (2012) and Zamparini et al. (2017), respectively, in efforts to estimate tourism demand. Least squares regression was applied in an early study on tourism demand by Uysal and Crompton (1984) for analysing the factors driving tourist flows to Turkey. While all the above researchers adopted tourist arrivals to proxy tourism demand, Downward and Lumdson (2003) pursued visitor spending as the

proxy in their study on the tourism demand of the UK. There are also studies not based on secondary data econometric methods (e.g. Corluka, 2018; Andriotis et al., 2007). While Corluka (2018) provided an extensive review of the literature on tourism seasonality, Andriotis et al. (2007) used univariate and bivariate statistics on the data collected from tourists by way of structured questionnaires. Kim (1999), unlike many other econometric studies on tourism demand, developed time series forecasting models for tourist departures from Australia.

In the present study, the dependent variable and five independent variables were transformed into logarithmic form to fix the issue of no stationarity, as the original data were seasonal. This could enable the dataset to fit the proper time series analysis. Time series analysis with log-transformed dataset estimates the elasticities or sensitiveness of tourism demand to change in the income of the origin markets, relative prices, destinations' rainfall, relative temperature, and the seasonality of the origin markets.

Table 1. *Summary of the variables*

Definition	Type of variable	Unit of measurement	Observations	Source of data
Logarithm of FTAs in Kerala from the UK, the US, and France to the base 10 for the period starting from Jan. 2015 to Dec. 2019	Dependent	Tourist arrivals (total)	60	Department of Tourism, Government of Kerala, 2022
Logarithm of the origin country's consumer price index / India's consumer price index to the base 10	Independent ODV	Ratio of index numbers	60	TheGlobalEconomy.com, 2021a–c
Logarithm of Income to the base 10 using imports of the source markets in USD million as proxy	Independent-OV	Total imports in \$ million	60	TheGlobalEconomy.com, 2020
Logarithm of rainfall in Kerala (mm) to the base 10	Independent DV	Millimetre	60	India Meteorological Department, 2021
Logarithm of source countries' temperature / Kerala temperature (°C) to the base 10	Independent ODV	Ratio of temperatures	60	National Oceanic and Atmospheric Administration, 2020
Logarithm of source markets' tourism season proxied by tourism season (total) to the base 10	Independent DV	Overnight stays (total)	60	Eurostat, 2021; CEIC, 2022

Notes: i: the UK; j: the US, k: France; t: period starting from Jan. 2015 to Dec. 2019; OV: origin-based variables; DV: destination-based variables; ODV: origin-and-destination-based variables.

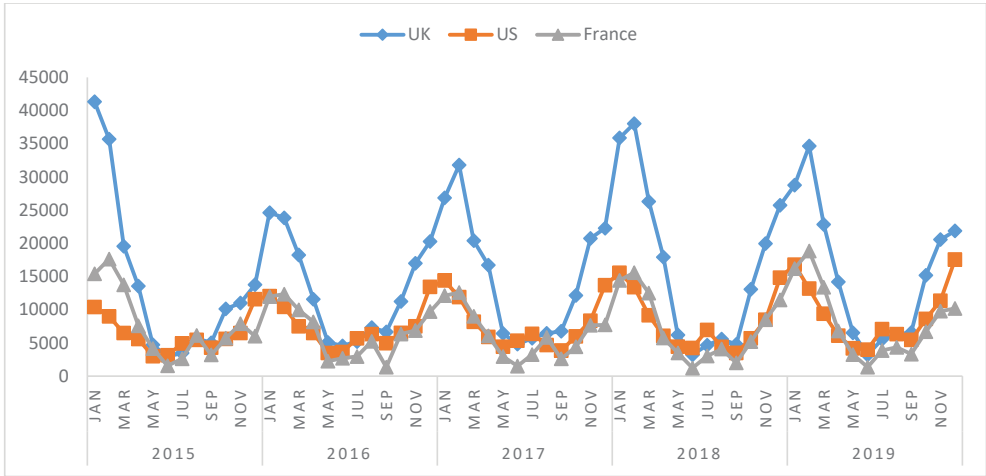
The dependent variable and all potential independent variables are transformed into logarithmic forms to develop valid linear multiple regression models. Three models are developed separately for measuring the determinants of tourist arrivals in Kerala from the top three source markets of the UK, the US, and France. Linear regression was run after transforming the entire dataset into logarithmic form to create a valid model by ensuring the stationarity and normality of the dataset. The month-wise data were collected on one outcome variable and a number of response variables for the time span of 60 continuous months from January 2015 to December 2019. Tourist arrivals in Kerala can possibly be due to the combination of destination-based, origin-based, and origin-and-destination-based variables.

The summary of Kerala's proposed tourism demand models with respect to the UK / the US / France models are presented in *Table 1*.

5. Results and Discussion

5.1 Month-Based Trends of Kerala's Foreign Tourist Arrivals from the Top Three Source Markets

Month-wise arrivals of tourists from the top source markets, viz. the UK, the US, and France, during Jan. 2015–Dec. 2019 are plotted in *Figure 1*. There has not been an upward trend visible in the arrivals of the tourists in Kerala from the UK, the US, and France since January 2015, as presented in the figure. It shows that tourist arrivals from the top source markets look nearly saturated although Kerala's overall tourist arrivals were growing positively until the outbreak of COVID-19 in 2020. The phenomenal growth of tourist arrivals in Kerala from the Middle East (Saudi Arabia, Oman, and the UAE), Russia, Malaysia, Canada, and Australia in the recent period were largely accounted for the growth of Kerala's inbound international tourism as per the data published by the Department of Tourism, Government of Kerala (2022). However, tourist arrivals in Kerala from the top three source markets account for nearly one-third of the total foreign tourist arrivals. While the UK remains the dominant market for Kerala's international tourism with some ups and downs (line with rhombus in the middle), the US and France come as the second and third largest markets (line with square in the middle for the US and line with triangle in the middle for France). May to July remained absolutely off-season for foreign tourist arrivals (FTAs) in Kerala from the top source markets when compared to overall arrivals. Monthly arrivals remained even below 3,000 for this period for the five consecutive years prior to COVID-19. Seasonal monthly arrivals peaked between 15,000 and 20,000 from the US and France and from 25,000 to 35,000 from the UK (during December and January).



Source: Department of Tourism, Government of Kerala (2022)

Figure 1. Total month-wise foreign tourist arrivals in Kerala from the UK, the US, and France (Jan. 2015–Dec. 2019)

5.2. Determinants of Kerala’s Tourism Demand: The UK, the US, and France Models

The Role of Standard Economic Determinants

Income makes only a mild impact on Kerala’s international tourism demand in the log-log regression analysis employed in the current study unlike several other studies on tourism demand (e.g. Roget and Rodriguez, 2006; Nguyen, 2021; Algieri, 2006; Lee, 1996). However, tourist arrivals in Kerala from the UK were positively related to income, with a statistical significance at 5% level, consistent with the economic theory (Samuelson and Nordhaus, 2002) and most previous studies. At the same time, income has but a slightly negative impact in the US model and a slightly positive impact in the France model, with no statistical significance even at 10% level. This implies that the UK tourists are more sensitive to income when compared to the US and France. One per cent change in income would follow 0.12% change in the arrivals of UK tourists in Kerala. This indicates that the positive economic growth in the UK leads to a rise in arrivals of tourists from the country, producing a significant effect. This is, however, not valid for tourist arrivals in Kerala from the US and France, as the income of tourists from these countries clearly has no considerable effect on Kerala’s international tourism demand. The income elasticity of tourism demand remains higher according to the studies of Roget and Rodriguez (2006), Nguyen (2021), Algieri (2006), and Lee (1996). The

present study, however, does not fully agree with that. The insignificant relation of income of the US and France to tourism demand cannot be surprising, as Dhariwal (2005) and Xie (2020) argued that an insignificant relation between income and tourist arrivals is possible. Regardless, income makes a positive impact on the arrivals of tourists in Kerala from the UK and a positive though mild impact on the arrivals of tourists from France. Percentage change in income leads to a less than 1% change in tourist arrivals in all three models, while only the UK model shows significance (see *Table 2*).

Tourism price measured by origin country's price level compared to that of the destination (relative prices) is more important in explaining Kerala's tourism demand from the top source markets than income. This has been proven, as relative prices were negatively related to the arrivals of tourists in the Indian state of Kerala from the UK and the US with a statistical significance at 1% level, which falls in line with the economic theory (Samuelson and Nordhaus, 2002) and econometric approaches. Among the top three source markets of Kerala's international tourism, US tourists remained highly sensitive to prices followed by UK tourists. With one per cent rise in relative prices, the number of tourist arrivals in Kerala from the US and the UK drops by 0.40% and 0.23%, respectively, with one per cent significance level in both cases. At the same time, tourists in Kerala coming from France were only slightly related to relative prices, results being statistically insignificant as well. There are studies that have confirmed an insignificant and unexpected relation between price and tourism demand although most studies on tourism demand have found a negative and significant relation. Dhariwal (2005), Algieri (2006), Divisekara and Kulendran (2006), Sharma (2016), Song et al. (2003), Masiero and Nicolau (2012), Malec and Abrham (2016), and Roget and Rodriguez (2006) found in their studies that prices were negatively and significantly related to tourism demand. A significantly negative effect of prices on tourism demand was confirmed by looking into tourist arrivals from the UK and the US. This implies that tourists in Kerala from the UK and the US are relatively more sensitive to prices, while French tourists are the least sensitive in this regard. Given its price sensitivity, Kerala's international tourism competitiveness must be preserved. There are also studies that have not confirmed the positive effect of prices on tourism demand (Shafiulla et al., 2019; Lee, 1996). The less relevance of income as a determinant of Kerala's tourism demand – at least in the US and France models – falls in line with Naude and Saayman (2005), who argue that income and prices are typical determinants of developed countries. It is, however, clear that relative prices are more relevant in explaining the tourism demand of Kerala when compared to nominal income. More specifically, Kerala receives more foreign tourists (especially from the advanced economies in the West), as Kerala's destinations remain more competitive (see *Table 2*).

The Role of Environmental Factors

Although the standard demand determinants of income and prices are only selectively or moderately related, the environmental factors of destination's rainfall and relative temperature remained highly relevant in explaining tourist arrivals in the state from all of the top three source markets. This is exactly in line with Alegre et al. (2011), who found that climate has been a major factor in determining tourism demand in Spain. A higher level of sensitivity of tourist arrivals to environmental factors was also confirmed by Mathivha et al. (2017), who argue that environmental factors among various others (social, economic, etc.) remain fragile in terms of the tourism industry. Both rainfall in Kerala and relative temperature (source country's / Kerala's temperature) are negatively related to tourism demand in all three tourism demand models, as expected. However, not all tourists are equally sensitive to environmental factors. While both UK and US tourists are more sensitive to rainfall and relative temperature, French tourists in Kerala were found less sensitive to both climatic variables. One per cent change in Kerala's rainfall and relative temperature leads to 0.42% and 0.45% change, respectively, in the arrival of tourists from the UK. Tourists from the US in Kerala were also highly sensitive to climatic factors when compared to French tourists. One per cent change in rainfall in Kerala and relative temperature lead to change in arrivals of US tourists by 0.48% and 0.39% respectively. The estimates were significant at 1% level too. Both environmental factors are negatively related to the arrivals of tourists from France too although both were statistically significant only at the 10% level. Results on the effect of environmental factors imply that tourist arrivals increase depending on the variations in rainfall and relative temperature. Tourism demand rises when rainfall and relative temperature decrease in the state of Kerala (see *Table 2*). There are several other studies that have confirmed a stronger effect of climatic factors on tourism demand (Sookram, 2011; Li et al., 2016; Corluka, 2018).

Effect of the Tourism Seasonality of Source Markets

The tourism seasonality of the source countries is negatively related to Kerala's tourism demand from the UK and France, as expected. One per cent change in the source countries' tourism seasonality causes 0.17% and 0.32% change in the arrivals of UK and French tourists. While the tourism seasonality of France was significant at 5% level, seasonality in the UK was significant only at 10% level. The seasonality of the US (tourist departures from the US were taken as the proxy, and a positive relation was expected; the positive impact of tourist departures from the US was considered to be inversely related to the US tourism seasonality: the higher the number of departures, the weaker the tourism season, and vice versa) was slightly and positively related with no statistical significance, even at 10% level.

As per the data presented in *Table 2*, the tourist departures from the US were negatively (although slightly) related to tourism demand. Hence, it is clear that US tourism seasonality was positively but slightly related to Kerala's international tourism demand. This implies that the tourism seasonality of the source market of Kerala's international tourism was only relevant in the case of the arrivals of UK and French tourists. Nevertheless, tourism seasonality has consistently influenced tourism demand worldwide, as stated by Corluka (2018). Although the destination's tourism seasonality measured by environmental attributes is relevant, the present study examined the effects of the source countries' seasonality on Kerala's tourism demand. It was found that this can be valid in cases of tourist arrivals from the UK and France in Kerala considering the top three source markets (see *Table 2*). It was hypothesised that the source country's tourism seasonality remains negatively related to the arrivals of tourists in Kerala from the main source countries. This holds true for the arrivals of tourists from the UK and France, showing statistical significance. US tourists, at the same time, were insignificantly but negatively related to the tourism seasonality of the source country.

Table 2. Results of the log-log regression on Kerala's international tourism demand from the top 3 source markets (the UK, the US, and France)

		Income (Y)	Relative price (P)	Rainfall (RNF)	Relative temperature	Tourism season
UK model	Coeff.	.124	-.227	-.416	-.447	-.170
	t	2.067	-3.662	-4.471	-4.115	-1.761
	Sig.	.044	.001	.000	.000	.084
US model	Coeff.	-.073	-.405	-.476	-.388	-.042
	t	-.774	-4.174	-4.607	-4.042	-4.418
	Sig.	.442	.000	.000	.000	.678
France model	Coeff.	.020	-.042	-.249	-.336	-.299
	t	.177	-.375	-1.759	-1.922	-2.074
	Sig.	.861	.709	.084	.060	.043

Source: authors' estimates

Hypothesis Testing Results

While null hypothesis of no effect of both standard economic determinants, viz. income and relative prices, stands rejected in the UK model, the US model remains significantly related to Kerala's tourism demand only in the case of relative prices out of the two standard economic determinants. The null hypothesis is accepted in the France model for both of the variables, as no significant relation was found. Overwhelming relevance of environmental factors (relative temperature and rainfall) in affecting tourism demand leads to the rejection of the null hypothesis of no relation in all three models. The null hypothesis gets rejected in terms of

the significant effect of the source country's tourism season on Kerala's tourism demand in the case of the UK and France models. It, however, stands accepted in the US model. It can be generalized that there has been a significant effect of the selected economic and non-economic factors, the destination-based, origin-based, and origin-and-destination-based variables, on Kerala's international tourism.

Among the three models of Kerala's international tourism as per the log-log regression analysis, the UK model remains more relevant, as its adjusted R-squared value (0.8) shows a greater significance in explaining tourist arrivals. This is followed by the US model with the adjusted R-squared value of 0.71 and the France model with 0.63. Since F changes are significant at 1% level in all three models, the models are accurate in terms of their predictability. The Durbin–Watson values fall in the acceptable range in all of the three models (see *Table 3*).

Table 3. *Model summary: the UK, US, and France models of Kerala's international tourism demand*

Model	Adjusted R-square	F change	Sig. F change	Durbin–Watson
UK model	.803	48.259	.000	1.662
US model	.710	28.908	.000	1.908
France model	.629	20.646	.000	2.081

Source: authors' estimates

6. Conclusions

The income level of the source markets has only a mild impact on Kerala's international tourism demand, as the income elasticity of tourism demand remains lower (below 1) in all of the three models (the UK, the US, and the France model). This holds true even as income stands significantly related to Kerala's international tourism demand in the UK model. The effect of the income level of the source markets on Kerala's tourism demand was negligible. The moderate effect or low relevance of income on Kerala's tourism demand falls in line with Roget and Rodriguez (2006), Nguyen (2021), Algieri (2006), and Lee (1996). At the same time, the lower impact of income is not surprising, as there are studies to have failed to ascertain a significant relation between income and tourism demand (Dhariwal, 2005; Xie, 2020; Naude and Saayman, 2005). Naude and Saayman (2005) argued that the standard determinants of tourism, viz. income and prices, are determinants of the developed countries, which implies that both standard factors make a stronger impact on the tourism demand of advanced economies than that of developing countries.

Relative tourism prices make a stronger impact on Kerala's tourism demand, as tourist arrivals from the UK and the US (Kerala's top two source markets of

international tourism) are relatively more sensitive to relative prices, with a statistical significance at 1% level. French tourists in Kerala were not significantly sensitive to prices at the same time, even though negatively related, as expected. Relative prices being highly relevant compared to the income level of the source countries, the destination country must ensure that Kerala's tourism export competitiveness remains on a sufficiently high level to deal with the increasing arrivals of foreign tourists in the future. It has been, however, revealed that relative prices, and not the income level of the source markets, was a more relevant economic variable. This implies that people travelled to Kerala (from its top three source countries) not because they were rich but because they had a greater purchasing power in Kerala than in their home countries, as prices in India remain lower when compared to those of the top tourist-sending countries, which are developed economies. The negative relation between relative prices and tourism demand is consistent with the studies of Dhariwal (2005), Algieri (2006), Divisekara and Kulendran (2006), Sharma (2016), Song et al. (2003), Masiero and Nicolau (2012), Malec and Abrham (2016), and Roget and Rodriguez (2006). Hence, it is obvious that keeping the destinations competitive is of utmost importance, as relative prices play a significant role in driving tourist arrivals. It is the real income, caused by lower prices, rather than nominal income, that played a greater and more significant role in shaping Kerala's international tourism demand. All three top source countries of Kerala's international tourism are developed economies where the cost of living remains higher than in developing economies such as India (*The Economic Times*, 2017). Therefore, the affordability of Indian destinations for the visitors from Western developed economies has been crucial in explaining Kerala's international tourism demand.

Environmental factors remain more relevant in Kerala's international tourism demand when compared to the standard determinants of income and prices. Both rainfall in Kerala and relative temperature were statistically significant in driving the arrivals of tourists from the UK, the US, and France. This is consistent with the seasonality nature of Kerala's international tourism and previous studies on tourism demand (Alegre et al., 2011; Mathivha et al., 2017; Sookram, 2011; Li et al., 2016; Corluka, 2018). They have found a stronger impact of climatic factors, including rainfall and temperature of the destination, on tourism demand. While taking into account these studies, the present study points out that not only the destination's but also the source country's climate has an influential role in shaping Kerala's international tourism demand. Tourists in Kerala from its top source markets arrive to experience its comfortable weather and get away from the extreme winter in their home countries. At the same time, the source markets' tourism seasonality could affect tourism demand. In line with this notion, French tourists are more sensitive to the seasonality of France with 1% level of significance when compared to tourists from the UK and the US.

UK tourists in Kerala are more sensitive to source markets' tourism seasonality than US tourists, as the estimate was significant at 10% level. Among the top three source markets of Kerala's international tourism, the elasticities of the UK tourists were relatively higher, with a greater significance level. This is confirmed by the significant p values and greater adjusted R-squared values presented in *tables 2 and 3* respectively.

We conclude that although climatic factors (rainfall and relative temperature) appear to have an extensive and strong impact on tourist arrivals in Kerala from the top source countries, the higher international tourism export competitiveness of Kerala marked by lower prices than in the source countries acted as the true primary driving force of tourist arrivals in the Indian state of Kerala. This assertion remains valid, as climate has significantly contributed to attracting tourists to Kerala, while the region's tourism competitiveness has successfully secured tourist arrivals. This pattern holds true, at least in the models for tourist arrivals from the UK and the US. Besides the environmental factors, French tourists mainly responded to France's tourism seasonality. Economic predictors (income and relative price) were insignificantly but negatively related in the France model. Regardless, the role of relative prices in affecting tourist arrivals in Kerala cannot be neglected in any of the three models although French tourists were insignificantly sensitive to it.

The study gives a clear understanding of the factors (economic, environmental, and tourism-seasonality-based) driving Kerala's international tourism demand. It shows how tourist arrivals are affected and how foreign tourists are responding to the primary variables such as income and relative prices. The study also reveals how tourists remain sensitive to the climatic and tourism seasonality factors. Despite the data being continuous, the tourist arrivals dataset had to be limited to 60 observations due to availability constraints. Kerala's tourism demand based on three source markets may not be perfectly applied to the overall tourism demand of Kerala, as the three source markets constitute not more than 35% of the total arrivals. Despite this shortcoming, the present study may facilitate better international tourism management in Kerala. Also, the study urges tourism managers and authorities in Kerala to make sure that tourist destinations remain competitive. More importantly, it could form a bridge between tourism demand literature and tourism demand models of Kerala. This study used the source country's tourism seasonality as a variable in addition to economic and environmental factors. The significance of tourism competitiveness was firmly established in the study on tourism demand in Kerala. Specifically, competitive tourism prices in the developing region continue to be highly relevant for influencing tourist arrivals from developed Western countries.

Acknowledgements

This paper was prepared on the basis of a PhD thesis submitted in April 2023 to the University of Calicut, Kerala, India. The authors received no financial support for the research, authorship, and/or publication of this article.

References

- Alegre, Joaquin; Cladera, Magdalena; Sard, Maria. (2011). Analysing the influence of tourist motivations on tourist expenditure at a sun-and-sand destination. *Tourism Economics* 17(4): 813–832.
- Algieri, Bernadina. (2006). An econometric estimation of the demand for tourism: The case of Russia. *Tourism Economics* 12(1): 5–20.
- Andriotis, Konstantinos; Agiomirgianakis, George Myron; Mihiotis, Athanasios. (2007). Tourist vacation preferences: The case of mass tourists to Crete. *Tourism Analysis* 12(1–2): 51–63. DOI: 10.3727/108354207780956672.
- Bunghez, Corina Larisa. (2016). The importance of tourism to a destination's economy. *Journal of Eastern Europe Research in Business & Economics*. DOI: 10.5171/2016.143495.
- Butler, Richard. (1998). Seasonality in tourism: Issues and implications. *The Tourist Review* 53(3): 18–24. <https://doi.org/10.1108/eb058278>.
- CEIC. (2022). *United States visitor arrivals*. Retrieved from: <https://www.ceicdata.com/en/indicator/united-states/visitor-arrivals>.
- Corluka, Goran. (2018). Tourism seasonality – An overview. *Journal of Business Paradigms* 4(1): 21–43.
- Correia, Antonia; Zins, Andreas H.; Silva, Fransisco. (2015). Why do tourists persist in visiting the same destination. *Tourism Economics* 21(1). DOI: 10.5367/te.2014.0443.
- Daniel, Ana, C. M.; Rodrigues, Paulo M. M. (2012). Assessing the impact of shocks on international tourism demand for Portugal. *Tourism Economics* 18(3): 617–634.
- Department of Tourism, Government of Kerala. (2022). *Kerala tourism statistics (various years)*. Retrieved from: www.keralatourism.org/touriststatistics/.
- Dhariwal, Richa. (2005). Tourist arrivals in India: How important are domestic disorders? *Tourism Economics* 11(2): 185–205.
- Divisekara, Sarath; Kulendran, Nada. (2006). Economic effects of advertising on tourism demand: A case study. *Tourism Economics* 12(2): 187–205.
- Downward, Paul; Lumsdon, Les. (2003). Beyond the demand for day visits: An analysis of visitor spending. *Tourism Economics* 9(1): 67–76.

- Eurostat. (2021, September 18). *Nights spent at tourist accommodation establishments – Monthly data*. Retrieved from: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=tour_occ_nim&lang=en.
- Gani, Azmat; Clemes, Michael D. (2017). The main determinants effecting international visitor arrivals in New Zealand: Some empirical evidence. *Tourism Economics* 23(5): 921–940.
- Garau–Vadell, J. B.; De-Juar-Vigaray, M. D. (2017). International residential tourist shopping styles: A study of British and German citizens in Spain. *Tourism Economics* 23(3): 485–505.
- Hamilton, Jacqueline; Lau, Maten A. (2004). *The role of climate information in tourist destination choice*. Working Paper FNU-56.
- India Meteorological Department, Government of India. (2021). *Meteorological data supply – Monthly rainfall at Kochi*. Purchased on: <https://dsp.imdpune.gov.in/>.
- Ivanov, Stanislav; Webster, Craig. (2007). Measuring the impact of tourism on economic growth. *Tourism Economics* 13(3): <https://doi.org/10.5367/00000007781497773>.
- Kim, J. H. (1999). Forecasting monthly tourist departures from Australia. *Tourism Economics* 5(3). <https://doi.org/10.1177/135481669900500304>.
- Kim, Woo Gon; Kim, Taegoo; Gazzoli, Gabriel; Park, Yumi; Kim, Sang Hyuk; Park, Si Sa. (2011). Factors affecting the travel expenditure of visitors to Macau, China. *Tourism Economics* 17(4): 857–883.
- Lee, C. (1996). Major determinants of international tourism demand for South Korea. *Journal of Travel & Tourism Marketing* 5(1–2): 101–118. DOI: 10.1300/J073v05n01_07.
- Li, Hengyun; Song, Haiyan; Lili, Lili. (2016). A dynamic panel data analysis of climate and tourism demand: Additional evidence. *Journal of Travel Research* 56(2). <https://doi.org/10.1177/0047287515626304>.
- Malec, Lukas; Abrham, Josef. (2016). Determinants of tourism industry in selected European countries: A smooth partial least squares approach. *Economic Research – Ekonomska Istraživanja* 29(1): 66–84. DOI: 10.1080/1331677X.2016.1156554.
- Marcussen, Carl Henrick. (2011). Determinants of tourist spending in cross-sectional studies and at Danish destinations. *Tourism Economics* 17(4): 833–855.
- Masiero, Lorenzo; Nicolau, Juan L. (2012). Price sensitivity to tourism activities: Looking for determinant factors. *Tourism Economics* 18(4): 675–689.
- Mathivha, Fhumulani; Tshipala, Ndivhuwo; Nkuna, Zanele. (2017). The relationship between drought and tourist arrivals: A case study of Kruger National Park, South Africa. *Journal of Disaster Risk Studies* 9(1). <https://hdl.handle.net/10520/EJC-a873b6115>.
- Ministry of Tourism, Government of India. (2022). India tourism statistics (various years). Retrieved from: www.tourism.gov.in/market-research-and-statistics.

- Nair, Lekshmi R; Dhanuraj, D. (2018). *Kerala tourism: The role of the government and economic impacts*. The report submitted to the Centre for Public Policy Research (CPPR). Retrieved from: www.cppr.in/wp-content/uploads/2018/01/Kerala-Tourism-%E2%80%94-The-Role-of-the-Government-and-Economic-Impacts.pdf.
- Narayan, Paresh Kumar. (2004). Fiji's tourism demand: The ARDL approach to cointegration. *Tourism Economics* 10(2): 193–206.
- National Oceanic and Atmospheric Administration. (2020). *Monthly climatic data for the world*. Retrieved from: <https://www.climate.gov/maps-data>.
- Naude, Willem A.; Saayman, Andrea. (2005). Determinants of tourist arrivals in Africa: A time series data regression analysis. *Tourism Economics* 11(3): 365–391.
- Nguyen, Hai Quang. (2021). Elasticity of tourism demand by income and price: Evidence from domestic tourism of countries in ASEAN. *Cogent Social Sciences* 7(1). <https://doi.org/10.1080/23311886.2021.1996918>.
- Ouerfell, C. (2008). Co-integration analysis of quarterly European tourism demand in Tunisia. *Tourism Management* 29(1): 127–137.
- Papatheodorou, Andreas; Song, Haiyan. (2005). International tourism forecasts: Time-series analysis of world and regional data. *Tourism Economics* 11(1): 11–23.
- Pindyck, Robert; Rubinfeld, Daniel; Banerjee, Sreejata. (2022). *Microeconomics*. 9th edition. Pearson India Education Services Pvt. Ltd: Noida, India.
- Ridderstaat, Jorge; Oduber, Marck; Croes, Robertico; Nijkamp, Peter; Martens, Pim. (2014). Impacts of seasonal patterns of climate on recurrent fluctuations in tourism demand. Evidence from Aruba. *Tourism Management* 41: 245–256. <https://doi.org/10.1016/j.tourman.2013.09.005>.
- Roget, Fidel Martinez; Rodriguez, Xose Anton. (2006). Rural tourism demand in Galicia, Spain. *Tourism Economics* 12(1): 21–31.
- Samuelson, Paul; Nordhaus, William. (2002). *Economics*. Tata McGraw-Hill Publishing Company Ltd, New Delhi: India. 67–84.
- Shafiullah, M; Okafor, L. M; Khalid, U. (2019). Determinants of international tourism demand: Evidence from Australian states and territories. *Tourism Economics* 25(2): 274–296.
- Sharma, Harshil. (2016). An econometric model of tourism demand in India. *International Journal of Development Research* 6(6): 8227–8231.
- Song, Haiyan; Witt, Stephen F.; Li, Gang. (2003). Modelling and forecasting the demand for Thai tourism. *Tourism Economics* 9(4): 363–387.
- Sookram, Sandra. (2011). *An assessment of the economic impact of climate change on the tourism sector in Aruba*. Economic Commission for Latin American and the Caribbean (ECLAC). Retrieved from: <https://repositorio.cepal.org> » LCCARL303_en.

- The Economic Times. (2017, June 21). *How cheap or costly are world cities in Indian rupees*. Retrieved from: <https://economictimes.indiatimes.com/wealth/personal-finance-news/how-cheap-or-costly-are-world-cities-in-indian-rupees/articleshow/59247470.cms?from=mdr>.
- TheGlobeconomy.com. (2020). *Imports, billion dollars*. Retrieved from: <https://www.theglobeconomy.com>.
- (2021a). *France: Consumer price index (CPI)*. Retrieved from: <https://www.theglobeconomy.com/France/cpi/>.
- (2021b). *United Kingdom: Consumer Price Index (CPI)*. Retrieved from: <https://www.theglobeconomy.com/United-Kingdom/cpi/>.
- (2021c). *USA: Consumer price index (CPI)*. Retrieved from: <https://www.theglobeconomy.com/USA/cpi/>.
- Thomas Cook. (2023a, August 4). *Best season to visit America*. Retrieved from: <https://www.thomascook.in/international-tourism/best-time-to-visit-america>.
- (2023b, August 4). *Best season to visit United Kingdoms*. Retrieved from: <https://www.thomascook.in/international-tourism/best-time-to-visit-united-kingdom>.
- (2023c, August 4). *Best season to visit France*. Retrieved from: <https://www.thomascook.in/international-tourism/best-time-to-visit-france>.
- Uysal, Muzaffer; Crompton, John L. (1984). Determinants of demand for international tourist flows to Turkey. *Tourism Management* 5(4): 288–297.
- Vu, Jo; Turner, Lindsay. (2006). Asia versus Oceania: Comparative net shifts in tourist arrivals. *Tourism Economics* 12(4): 519–529.
- Xie, Jinghua. (2020). The economic determinants of tourism seasonality: A case study of the Norwegian tourism industry. *Cogent Business & Management* 7(1). <https://doi.org/10.1080/23311975.2020.1732111>.
- Zamparini, Luca; Vergori, Anna Serena; Arima, Serena. (2017). Assessing the determinants of local tourism demand: A simultaneous equations model for the Italian provinces. *Tourism Economics* 23(5): 981–992.
- Zhang, Hanquin Qiu; Kulendran, Nada. (2016). The impact of climate variables on seasonal variation in Hong Kong inbound tourism demand. *Journal of Travel Research* 56(1). <https://doi.org/10.1177/0047287515619692>.



Revisiting the Financial Development and Income Inequality Nexus: Evidence from Hungary

Faeyzh BARHOOM

Faculty of Economics, Management and Organizational Sciences, Hungarian University
of Agriculture and Life Sciences (MATE), Hungary
e-mail: F_barhoum@yahoo.com

Abstract. The finance–inequality nexus has been a major topic of discussion since the 1990s and became even more so after the financial crisis of 2007–08. This paper aims to empirically investigate whether financial development and/or financial openness increased or decreased income inequality in Hungary over the period of 1971–2019. An empirical analysis of an autoregressive distributed lag (ARDL) model suggests the existence of long-run co-integration between the analysed variables. Financial openness contributes to reducing Hungarian income inequality in the short run but fuels greater income inequality in the long run. Whereas the effects of financial development on inequality vary according to the indicators, the domestic credit by banks has a significant negative effect on inequality in the short and long run, while the impact of the credit to the private sector from all the sectors on inequality is insignificant.

Keywords: financial development, income inequality, Hungary, ARDL

JEL Classification: G10, G21, O15, D63, C22

1. Introduction

Rising inequality is a major social and economic issue and is the most controversial issue within most countries, as well as a global challenge that worries policymakers and researchers. In fact, the major concern results from the potential negative economic and social impacts of inequalities, rather than from the inequality issue itself (Rajan, 2011; Stiglitz, 2012; Dabla-Norris et al., 2015). Thus, inequality is more than a sign of low income in the lower deciles, or perhaps an indication of

a lack of chance and income mobility or a signal of a lack of income mobility and opportunity, which requires attracting considerable attention and calls for action.

Because of this concern, the inequality topic has received greater attention from international organizations. For example, Goal 10 of the UN's Sustainable Developments (SDGs) (<https://sdgs.un.org/goals/goal10>) emphasizes reducing inequality as a crucial priority and its role in achieving agenda 2030 SDGs. As a result, increasing equality has become a top priority for policymakers in all countries.

In addition, several questions related to income distribution and wealth inequality have been raised by researchers, especially after the global financial crisis of 2007–08 (e.g. Stiglitz, 2012, 2016; Piketty, 2014; Morelli and Atkinson, 2015) that led to the inequality issue and moved into the limelight of a public debate. Further, COVID-19 and the current economic crisis have deepened existing inequalities and poverty since it hit the poorest and most vulnerable communities the hardest and amplified the impacts of the pandemic, according to international reports (e.g. UNDP, 2023; World Bank, 2023).

A literature review of factors that may contribute to exacerbating income inequality suggests that those factors are: access to economic and financial resources (de Haan and Sturm, 2017), structural change (Kum, 2008), the reduced role of labour unions (Morelli and Atkinson, 2015), technological change and globalization (Jaumotte et al., 2013), scarcity rents (Stiglitz, 2012), international trade (Stiglitz, 2015), tax and transfer system (Piketty, 2014), financial development (hereafter, FD), and financial liberalization (hereafter, FL), as de Haan and Sturm (2017) and Furceri and Loungani (2018) have reported. However, this study will focus primarily on the relationship between FD/and or FL and inequality in Hungary and how finance can affect inequalities directly and indirectly.

The financial literature has long acknowledged the importance of finance in economic growth by channelling financial resources into the most productive uses, but that body of research does not address the question of who benefits more from this growth if the rich or the poor may benefit disproportionately from FD (Levine 2021). Especially access to financing is more constrained for impoverished people since it is based on their income level and capacity to provide collateral (Rajan and Zingales, 2003).

Indeed, up until the 1990s, when the endogenous growth theory emerged, underlining the relevance of finance in reducing inequality, FD and inequality had been separate issues. Later on, scholars held opposing viewpoints. For example, Rajan and Zingales (2003) argue that FD/or FL does not have to assist individuals on low income but may fall disproportionately on the rich. On the contrary, the endogenous growth theory gives grounds to believe that low-income persons gain disproportionately from FD/FL (Banerjee and Newman, 1993; Galor and Zeira, 1993). It also helps to reduce the persistence of relative income disparities

across generations by making financial services more accessible to people who previously did not have access because of limitations and high costs (Greenwood and Jovanovic, 1990). Third, FD/and or FL are frequently associated with increased financial insecurity and financial crises, which have devastating effects on inequality because poor and low-income families are the most vulnerable to shocks and are harmed the most by policy responses to the financial crises (de Haan and Sturm, 2017). As a result, the relationship between inequalities and finance concepts started as a major topic of discussion and increased after the financial crisis of 2007–08. Until now, doubts and concerns about this relationship are still growing every day (Levine, 2021; Biyase, et al. 2023; Biyase and Chisadza, 2023). Thus, there is a strong evidence that countries with a high financial development level have a higher rate of income inequality (de Haan, 2017; de Haan et al., 2022).

Remarkably, in the world, the income inequality within countries has soared throughout the last four decades, and Hungary is no exception to this. The income gap and wealth inequality have widened over the past 40 years. In this context, the household income share held by the wealthiest 10 per cent has shown a sharper increase than the other deciles. Financial assets may appear to be the primary drivers of their income increase and wealth concentration (Mavridis, 2017; Evans et al., 2022; Chancel et al., 2021; Wang et al., 2023) given that they held nearly 70 per cent of financial assets in 2017 (European Central Bank (ECB), 2021). In particular, financial rents have been the key drivers of income for those at the top of the distribution ladder in the last decades (Stiglitz, 2012, 2016; Bolton et al., 2016). Thus, this requires scrutiny and attention to the relationship between FD and inequality in Hungary. After scrutinizing and reviewing the literature on the relationship between FD or FL and inequality in Hungary during the last three decades, we found that more studies are needed in this regard. Especially the conclusions of existing studies are contradictory, inconclusive, and also dominated by cross-country analyses.

Hungary could be an interesting case study of the finance–inequality nexus because of the considerable changes in the financial system and the increasing inequality trend since the collapse of the Soviet communist era. The Hungarian financial system has seen the launching of various financial restructuring programmes during the transition process, leading it to become one of the best-developed systems in the EU at the beginning of the new millennium. However, this system also endured two financial crises in 1991 and 2008, which considerably affected this system. Recently, the financial sector has improved significantly, as its indicators showed.

However, we do not know how these changes affect inequality, and decision makers lack evidence. On the other hand, Hungarian literature on these effects is also insufficient and dominated by cross-country analyses (e.g. de Haan and Sturm, 2017; Bezemer and Samarina, 2016; Zhang and Naceur, 2019; Nguyen et al.,

2019; Kavya and Shijin, 2020; Mbona, 2022). In addition, it seems that their results lead to conflicting predictions about the finance–inequality nexus in Hungary and other countries. For example, the study of de Haan and Sturm (2017) provides evidence for supporting the finance–inequality widening hypothesis. Zhang and Naceur (2019) and Cevik and Correa-Caro (2020) established that extending the availability of financial services to low-income consumers and small projects might contribute to reducing inequality. However, Kavya and his colleague Shijin failed to find clear-cut evidence to support reducing income inequality. In contrast to the findings of Nguyen et al.’s (2019) study, Mbona (2022) indicated that financing lowers inequality in the first stage but raises it in the second. Accordingly, we aim to empirically assess the role of FD/FL in inequality by examining whether the FD/FL in Hungary had a relationship with income inequality in the short and long run.

The primary objectives of this study are: (i) contributing to the scant information on the specific relationship between FD and/or FL and income disparity in Hungary and filling a gap in the existing literature (e.g. Bezemer and Samarina, 2016; Zhang and Naceur, 2019; Nguyen et al., 2019; Kavya and Shijin, 2020; Mbona 2022); (ii) besides increasing our understanding of these relationships, addressing the questions is critical for policymakers to determine if Hungary’s FD and FL policies can accomplish the UN SDG 10 target; (iii) the empirical results of this study may help policymakers create strategies for achieving Hungary’s financial stability goals; (iv) contributing to the debate on the effectiveness of FD on income inequality and to the macroeconomic literature on the finance–inequality nexus (Levine, 2021; Biyase et al., 2023; Biyase and Chisadza, 2023).

The remainder of this essay is structured as follows: the literature relating FD to inequality is reviewed in Section 2; Section 3 outlines Hungary’s FD and income inequality experiences; Section 4 presents the model and data; Section 5 presents and analyses the findings; Section 6 concludes with statements.

2. Literature Review

2.1. Theoretical Discussion

Indeed, the theoretical relationship between FD and inequalities goes back to the Financial Kuznets (1955a–b) Curve (FKC) hypothesis, in which finance initially leads to worse equality, up to a peak, followed later by reduced inequality. The early studies supported Kuznets’s hypothesis; however, it was later refuted (Barro, 2000; Piketty, 2014). In particular, there is increasing evidence that an economy with higher FD levels has high inequality ratios.

With the emerging endogenous growth theory in the 1990s, the model of Greenwood and Jovanovich (1990) explained how FD and income inequality

variables have an inverted U-shaped connection. Three years later, Galor and Zeira (1993) and Banerjee and Newman (1993) rejected the inverse U-shaped hypothesis of the relationship between finance and inequality and claimed that the squared financial system indicator representing this relationship was checked and found to be statistically insignificant; hence, they predict a linear negative relationship between the two variables.

The endogenous growth theory models put forward the inequality-narrowing hypothesis of finance by its influence on the extensive margin of financial services, whereby financial improvements lead to capital allocation and boost economic opportunities for underprivileged groups. Thus, investment in business and education, regardless of inheritance wealth, increases the demand for labour. Besides, it also helps to reduce the persistence of relative income disparity across generations.

Nonetheless, this widely held belief has been called into doubt in the literature since the turn of the millennium, and an opposite hypothesis emerged that finance may have a stronger effect on the intensive margin, which only benefits the ones already using those services. Rajan and Zingales (2003) put forward that in the absence of well-functioning institutions, finance advances towards the inequality-widening and not inequality-narrowing hypothesis due to poor protection (Chong and Gradstein 2007). Later, this view has been empirically confirmed by Law et al. (2014) and de Haan and Sturm (2017).

In the last decade, an even vaster literature has suggested that FD and FL are often associated with high ratios of financial instability and financial crises (Rajan, 2011). Hence, low-income individuals will become more vulnerable (de Haan and Sturm, 2017), especially in times of recession, which often follow a crisis (Morelli and Atkinson, 2015). In this context, several theoretical considerations have forcefully suggested that income inequality is one predictor of financial crises because of over-indebtedness (Schularick and Taylor, 2012). Some researchers, however, suggest that governments' monetary policies, financial liberalization, and reform dynamics may have both direct and indirect effects on the finance–inequality nexus (Atkinson and Morelli, 2011). Recently, some theoretical arguments point out the role of increasing rent extraction in rising income inequality (Stiglitz, 2012, 2016; Bolton et al., 2016), either through financial innovations that are inefficient or damaging (Bolton et al., 2016) or through the wages of employees in the financial sector (Demirgüç-Kunt and Levine, 2009; Philippon and Resheff, 2012; Piketty, 2014).

In the financial theory, FD and FL do not have effects only on the current incomes but also on the income inequality across dynasties through wealth accumulation. According to Greenwood and Jovanovic's (1990) model, FD can influence accumulating assets by reducing the information and transaction costs, allowing individuals to benefit from economies of scale in screening projects. Extra

investment options become available to low-income savers and talents, which helps to increase their wealth. However, the direct effect of increasing stock prices could fall disproportionately on the wealthy, causing a further significant widening of inequality (Domanski et al., 2016). Particularly rising values of households' bond portfolios are significantly associated with rising equity prices. Additionally, high equity returns are the major drivers of wealth at the top of the distribution, as emphasized by Domansky and others. In the same vein, some seminal papers (Stiglitz, 2015, 2016) stated that wealth inequality has been made higher than income inequality over the recent decades by credit creation, which finances the remuneration of rent-generating activities via allocating funds towards more remunerative things, such as securitization and financial engineering, which promote rents and especially financial system rents.

2.2. Empirical Literature

A considerable amount of literature on the relationship between finance and inequality and the findings of the empirical literature on this nexus are similar to theoretical literature and are far from conclusive. These empirical studies could be divided into five main strands.

In the first strand, the studies showed that countries with less income inequality have higher levels of FD, and alleviating income disparity could be achieved through implementing policies aiming to enhance FD. For example, using the four dimensions of FD (access, efficiency, deepening, and stability) on a sample of 143 countries (including Hungary) covering the period from 1961 to 2011, Zhang and Naceur (2019) applied the exogenous instruments method. The authors suggest that contrary to FL, FD reduces income inequality and poverty, and FD affects income inequality more via bank credit channels than via the capital markets' credit channels. Similarly, Cihak and Sahay (2020) examined the empirical relationship between income inequality and FD using panel data for 128 economies (including Hungary) during the period of 1980–2015. They looked into three aspects: financial depth, inclusion, and stability. The authors reasoned that FD may help to reduce inequality by making financial services more accessible to low-income customers and small businesses. The same finding has been reached by Cevik and Correa-Caro (2020), who investigated the main determinants of income inequality in 29 transition countries (including Hungary) between 1990 and 2018.

Contrarily, the second researchers' strand demonstrated that a deeper FD might worsen inequality rather than reduce it. Accordingly, they support the hypothesis of a widening impact of FD on income inequality (e.g. Kim and Lin, 2011; Jauch and Watzka, 2011; Sehrawat and Giri, 2016; Adams and Klobodu, 2016; de Haan and Sturm, 2017; Maldonado, 2017; Bittencourt et al., 2018; de Haan et al., 2022). De Haan and Sturm, for example, employ a panel fixed and random effects model

for a sample of 121 countries (including Hungary) between 1975 and 2005 to investigate the impacts of FD, FL, and banking crises on income inequality. The results of the study show that all financial variables increase income inequality. In addition, both the level of FD and the quality of institutions' conditions affect the impact of FL on inequality.

The third strand of researchers concluded that the link between the two variables depends on the extent of a country's level of FD (e.g. Rehman et al., 2008; Nikoloski, 2013; Baiardi and Morana, 2016; Basirat et al., 2016; Cong Nguyen et al., 2019; De la Cuesta-González et al., 2019; Hassan and Meyer, 2021). They found the Financial Kuznets Curve (FKC) hypothesis to be valid. For instance, from 1961 to 2017, Cong Nguyen and his colleagues empirically evaluated the relationship between finance and inequality for 21 emerging economies, including Hungary (2002–16). They used various proxies of FD and employed the Dynamic OLS (DOLS) and the Fully Modified OLS (FMOLS) methods to investigate the FKC on FD and income inequalities. The result of their study supported the existence of an inverted U-curve hypothesis.

Contrarily, many studies rejected the FKC hypothesis (e.g. Ang, 2010; Batuo et al., 2010; Elmi and Ariani, 2011; Jauch and Watzka, 2011; Shahbaz and Islam, 2011; Tiwari et al., 2013; Sehrawat and Giri, 2015; Wajid and Awan, 2021), while other studies supported the “too much finance hypothesis”, in which increasing FD first improves income equality and then, after reaching a threshold, growth in FD enhances income inequality (e.g. Younsi and Bechtini, 2018; Mbona, 2022). Mbona employed the generalized method of moments (GMM) on the panel data of 120 countries (including Hungary) from 2004 to 2019. Her study established that the “too much finance hypothesis” holds in the selected countries, and the effects of FD's various characteristics on income inequality vary.

According to the fourth study strand, FD has no effect on inequality (e.g. Law and Tan, 2009; Seven and Coskun, 2016; Ahmed and Masih, 2017; Kavya and Shijin, 2020). Using dynamic panel data approaches, Seven and Coskun found no connection between FD and income disparity in 45 rising nations from 1987 to 2011. Using a panel of 85 economies, including Hungary, between 1984 and 2014, Kavya and Shijin recently employed a threshold regression approach and unbalanced dynamic panel GMM estimation model. They came to the conclusion that there is not any conclusive evidence to promote lowering disparity in income and that Hungary, a high-income nation, does not gain from FD.

Finally, the findings of the last strand led to mixed results. For example, Bahmani-Oskooee and Zhang (2015) suggested that only in 10 out of the 78 countries included in their study are there effects of financial market development on income distribution in the short run and in three countries in the long run. A year later, Bezemer and Samarina (2016) found that the impact of FD on inequality varies according to the components of FD, their study being based on

26 EU countries (including Hungary) and conducted between 1990 and 2012. While bank credit to real estate and financial asset markets increases inequality, credit to non-financial businesses and household consumption decreases income inequality. The inequality-narrowing hypothesis was confirmed to be true in the short term by Wajid and Awan (2021) while the inequality-widening hypothesis in the long run.

In brief, economic theories appear to forecast incongruently, and, similarly, empirical investigations' findings revealed a sizable disparity. These contradictory predictions can be put down to a difference in the times of the inquiry, the measures and indicators employed, and the methodologies. They suffer from a lack of data and methodological limitations. On the other hand, cross-country analysis predominates in the Hungarian literature, which is likewise insufficient for Hungarian decision makers.

3. Financial Development and Income Inequality in Hungary

3.1. Financial Sector Reforms in Hungary

Hungary's financial sector is less developed than the industrialized European countries, with the bank-based financial system serving as the primary source of credit for non-financial firms. Similar to other Visegrád countries, Hungary had to develop its financial system during the transition period, which was inefficient during the communist era and passed through a financial crisis in 1991 because Hungarian banks were technically insolvent and due to the economic collapse, along with terrible legacies of the past (Botos, 2019). The establishment of a two-tier banking system in 1987 and the government's bailout plan for the banks' aftermath of the financial crisis in 1991 played a part in the transformation of the banking industry and strengthened the quality of their portfolios.

And as part of the economy's fundamental transition, this sector has seen a substantial, quick privatization process reflected in the rapidly increasing foreign-held shares as part of the total assets of banks (Hasan and Marton, 2003), and it resumed Budapest stock market activities after having been interrupted during the communist era. The essential regulatory framework for this sector's functioning was constructed, including launching new laws and regulations for the securities market and credit institutions. Furthermore, a reform in monetary policy permitted banks to perform services such as investment transactions. These changes have increased the efficiency of the banks, which served as one of the growth drivers around the year 2000.

Besides, other factors reinforced FD and FL in Hungary such as transfers from closed economics to open markets and European integration, recommendations of the World Bank, a flourishing of ideas of the endogenous growth theory that emphasizes the importance of FD and FL in both economic growth and improving the standard of living and the quality of life. As a result, the Hungarian financial system became one of the best-developed systems in the EU at the beginning of the new millennium. For example, improving regulation and monitoring was spurred as part of the European integration process and the necessity to implement EU standards by 2004. As a result, Hungary eliminated capital mobility limitations, and the central bank passed a new regulation in 2001 that corresponded to EU norms (MNB, 2002).

The Hungarian financial system, integrated with the international system, embraced new operational methods and became one of the region's most advanced systems. Its banking system began to enjoy the benefits of being sufficiently funded, a high profitability, modernized services supported by external sources, and a well-developed banking culture (Bod, 2017). The increased access to credit with an expansion of sales channels and of regional branch networks improved depth and efficiency and grew consumer trust in Hungary and on the global financial markets (Kovács, 2019).

However, this resulted in an unhealthy banking sector and increased the country's external vulnerability due to its heavy reliance on foreign finance, short-term debt, and derivative instruments and a high level of government debt. As a result, when the 2008 crisis set in, Hungary faced a liquidity issue, forcing it to get an IMF-EU loan, followed by an economic recession up until 2012.

The crisis and its effects put the Hungarian banking industry through many hardships. Credit institutions witnessed a significant decline in their investment portfolios, reflecting declining demand and supply for credit, and they lost their competitiveness because of the increase in expenses. Households were unwilling to apply for loans because of the high monthly repayment obligation, and, at the same time, the overall economic environment's uncertainty and recessionary pressures reduced banks' desire to lend. These and other factors, such as high credit risk and low internal capital generation capacity, led to a decline in lending (MNB, 2014). In addition to government initiatives, such as the early payment system and the new banking tax, which impacted bank performance through poor profitability and restrictive lending conditions, these factors also contributed to fast deleveraging.

The government implemented several measures to mitigate the effects on banks, including capital injections and unconventional monetary policy measures aiming to address weak bank lending activity, such as the Funding for Growth Scheme and the Growth Supporting Programme. These played a significant role in both economic growth and in avoiding a credit crunch, and the turnaround in corporate lending. Initially, the monetary policy focused on assistance lending to SMEs that

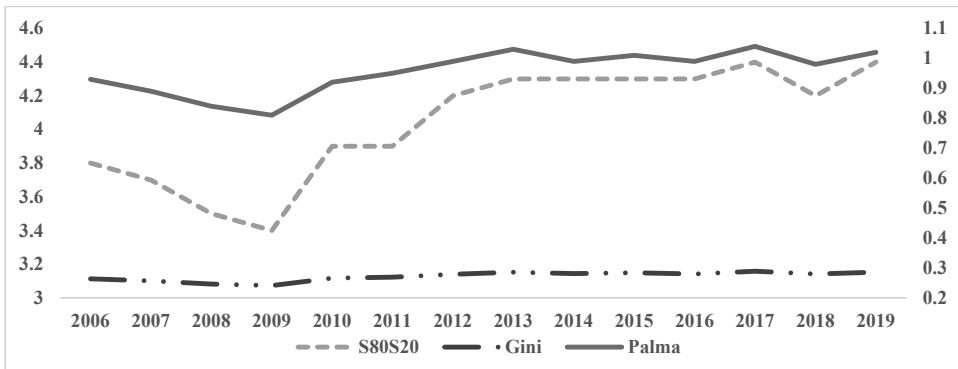
commenced in 2013 and later to big enterprises and the family sector in 2016, but credit requirements have generally remained conservative (MNB 2021).

3.2. Inequality in Hungary and Its Relatedness with Finance

Hungary witnessed an increase in income inequality over four decades owing to different factors across time, which are somehow similar to those in all the transition countries. For example, income inequality increased in the late 1980s and early 1990s due to various reforms and policies such as privatization, deregulation, and austerity measures. While the impact of FD and/or FL related to Foreign Direct Investment (FDI) in the late 1990s contributed to a slight increase in employment, it also contributed to inequality by creating a dual labour market.

Although income distribution showed stagnation in the second half of the 1990s, it then increased again to peak in 2006. According to the Eurostat database (2021), the Gini coefficient of equalized disposable income increased by 9.3 points between 2003 and 2006 (where the Gini index reached 33.3 per cent). Several factors shaped inequality during this period such as the welfare state in 2003, benefit cuts, tax policies after joining the European Union in 2004, and austerity in 2006.

Inequality increased during the financial and economic crises because of the high unemployment rate, decreasing real income, the burden of loan repayment, and response policies to the financial crisis. Relatively ungenerous income redistribution policies, taxation systems, globalization, skill-biased technology, and wealth accumulation have been the main determiners of increasing inequality in the last decade.



Source: author's calculations based on data from OECD (2023)

Note: Gini and Palma indicators (right-hand scale).

Figure 1. Income inequality in Hungary

In 2019, the Gini coefficient (where “0” marks equality and “1” total inequality) of equivalized disposable income reached a record of 28 per cent, while it was 24.1% in 2009, according to data from the Hungarian Central Statistical Office (HCSO, 2021 – https://www.ksh.hu/stadat_files/ele/en/ele0009.html), even under crisis circumstances. On the other hand, the GINI indicator exceeds the average of the V3 countries in 2019, but it falls short of the EU average. Similarly, the Palma ratio (the disposable income share of the top 10% to that of the bottom 40%) in Hungary increased by 21 points during the past ten years, reaching 102 in 2019 (Organization for Economic Co-operation and Development (OECD), 2023), as Fig. 1 shows. The human development measure (the top rich 20% to the poorest 20%) of the United Nations Development Programme (UNDP) was 3.6 in 2008 and increased to 4.2 by 2018, being the highest value among the Visegrád countries in 2020 (Eurostat 2022). Thus, we can argue that Hungary still needs to make further efforts to achieve goal No. 10 of the SDGs, even in a regional comparison.

The severe material deprivation rate in 2018 is also among the highest ratios in the EU countries and above the EU average by 3.2 points, as well as the highest among the Visegrád countries (HCSO 2021).

Similarly, the top 1 and the top 10 per cent shares have seen rapid increase patterns at the expense of the other groups, and capital income forms a large percentage of their earnings. In particular, wealth inequality in Hungary is like in other countries, i.e. significantly higher than income inequality. Financial assets appear to be a significant driver of the increase in wealth concentration in the top decile in Hungary, who possessed roughly 70% of the financial assets and more than half of total household wealth in 2017, while the lower 50% of households held only 8.9 per cent (ECB 2016; 2021). Moreover, owing to the effects of the coronavirus pandemic, equity prices and house prices experienced an increase, raising wealth and income inequalities in 2020.

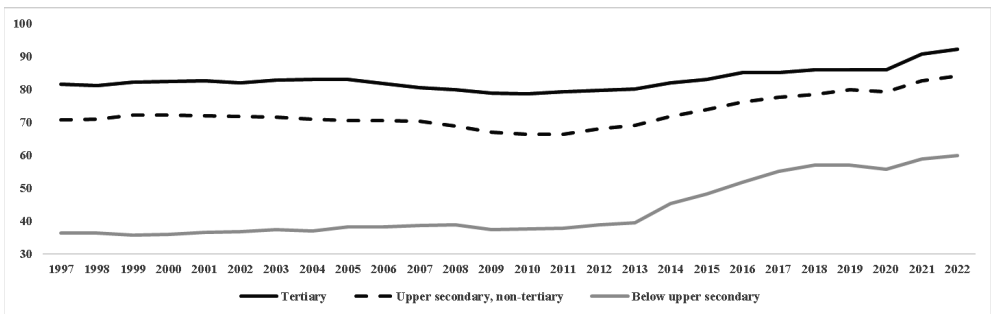
Income disparities in Hungary, like in other countries, are the result of a number of factors. According to the economic theory, finance is one of the factors that may affect inequality directly (funding conditions, returns on financial assets, wealth accumulation, and investment in human capital) or indirectly, through several channels such as economic growth, financial crises, political capture, etc. (Banerjee and Newman, 1993).

Human capital mechanisms are typically highly correlated with economic opportunities and labour earnings, which forms more than two-thirds of income inequality, as suggested by Demirguc-Kunt and Levine (2009). Thus, FD will improve equality by enhancing human capital over generations regardless of the parents' education and wealth (Galor and Zeira, 1993; Demirgüç-Kunt and Levine, 2009).

In Hungary, despite the considerable growth in education that happened since the financial openness in the middle of the 1990s, the importance of parental background still plays an increased role in student trajectories (Eurofund,

2017; Róbert, 2019; Medgyesi, 2019; WEF, 2020; UNDP, 2021; Bukowski et al., 2022), particularly in admissions to universities or obtaining certain university degrees (Hordósy and Szanyi, 2020). On the other hand, FD has not reduced the employment gap between highly educated and medium- and low-educated labourers, as per the financial theory – see *Fig. 2*.

Interestingly, the increasing employment in the past decade was owing to the public works scheme, which has been considerably implemented since 2010, and to job creation in the primary labour markets. In this context, contrary to other CEE countries, self-employment rate (% of employment) gradually declined from 20.5 per cent in 1991 to 10.8 per cent in 2019 (according to data from the World Bank) even though the Hungarian financial system saw a considerable improvement during this period.



Source: author's calculations based on data from OECD database (2022)

Figure 2. *Employment by the education level of 25–64-year-olds (as %)*

Thirdly, it has been revealed that the rate of students' drop-out of school increased in Hungary during the shocks; thus, FD did not reduce this impact (*OECD data on Education*), and the percentage of persons experiencing financial difficulties increased. For example, the lowest-income household quantile suffered the most from the burden of loan repayment obligations because they had to pay a higher share of their income towards their debts (Tóth, 2016). Furthermore, according to the OECD/European Observatory, 12 per cent of families in Hungary experienced catastrophic healthcare costs in 2015 (OECD/European Observatory, 2019).

Besides, easy access to finance and financial services in the pre-crisis years of 2008 was also one channel for increasing inequality since it led to over-indebtedness and instability, which contributed to the crisis (Ranciere and Kumhof, 2010). Because the crisis was followed by an economic downturn and high unemployment, the lower-income deciles suffered the most (Tóth, 2016). Furthermore, as a response to the crisis, social and fiscal policies have been adjusted (Aristei and Perugini, 2014), which is reflected in increasing their financial difficulties to pay obligations.

Deregulation reforms with privatization and financial globalization also amplified inequality in Hungary through an accumulation of wealth and portfolio equity (Mavridis and Mosberger, 2017), which is highly correlated with rent seeking (Demirgüç-Kunt and Levine, 2009; Piketty, 2014). Mavridis and Mosberger suggested that the income share from the capital profits of those at the upper tail of the income distribution rapidly increased in Hungary and reached the level in the USA over the two decades after the transition period, which played a significant role in inequalities. They said that people in the top 1% and the top 0.1% of the income distribution have received above 25% and 50% of their income from capital income respectively. Conversely, those in the lower deciles received smaller shares of their income from capital.

On the other hand, deregulation led to inequality by allowing the wealthy to control financial and economic policies, benefiting themselves and increasing their wealth. For example, this capturing weakened the provision and prudential regulation mechanisms, leading to increasing irresponsible risk-taking and immoral hazards by the financial actors during the pre-crisis years (MNB, 2017). In addition, the wealthy interest groups have also used their financial power to cut public expenditure and keep a downward pressure on top income tax rates, capital gains, and inheritance wealth. Thus, taxation has become less capable of redistributing gains from significant economic growth since 2010, whereby introducing both the flattening of tax and consumption tax played an important role in the income and asset situation. Moreover, work policy capturing was beneficial to the businesses through reducing labour unions' ability to negotiate, and diminishing labour protections adversely affects economic and social equality. All of these factors contributed to shifts in the composition of incomes, wherein the share of equity income raised at the account of the income labour share.

According to financial theory, finance can indirectly affect inequality through economic growth mechanisms (Galor and Zeira, 1993; Kuznets, 1955a–b). However, in Hungary, high economic growth coincides with increased inequality: for example, FDI initially fuelled economic growth in the second half of the 1990s and contributed to a slight increase in employment, but it also had several consequences for income distribution. Thereby, it contributed to raising inequality between those who worked and those who were out of the labour market, even among workers, and increased labour inequality by wage premiums for educated workers and non- or low-educated workers (Kopasz et al., 2013). Similarly, inequalities have increased in recent years in tandem with economic growth.

On the other hand, FDI created a dual labour market, with international companies of higher productivity and higher wages and domestic companies with low productivity and wages, poor working conditions, and less insecure jobs. Moreover, a high degree of dependence on FDI in Hungary played an important role in exacerbating inequality where the FDI was concentrated in the prosperous northern and western parts of

Hungary (e.g. the Budapest, Győr-Moson-Sopron, and Esztergom regions), while the FDI ignored the poor, lesser developed parts in the northeast and southeast of Hungary, which resulted in high regional inequalities, even compared to the Czech Republic (Buti and Székely, 2019; Neszmeélyi et al., 2022).

4. Data and Methodology

4.1. Data and Variables

Based on the literature on the link between FD and inequality, we postulate the following model:

$$GINI_t = \beta_0 + FD_t + CV_t + \mu_t.$$

GINI measures income inequality in society. I use the Market-Gini because it is a good proxy for income inequality before taxes, as has been suggested by de Haan and Sturm (2017). Political money capturing affects government spending and taxes, which has an enormous influence on shaping income distribution, so I use post-tax-Gini (GINID) to check the robustness.

FD is a level of financial development in Hungary. This paper uses the credit ratio to the private non-financial sector from banks to GDP (CB) as a proxy for FD. I use this ratio because, firstly, it might be superior to other alternative measures of FD (such as the money supply (M2) ratio to GDP). Further, it evaluates the fundamental role of financial intermediaries by channelling population savings into private sector actions (Beck et al., 2007). In addition, it excludes credits and claims between banks and also credits to the government. The banking industry influences income inequality more than capital market capitalization, as Naceur and Zhang (2019) have noted.

To look at the connection between FL and inequality, the article employs a de facto index of financial openness (KOFF), which allows for an assessment of both the overall consequences of the openness of finances and the key components (FDI, capital equity, debt to other countries, reserve accumulation, and foreign income payments). In addition, de facto measures have a significant effect on the impact of de jure measures on inequality (Furceri et al., 2019). Despite previous studies showing mixed results regarding the influence of FD and FL on inequality, we expect financial proxies to affect inequality negatively.

In addition, other explanatory variables (CV) were added to the empirical model to control for the omitted variable bias. In particular, some studies reported these variables to influence the relationship between FD and income inequality, including EMP: the number of employees to capture changes in employment. SEC is a proxy

for education (school enrolment, % gross secondary) to capture heterogeneity in human capital. I expect that with increased variables, income inequality will decrease despite this impact also being affected by the quality of education and the supply and demand of the job market. However, higher education and skills lead to higher wages and employment opportunities. Finally, INF stands for Inflation and is a proxy for macroeconomic instability, assuming that a higher inflation rate worsens the income distribution.

For robustness check purposes, this paper replaced:

1. The market income Gini index (GINIM) by the disposable income Gini index (GINID) as a proxy for inequality.
2. The ratio of credit to private non-financial sector from banks to GDP(CB) by the credit ratio to the private non-financial sector from all sectors to GDP (CPNF) as a proxy for FD.
3. The age dependency ratio (ADG), instead of the number of employees, is a control variable.

This research is based on annual time series data from 1970 to 2019. I derived the data from the World Bank's indicators for development, the HCSO, the KOF Globalization Index (<http://globalization.kof.ethz.ch/>), International Financial Statistics (IFS), and Solt's (2022) Standardized World Income Inequality Database (SWIID).

4.2. The ARDL Estimation Technique

In order to examine the results of stationarity and cointegration tests among the models' variables, the empirical literature has used several selections of cointegration approaches. However, this paper used the ARDL bounds testing technique, which was developed by Pesaran et al. (2001), for its advantages over other estimation approaches such as the order of integration I (0) or I (1) should not be taken into account when using this technique and that it is a more reliable technique than the conventional one (Pesaran et al., 2001). Contrary to other techniques, ARDL enables the variables to have varied optimum lags, making it more statistically significant and resilient when we cannot have a large sample size. In addition, we employ the ARDL approach to estimate the link between variables in the long and the short run from the model's equation simultaneously. Finally, using a simple linear transformation (Banerjee et al., 1993), the Error Correction Model (ECM) can be obtained from ARDL. To investigate the relationship between income inequality and FD in Hungary, the following equation will be used:

$$\Delta GINI_t = \alpha_0 + \sum_{i=1}^p \beta_1 \Delta GINI_{t-1} + \sum_{i=1}^{k1} \beta_2 \Delta CB_{t-1} + \sum_{i=1}^{k2} \beta_3 \Delta KOF_{t-1} + \sum_{i=1}^{k3} \beta_4 \Delta EMP_{t-1} + \sum_{i=1}^{k4} \beta_5 \Delta SEC_{t-1} + \sum_{i=1}^{k5} \beta_6 \Delta INF_{t-1} + \delta_1 GINI_{t-1} + \delta_2 CB_{t-1} + \delta_3 KOF_{t-1} + \delta_4 EMP_{t-1} + \delta_5 SECT_{t-1} + \delta_6 INF_{t-1} + ut,$$

where GINI represents income inequality as a dependent variable, while the other variables are independent variables, as identified above: Δ denotes the first difference operator, μ is an error term, β_1 – β_6 represent the short-run coefficients, δ_1 – δ_6 are the long-run coefficients, μ is the white noise errors, and k_1 – k_5 are the optimal lag lengths for each series.

The next step after determining the optimal lag lengths for the ARDL model is Pesaran et al's (2001) bound test. According to this test, when the value of the F-statistic is higher than the upper bound critical value, the null hypothesis of no cointegration ($H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = 0$) will be rejected. Thus, the alternative hypothesis of cointegration is valid ($H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq 0$), a long-run relationship between a dependent variable and independent variables exists, and the conditional autoregressive distributed lag model can estimate the long-run coefficient.

Once the cointegration between the variables is insured, we can estimate an error correction model linked with the long-run estimates to derive the short-run dynamic parameters.

$$\Delta GINI_t = \alpha_0 + \sum_{i=1}^p \alpha_{1i} GINI_{t-1} + \sum_{i=1}^{k_1} \alpha_{2i} \Delta CB_{t-1} + \sum_{i=1}^{k_2} \alpha_{3i} \Delta KOF_{t-1} + \sum_{i=1}^{k_3} \alpha_{4i} \Delta EMP_{t-1} + \sum_{i=1}^{k_4} \alpha_{5i} \Delta SEC_{t-1} + \sum_{i=1}^{k_5} \beta_{6i} \Delta INF_{t-1} + \mu t$$

The results of the error correction model represent the period required to return to long-term equilibrium after a short-term shock.

5. Empirical Results

5.1. Unit Root Test

Before estimating the base model to test the hypotheses, it is critical to determine whether there is a mutual dependence among the variables to identify their integration order and prevent spurious correlation. I used the Augmented Dickey–Fuller (ADF) test, the Philips–Perron (PP-1988) test, and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS-1992) unit root tests to check the stationarity of each variable. In *Table 1*, only the CB variable does not have a unit root in level, according to the ADF unit root test results. Thus, I cannot reject the null hypothesis at the level $I(0)$. While at the first difference, all series are stationary, only the ADG variable is not stationary, as seen in the table.

All series are stationary only at the first difference according to the PP unit root test, and all variables are significant, ranging between 1 and 5 per cent level of significance; therefore, we rejected the null hypothesis. The results of the stationarity KPSS test show that the CB series only contains a unit root at the level $I(0)$, while the CB, CPNF, INF, and SEC variables are not stationary at the first

difference. The results of all three-unit root tests suggest that the variables studied are stable at I (0) or at I (1). Therefore, we recommend adopting the ARDL bounds technique rather than one of the other cointegration tests.

Table 1. Unit root tests for stationarity

Variables	At Levels			At 1 st Difference		
	ADF	PP	KPSS	ADF	PP	KPSS
GINID	-1.08	-0.68	0.77	-3.02	-3.03	0.12
Prob.	[0.72]	[0.84]	[0***]	[0.003***]	[0.003***]	[0.119*]
GINIM	-1.23	-0.64	0.84	-1.99	-2.02	0.13
Prob.	[0.66]	[0.85]	[0***]	[0.045**]	[0.04**]	[0.12*]
CB	-4.63	-1.84	0.08	-2.70	-3.93	0.10
Prob.	[0.00***]	[0.355]	[0.347]	[0.008***]	[0.004***]	[0.35]
CPNF	-2.38	-1.60	0.60	-2.02	-3.67	0.10
Prob.	[0.15]	[0.48]	[0.46**]	[0.043**]	[0.008***]	[0.74]
KOF	-1.05	-1.05	0.84	-7.75	-7.72	0.20
Prob.	[0.73]	[0.73]	[0.739***]	[0***]	[0***]	[0.146**]
EMP	-1.80	-1.01	0.16	-2.81	-5.34	0.18
Prob.	[0.38]	[0.74]	[0.146**]	[0.006***]	[0***]	[0.146**]
AGD	-2.52	-1.43	0.44	-1.08	-2.18	0.16
Prob.	[0.12]	[0.56]	[0.347*]	[0.72]	[0.03**]	[0.146**]
SEC	-1.84	-1.84	0.80	-3.04	-3.04	0.29
Prob.	[0.36]	[0.36]	[0.74***]	[0.003***]	[0.003***]	[0.347]
INF	-2.36	-1.64	0.18	-6.05	-6.12	0.15
Prob.	[0.159]	[0.453]	[0.146**]	[0***]	[0***]	[0.347]

Source: author's calculations

Notes: ** and *** denote statistical significance at 1% and 5% level respectively.

After ensuring that no variables are integrated into order two I (2), we may begin to analyse the long-term link between inequality and FD using the ARDL method.

5.2. Bounds test and the results of the long-run relationship

Besides unit root estimations, the second step in the ARDL approach is determining the optimal lag length based on the Akaike information criteria over other criteria (top 20 models). The optimal ARDL are (1, 1, 4, 3, 2, 0) and (1, 3, 0, 4, 3, 2) for model 1 and model 2 respectively.

Table 2 provides the bound test results when the GINIM (and GINID) as dependent variables are used, showing that the calculated F-statistic for both models is 14.472 and 13.801 respectively. These values are higher than the upper bound 5.598 (and 5.583) critical values reported in Pesaran et al. (2001) at the 99% significance level. Therefore, the null hypotheses of no cointegration for both models were rejected, and we accepted both alternative hypotheses.

Table 2. *The bounds test*

		Model 1				Model 2			
		Dependent Variable = GINIM				Dependent Variable = GINID			
Test Statistic	Value	Signif.	I (0)	I (1)	Test Statistic	Value	Signif.	I (0)	I (1)
F-statistic	14.472	10%	2.435	3.6	F-statistic	13.801	10%	2.44	3.6
k	5	5%	2.9	4.22	k	5	5%	2.9	4.22
		1%	3.96	5.58			1%	3.96	5.58

Source: author's calculations

Consequently, there is a long-run relationship between income inequality and the representative of the FD (CB, CRPB) and the representative of the FL (KOFF) variables and between income inequality and the control variables as well (EMP, AGD, SEC, and INF). This implies that the variables have a long-run equilibrium and thus tend to move together over time.

Table 3 shows that the long-run coefficients of the two models suggest a negative association between income inequality and FD variables, as expected. However, only when FD is measured as a domestic credit by banks as a share of the GDP in the long run does it have a significant effect on inequality, while the impact of credit to the private sector from all the sectors on inequality is insignificant. This means that only the changes in the ratio of credit to the private sector (% of GDP) from banks in Hungary are a matter of inequality in the long run. A one percentage point (hereafter, pp) increase in credit to the private sector by the banks will decrease GINIM by 0.086 pp. These findings are consistent with the findings of Back et al. (2007).

In terms of financial openness, the results confirm an inequality-widening hypothesis, and FL is positively associated with inequality in both models and is significant at a high level (1%). A 1 pp increase in FL will increase GINIM by 0.27 pp and GINID by 0.115 pp, according to the coefficients of the models. This result is in line with the finding of both Heimberger (2020) and Li and Su (2020), who reported that financial globalization and capital account liberalization have a considerable inequality-increasing impact.

Similarly, the control variable of the number of employees is positively associated with the market-based Gini index, but it is statistically insignificant. Contrarily, the

age dependency ratio has negative and significant influences on the disposable-based Gini index. A 1 pp increase in the age dependency ratio will decrease GINID by some 0.30 pp in the long run, which can be explained by family-friendly policies in Hungary. This finding contradicts the theory that predicts that the age dependency ratio increases income inequality, as well as the works of Dolls et al. (2019), Sun (2019), and Chen et al. (2018), who found that the age dependency ratio amplifies inequality.

The coefficient of education variable (school enrolment, secondary (% gross)) harms inequality but is insignificant in the long run in both models. Our result does not correspond with Hoi and Hoi (2013) and Batuo et al. (2010), who found that education enhances equality. Contrarily, the inflation index is associated positively with inequality measures, and a 1 pp increase in the inflation ratio will increase GINIM by 0.49 pp and GINID by 0.23 pp in the long run. Lower real wages and lower employment can explain the effect of inflation on inequality. This result is in line with the a priori expectation and economic theory and confirms the findings of Mookerjee and Kalipioni (2010), Zhang and Naceur (2019), Sehrawat and Giri (2015), and Bolarinwa and Akinlo (2021) but differs from the results of Park and Shin (2017).

Table 3. Long-run estimation (dependent variable = income inequality)

Regressor	Model 1			Model 2		
	Dependent Variable = GINIM			Dependent Variable = GINID		
	Coefficient	T-ratio	Prob.	Coefficient	T-ratio	Prob.
CB	-0.086	-2.403	0.023**			
CPNF				-0.004	-0.36	0.726
KOFF	0.269	3.56	0.001***	0.116	4.854	0***
EMP	0.001	0.53	0.598			
AGD				-0.297	-2.707	0.012**
SEC	-0.019	-0.37	0.718	-0.026	-0.756	0.456
INF	0.491	2.556	0.016**	0.232	4.857	0***

Source: author's calculations

Notes: ** and *** denote statistical significance at 1% and 5% level respectively.

5.3. Error correction model results

The empirical tests of the short-run coefficient estimate in Table 4 indicate that the speed of adjustment to restore equilibrium in the dynamic models is negative and significant at 1% level in both models. This provides further proof of the existence of a long-run relationship between the variables of the model (Narayan and Smyth,

2005). The value of the lagged error correction term in GINIM is -11.73 per cent each year in a long span of time, while it is -25.711 per cent in GIND. Hence, 11.73 percent of the change in GINIM (and 25.711 percent in GIND) is corrected every year towards its long-run equilibrium. The coefficients of (R2) are high in both models, which are 0.8913 and 0.8279 in model 1 and model 2 respectively.

The short-run estimations of the link between FD and inequality also support the initial findings obtained by the long-run regression. When FD is proxied by the ratio of credit to the private sector by banks, it improves income distribution, and an increase in the degree of FD by 1 pp leads to a decrease in the level of income inequality by 0.023 pp in the short run, which is statistically significant at 1%. Contrarily, the ratio of credit to the private sector by all the sectors will increase inequality, but this effect is insignificant. With further orders, however, the effects will be negatively and statistically significant.

Table 4. Short-run and ECM analysis (dependent variable = income inequality)

Model 1				Model 2			
Dependent Variable: D(GINIM)				Dependent Variable: D(GINID)			
Variable	Coefficient	t-Statistic	Prob.	Variable	Coefficient	t-Statistic	Prob.
Δ(CB)	-0.023	-2.878	0.007***	Δ(CPNF)	0.004	0.547	0.589
				Δ (CPNF (-1))	-0.0232	-3.246	0.003***
				Δ (CPNF (-2))	-0.0173	-2.354	0.026**
Δ(KOFF)	-0.035	-4.536	0.0001***	Δ(KOFF)	-0.0196	-2.129	0.04**
Δ (KOFF (-1))	-0.065	-7.195	0***	Δ (KOFF (-1))	-0.0467	-4.552	0.000***
Δ (KOFF (-2))	-0.0336	-3.856	0.0006***	Δ (KOFF (-2))	-0.023	-2.3173	0.028**
Δ(EMP)	-0.0002	-0.738	0.4662	Δ(AGD)	-0.0221	-0.2519	0.803
Δ (EMP (-1))	-0.0007	-2.339	0.0264**	Δ (AGD (-1))	0.0024	0.0188	0.985
Δ (EMP (-2))	-0.0007	-2.253	0.032**	Δ (AGD (-2))	-0.0788	-0.6056	0.55
Δ (EMP (-3))	0.0008	2.912	0.007***	Δ (AGD (-3))	0.2899	3.1006	0.004***
Δ(INF)	0.0146	1.693	0.1012	Δ(INF)	0.0143	1.4173	0.168
Δ (INF (-1))	-0.0198	-2.143	0.041**	Δ (INF (-1))	-0.034	-3.1173	0.004***
CointEq (-1) *	-0.1174	-10.089	0***	CointEq (-1) *	-0.257	-9.9066	0***
R-squared	0.8913	F-statistic	25.350	R-squared	0.828	F-statistic	11.839
Adjusted R-squ	0.856	Prob(F-sta)	0	Adjusted R-squ	0.758	Prob(F-sta)	0
Durbin-Watson	2.061			Durbin-Watson	1.510		

Source: author's calculations

Notes: ** and *** denote statistical significance at 1% and 5% level respectively.

The influence coefficient of KOFF on income inequality in the short run has opposite signs from that in the long-run equilibrium estimations, and their effects are still statistically significant in both models, but at different levels of impact and significance. Both Gini coefficients, GINIM and GINID, will increase by 0.035 pp and 0.020 pp, respectively, when the financial globalization index increases by 1 pp in the short run.

Regarding the control variables, the coefficient of the employment rate and age dependency rate variables are negatively associated with the coefficients of inequity, but results are statistically insignificant for these relationships. Similarly, the impact of inflation on inequality is statistically insignificant, but it has a positive relationship with inequality in both models. It should be noted, however, that the influence of both employment and inflation will be statistically significant with further orders, and raising the inflation or employment level leads to a decrease in inequality.

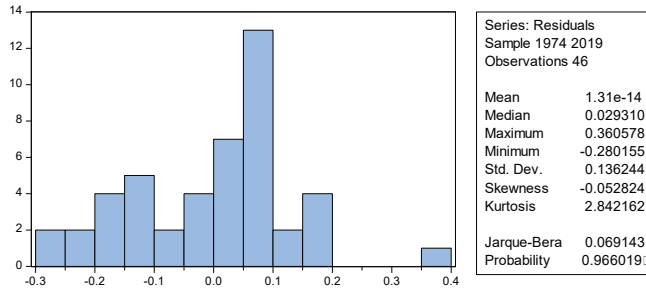
5.4. Results for the stability and diagnostic tests

The results of the various diagnostic tests were performed to check the fitness of the two models. The findings in *Table 5* demonstrate that the residuals of both models are devoid of serial correlation, and heteroscedasticity (all P values are more than the critical value of 0.05). In addition, the models have a normal distribution, as seen in *Fig. 2*.

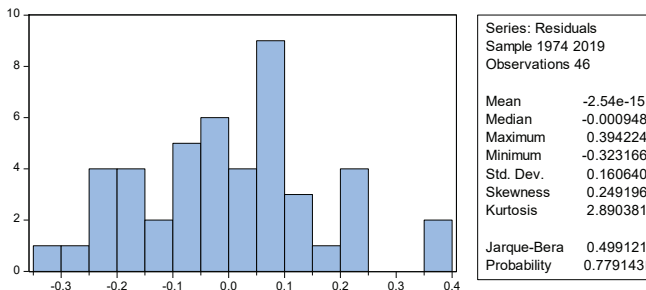
Table 5. Residual tests

	Model 1 – Dependent Variable: D(GINIM), ARDL (1, 1, 4, 3, 2, 0)			Model 2 – Dependent Variable: D(GINID), ARDL (1, 3, 0, 4, 3, 2)				
Breusch–Godfrey Serial Correlation LM Test:	F-statistic	0.017	Prob. F (2,27)	0.983	F-statistic	1.699	Prob. F (1,26)	0.21
	Obs*R-sq	0.06	Prob. Chi- Square (2)	0.971	Obs*R- squared	2.822	Prob. Chi- Square (1)	0.09
Heteroscedasticity Test: Breusch– Pagan–Godfrey	F-statistic	1.201	Prob. F (16,29)	0.324	F-statistic	2.094	Prob. F (18,27)	0.04
	Obs*R- squared	18.34	Prob. Chi- Square (16)	0.305	Obs*R- squared	26.801	Prob. Chi- Square (18)	0.08
Heteroscedasticity Test: ARCH	F-statistic	0.072	Prob. F (1,43)	0.789	F-statistic	0.974	Prob. F (1,43)	0.33
	Obs*R- squared	0.076	Prob. Chi- Square (1)	0.783	Obs*R- squared	0.997	Prob. Chi- Square (1)	0.31

Source: author's calculations



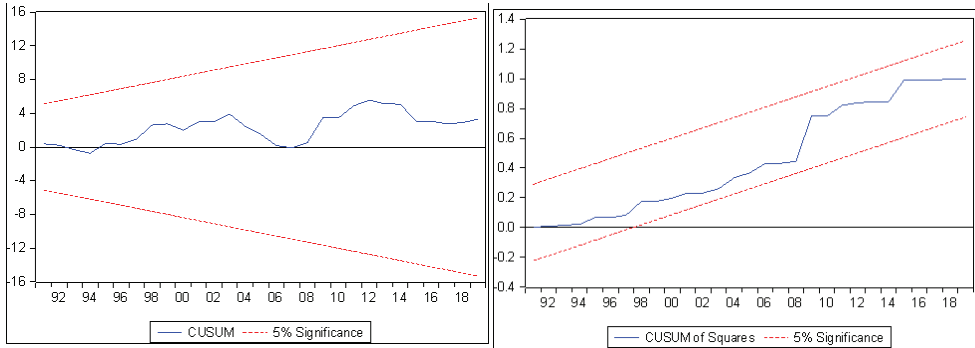
a. Model 1 normality test



b. Model 2 normality test

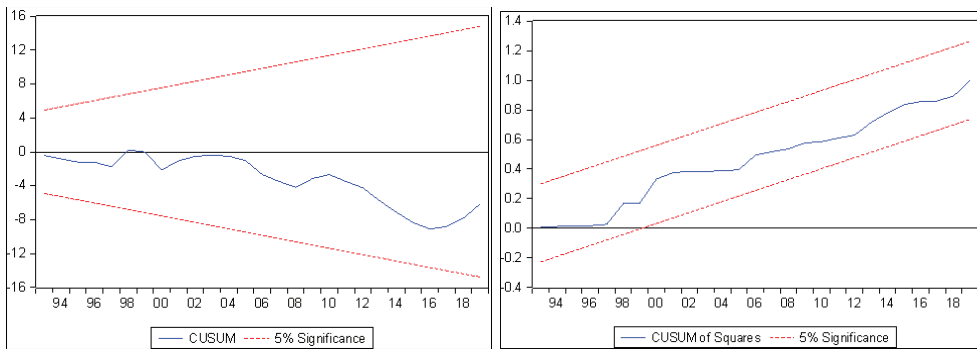
Figure 2. Normality tests

The study applied two tests to examine the stability of the ARDL models: the first one is the cumulative sum of recursive residuals (CUSUM) test, which is used to reveal whether there is a structural break in the series, and the second one is the cumulative sum of the squares of recursive residuals (CUSUMSQ) tests, which is used to reveal the date of a structural break, if there is one. Fig. 3 shows that the two models are stable at 5% degree of liberty, considering that all wavy lines are between the straight lines.



a. Model 1 ARDL (1, 1, 4, 3, 2, 0)

Figure 3a. Plots of the CUSUM and CUSUM sq. tests



Note: The straight lines represent critical bounds at 5% significance level.

b. *Model 2 ARDL (1, 3, 0, 4, 3, 2)*

Figure 3b. *Plots of the CUSUM and CUSUM sq. tests*

6. Discussion and Conclusions

Economic theories provide conflicting predictions about the finance–inequality nexus, and discussing the findings of the empirical literature also yields mixed and inconclusive results. The endogenous growth theory gives weight to the inequality-narrowing hypothesis by finance, while recent research claims that finance could fall disproportionately on the wealthy (Rajan and Zingales, 2003; de Haan and Sturm, 2017). In particular, it improves intensive margins – and not extensive margins – and rent extraction (Stiglitz, 2016; Bolton et al., 2016; Piketty, 2014). Besides, FL and FD are often associated with more financial instability, which has devastating effects on inequality (de Haan and Sturm, 2017). From a Hungarian literature perspective, there is a strong paradox that emerges among empirical findings and is dominated by cross-country analysis. As a result, the current study seeks to provide new evidence on the relationship between FD and FL on income inequality, thus providing an efficient policy reference for the country’s policymaking authorities.

Although Hungary’s national development policies frequently state their intention to combat poverty and inequality, earnings and wealth inequalities seem to be increasing over the last thirty years. And finance is among the factors that contribute to shaping those inequalities directly or indirectly through different channels somehow or other. Those channels might be FDI, over-indebtedness, financial and economic crises, political money capturing, taxation, and redistribution. While the impact of FD and FL and related to FDI was noticeable in the second half of the 1990s, income distribution showed stagnation at first and then increased again. However, FDI inflows contribute to regional inequalities and income inequality because they are concentrated in a few areas and have a bias towards skilled and educated labour.

Results of the empirical test show that there is a relationship between FD and FL, with inequalities observable in the short and long run, and that financial openness leads to a decrease in Hungarian income inequality in the short run but increases it in the long run. Whereas the effects of FD on inequality vary according to financial indicators, credit to the private sector by banks improves income distribution in the short and long run, while credit from all credit sectors is insignificant. And the inflation index is associated positively with inequality measures in the long run. However, the change in the number of employees and education variables is not significant for income inequality.

Based on the discussion above and the empirical test results, the tendency towards FL raises inequality and financial instability. However, reducing the potentially unfavourable volatility distributional effects and ensuring that the advantages of more credit are shared more widely could take place through adopting policies that prevent volatility and the application of sound prudential policies and more stringent capital regulation.

Enhancing social safety nets and redistribution policies can redistribute income to the disadvantaged and reduce the potential passive effects of crises for the poor if they occur. However, high social benefits can negatively affect labour supply by reducing the incentives for work and employment. So, using active labour market policies is needed to limit these adverse effects, avoid skill mismatch, increase the minimum wage, expand the opportunities for young people, and enhance educational attainment and investment in skills such as providing apprenticeships and career training for the low-educated.

Another important conclusion about the finance–inequality nexus in Hungary is the issue of political capture because of a lack of quality at the institutional level. Money capturing is having control over the economic, monetary, and work policies that were financially beneficial to the wealthy, hence reducing economic and social equality and increasing wealth concentration at the top of the distribution ladder.

Accordingly, strengthening the building of oversight institutions will enhance the effective and efficient use of public funds and reduce the political capture of financial and economic policies. Besides, improving labour market institutions might allow employees to unite and bargain collectively for better pay and conditions, eliminating wage disparities between employees, boosting their protection, and putting an end to labour abuses. Finally, governance in progressive taxes aimed to enhance the redistributive potential of fiscal policy can play a pivotal role in addressing inequality, and changes in tax and transfer policies are needed.

References

- Adams, Samuel; Klobodu, Edem Kwame Mensah. (2016). Financial development, control of corruption and income inequality, *International Review of Applied Economics* 30(6): 790–808.
- Ahmed, Azleen Rosemy; Masih, Mansur. (2017). What is the link between financial development and income inequality? Evidence from Malaysia. *MPRA Paper* No. 79416. (May): 1–26. <https://mpra.ub.uni-muenchen.de/79416/>.
- Ang, James B. (2010), Finance and inequality: The case of India. (2010). *Southern Economic Journal* 76(3): 738–761.
- Arstei, David; Perugini, Cristiano. (2014). Speed and sequencing of transition reforms and income inequality: A panel data analysis. *Review of Income and Wealth* 60(3): 542–570.
- Atkinson, Anthony B.; Morelli, Salvatore. (2011). Economic crises and inequality. *UNDP-HDRO Occasional Papers* 2011/6.
- Baiardi, Donatella; Morana, Claudio. (2016). The financial Kuznets Curve: Evidence for the euro area. *Journal of Empirical Finance* 39: 265–269.
- Banerjee, Abhijit V.; Newman, Andrew F. (1993). Occupational choice and the process of development. *Journal of Political Economy* 101(2): 274–298.
- Barro, Robert J. (2000). Inequality and growth in a panel of countries. *Journal of Economic Growth* 5(1): 5–32.
- Batuo, Michael Enowbi; Guidi, Francesco; Mlambo, Kupukile. (2010). Financial development and income inequality: Evidence from African countries. *African Development Bank* 44: 1–27.
- Beck, Thorsten; Demirgüç-Kunt, Asli; Levine, Ross. (2007). Finance, inequality and the poor. *Journal of Economic Growth* 12(1): 27–49.
- Bezemer, Dirk; Samarina, Anna. (2016). *Debt shift, financial development and income inequality in Europe* University of Groningen, Research Institute SOM (Systems, Organisations and Management, Groningen). 1–34.
- Bittencourt, Manoel; Chang, Shinhye; Gupta, Rangan; Miller, Stephen M. (2018). Does financial development affect income inequality in the US States? *A Panel Data Analysis* 201803.
- Bod, Péter Ákos. (2017). *Critical phases in the evolution of the Hungarian banking system and the process of regime change: The relevance of hindsight*. <https://www.bankszovetseg.hu/Public/gep/2017/232-248%20Bod%20Peter%20Akos.pdf>.
- Bolarinwa, Segun Thompson; Akinlo, Anthony Enisan. (2021). Is there a nonlinear relationship between financial development and income inequality in Africa? Evidence from dynamic panel threshold. *The Journal of Economic Asymmetries* 24: e00226.

- Bolton, Patrick; Santos, Tano; Scheinkman, Jose A. (2016). Cream-skimming in financial markets. *The Journal of Finance*. 71(2): 709–736.
- Botos, Katalin. (2019). More than 30 years of the Hungarian banking system. *Polgári Szemle: Gazdasági és Társadalmi Folyóirat* 15(Spec.): 116–129.
- Bukowski, P.; Clark, G.; Gáspár, A.; Pető, R. (2021). Social mobility and political regimes: Intergenerational mobility in Hungary, 1949–2017. *Journal of Population Economics* 35: 1551–1588.
- Buti, Marco; Székely, István P. (2019). Trade shocks, growth and resilience: Eastern Europe's adjustment tale. *Working Paper, Social Science Research Network* June: 1–13.
- Cevik, Serhan; Correa-Caro, Carolina. (2020). Growing (un)equal: Fiscal policy and income inequality in China and BRIC+. *Journal of the Asia Pacific Economy* 25(4): 634–653.
- Chen, Xudong; Huang, Bihong; Li, Shaoshuai. (2018). Population ageing and inequality: Evidence from China. *The World Economy* 41(8): 1976–2000.
- Chong, Alberto; Gradstein, Mark. (2007). Inequality and institutions. *The Review of Economics and Statistics* 89(3): 454–465.
- Cihak, Martin; Sahay, Ratna. (2020). *Finance and inequality*. International Monetary Fund.
- Dabla-Norris, M. E.; Kochhar, M. K.; Suphaphiphat, M. N.; Ricka, M. F.; Tsounta, M. E. (2015). *Causes and consequences of income inequality: A global perspective*. International Monetary Fund.
- De Haan, Jakob; Pleninger, Regina; Sturm, Jan-Egbert. (2022). Does financial development reduce the poverty gap? *Social Indicators Research* 161(1): 1–27.
- De Haan, Jakob; Sturm, Jan-Egbert. (2017). Finance and income inequality: A review and new evidence. *European Journal of Political Economy* 50: 171–195.
- De la Cuesta-González, Marta; Ruza, Cristina; Rodríguez-Fernández, José M. (2020). Rethinking the income inequality and financial development nexus. A study of nine OECD countries. *Sustainability, MDPI* 12(13): 1–18.
- Demirgüç-Kunt, Asli; Levine, Ross. (2009). Finance and inequality: Theory and evidence. *Annu. Rev. Financ. Econ.* 1(1): 287–318.
- Dolls, M.; Doorley, K.; Paulus, A.; Schneider, H.; Sommer, E. (2019). Demographic change and the European income distribution. *The Journal of Economic Inequality* 17: 337–357.
- Domanski, Dietrich; Scatigna, Michela; Zabai, Anna. (2016). Wealth inequality and monetary policy. *BIS Quarterly Review* March.
- European Central Bank. (2016). The Household Finance and Consumption Survey: Results from the second wave. *Statistics Paper Series* 17(December 2016).
- (2021). The Eurosystem Household Finance and Consumption Survey – Results from the third wave. *Statistics Paper Series* 36(March 2020).

- Elmi, Zahra Mila; Ariani, Faezeh. (2011). Financial development and the distribution of income in MENA. *Iranian Economic Review* 15(28): 1–11.
- Eurofund. (2017). *Social mobility in the EU*. Publications Office of the European Union, Luxembourg. Available at: https://www.eurofound.europa.eu/sites/default/files/ef_publication/fielddefdocument/ef1664en.pdf.
- Eurostat. (2022). https://ec.europa.eu/eurostat/data/database?node_code=tessi190.
- Furceri, Davide; Loungani, Prakash; Ostry, Jonathan D. (2019). The aggregate and distributional effects of financial globalization: Evidence from macro and sectoral data. *Journal of Money, Credit and Banking* 51: 163–198.
- Galor, Oded; Zeira, Joseph. (1993). Income distribution and macroeconomics. *The Review of Economic Studies* 60(1): 35–52.
- Greenwood, Jeremy; Jovanovic, Boyan. (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy* 98(5[Part 1]: 1076–1107.
- Hasan, Iftekhar; Marton, Katherin. (2003). Development and efficiency of the banking sector in a transitional economy: Hungarian Experience. *Journal of Banking and Finance* 27(12): 2249–2271.
- Hassan, A.; Meyer, D. (2021). Financial development–income inequality nexus in South Africa: A nonlinear analysis. *International Journal of Economics and Finance Studies* 12(2): 15–25.
- Heimberger, Philipp. (2020). Does economic globalisation affect income inequality? A meta-analysis. *The World Economy* 43(11): 2960–2982.
- Hoi, Le Quoc; Hoi, Chu Minh. (2013). Financial sector development and income inequality in Vietnam: Evidence at the provincial level. *Journal of Southeast Asian Economies* 30(3): 263–277.
- Hordosy, R.; Szanyi, E. F. (2020). Moving through and moving away: (Higher) education strategies of Hungarian students. Intersections. *East European Journal of Society and Politics* 6(4): 34–62.
- Hungarian Central Statistical Office. (2022). *Income inequality*. <https://www.ksh.hu/stadatfiles/ele/en/ele0009.html>.
- Jauch, Sebastian; Watzka, Sebastian. (2011). Financial development and income inequality. *Working Paper, Center for Economic Studies and ifo Institute (CESifo), Munich* 3687: 1–33.
- Jaumotte, Florence; Lall, Subir; Papageorgiou, Chris. (2013). Rising income inequality: Technology, or trade and financial globalization? *IMF Economic Review* 61(2): 271–309.
- Kim, Dong-Hyeon; Lin, Shu-Chin. (2011). Nonlinearity in the financial development–income inequality nexus. *Journal of Comparative Economics* 39(3): 310–325.
- Kopasz, M.; Fábíán, Z.; Gábos, A.; Medgyesi, M.; Szivós, P.; Tóth, I. G. (2013). *GINI country report: Growing inequalities and their impacts in Hungary*. AIAS, Amsterdam Institute for Advanced Labour Studies.

- Kovács, Levente. (2019). The first three decades of the Hungarian Banking Association. *Economy and Finance [English Language Edition of Gazdaság és Pénzügy]* 6(1): 2–16.
- Kuznets, S. (1955a). International differences in capital formation and financing. In: *Capital formation and economic growth*. Princeton University Press. 19–111.
- (1955b). Economic Growth and Income Inequality. *American Economic Review* 45(1): 1–28.
- Kwiatkowski, D.; Phillips, P. C.; Schmidt, P; Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root? *Journal of Econometrics* 54(1–3): 159–178.
- Law, Siong Hook; Azman-Saini, W. N. W.; Tan, Hui Boon. (2014). Economic globalization and financial development in East Asia: A panel cointegration and causality analysis. *Emerging Markets Finance and Trade* 50(1): 210–225.
- Law, Siong Hook; Tan, Hui Boon. (2009). The role of financial development on income inequality in Malaysia. *Journal of Economic Development* 34(2): 153–168.
- Levine, Ross. (2021). Finance, growth, and inequality. *International Monetary Fund. Working Paper* 2021/164.
- Li, Xiang; Su, Dan. (2020). Capital account liberalisation does worsen income inequality. *IWH Discussion Papers* 7/2020.
- Magyar Nemzeti Bank. (2002). *Annual report: Business report and financial statements of the National Bank of Hungary for 2001*. National Bank of Hungary, Budapest.
- (2014). *Growth report*. <https://www.mnb.hu/letoltes/novekedesi-jelentes-en-1.pdf>.
- (2021). *Competitiveness report*. <https://www.mnb.hu/letoltes/mnb-competitiveness-report-2021.pdf>.
- Maldonado, Joana Elisa. (2017). Financial systems and income inequality. *Bruges European Economic Research Papers* 36/2017.
- Mavridis, Dimitris; Palma, Mosberger. (2017). Income inequality and incentives. The quasi-natural experiment of Hungary, 1914–2008. *WID.world Working Paper Series* 17: 1–113.
- Mbona, Nokulunga. (2022). Impacts of overall financial development, access and depth on income inequality. *Economies* 10(5): 118.
- Medgyesi, M. (2019). The situation of young people in Europe during and after the economic crisis. In: Tóth, I. Gy. (ed.), *Hungarian social report 2019*. Budapest: TÁRKI Social Research Institute. 163–176.
- Mookerjee, Rajen; Kalipioni, Paul. (2010). Availability of financial services and income inequality: The evidence from many countries. *Emerging Markets Review* 11(4): 404–408.

- Morelli, Salvatore; Atkinson, Anthony B. (2015). Inequality and crises revisited. *Economia Politica* 32(1): 31–51.
- Narayan, Paresh; Smyth, Russell. (2005). *Trade liberalization and economic growth in Fiji. An empirical assessment using the ARDL approach*. 96–115. <https://doi.org/10.1080/1354786042000309099>.
- Neszmélyi, György Iván; Vinogradov, Sergey; Nagy, Henrietta. (2022). Regional inequalities within the Visegrád group over the years 2000–2018. *European Spatial Research and Policy* 29(1): 5–24.
- Nguyen, Thang Cong; Vu, Tan Ngoc; Vo, Duc Hong; Ha, Dao Thi-Thieu. (2019). Financial development and income inequality in emerging markets: A new approach. *Journal of Risk and Financial Management* 12(4): 173.
- Nikoloski, Zlatko. (2013). Financial sector development and inequality: Is there a Financial Kuznets Curve? *Journal of International Development* 25(7): 897–911.
- OECD. (2023). *Income inequality*. <https://data.oecd.org/inequality/income-inequality.htm>.
- OECD and European Observatory. (2019). *Hungary: Country health profile 2019, state of health in the EU*. OECD Publishing, Paris/European Observatory on Health Systems and Policies, Brussels.
- Park, Donghyun; Shin, Kwanho. (2017). Economic growth, financial development, and income inequality. *Emerging Markets Finance and Trade* 53(12): 2794–2825.
- Philippon, Thomas; Reshef, Ariell. (2012). Wages and human capital in the US finance industry: 1909–2006. *The Quarterly Journal of Economics* 127(4): 1551–1609.
- Piketty, Thomas. (2014). Capital in the twenty-first century: A multidimensional approach to the history of capital and social classes. *The British Journal of Sociology* 65(4): 736–747.
- Rajan, Raghuram G. (2011). *Fault lines*. Princeton University Press.
- Rajan, Raghuram G.; Zingales, Luigi. (2003). The great reversals: The politics of financial development in the twentieth century. *Journal of Financial Economics* 69(1): 5–50.
- Rehman, Hafeez Ur; Khan, Sajawal; Ahmed, Imtiaz. (2008). Income distribution, growth and financial development: A cross-countries analysis. *Pakistan Economic and Social Review* 46: 1–16.
- Róbert, P. (2019). Intergenerational educational mobility in European societies before and after the crisis. In: Tóth, I. Gy. (ed.), *Hungarian social report 2019*. 120–136. TÁRKI. https://tarki.hu/sites/default/files/2019-02/120_136_Robert.pdf.
- Schularick, Moritz; Taylor, Alan M. (2012). Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870–2008. *American Economic Review* 102(2): 1029–1061.

- Sehrawat, Madhu; Giri, A. K. (2015). Financial development and income inequality in India: An application of ARDL approach. *International Journal of Social Economics* 42(1): 64–81.
- Seven, Unal; Coskun, Yener. (2016). Does financial development reduce income inequality and poverty? Evidence from emerging countries. *Emerging Markets Review* 26(March): 34–63.
- Shahbaz, Muhammad; Islam, Faridul. (2011). Financial development and income inequality in Pakistan: An application of ARDL approach. *MPRA Paper* 28222(January): 1–21.
- Solt, Frederick. (2020). Measuring income inequality across countries and over time: The Standardized World Income Inequality Database. *Social Science Quarterly* 101(3): 1183–1199.
- Stiglitz, Joseph E. (2012). The price of inequality. *New Perspectives Quarterly* 1(30): 52–53.
- (2015a). *The great divide*. Penguin UK, 1-302. DOI: 10.1016/j.sosci.2017.07.004
- (2015b). New theoretical perspectives on the distribution of income and wealth among individuals: Part IV: Land and credit. *National Bureau of Economic Research (NBER). Working Paper* 21192(May): 1–37.
- Sun, Ye. (2019). Aging and income inequality: An empirical analysis of the Chinese context, 1995–2016. In: *2019 3rd International Seminar on Education, Management and Social Sciences (ISEMSS 2019)*. Atlantis Press. 283–287.
- Tiwari, Aviral Kumar; Shahbaz, Muhammad; Islam, Faridul. (2013). Does financial development increase rural–urban income inequality? Cointegration analysis in the case of Indian economy. *International Journal of Social Economics* 40(2): 151–168.
- Tóth, István György. (2016). *Is Hungary still in search of its middle class? Europe's disappearing middle class?* Edward Elgar Publishing. 279–322.
- UNDP. (2021). *United Nations Development Programme, Inequality-Adjusted Education Index*. <https://hdr.undp.org/data-center/documentation-and-downloads>.
- (2023). *The Sustainable Development Goals report 2023: Special edition*. United Nations Statistics Division. <https://unstats.un.org/sdgs/report/2023>.
- Wajid, Nagina; Awan, Abdul Ghafoor. (2021). Financial development and income inequality: A case of Pakistan. *Global Journal of Management, Social Sciences and Humanities* 7(1): 137–162.
- World Bank. (2023, June). *Global economic prospects*. Washington, DC: World Bank.
- World Bank Indicators. (2023). <https://datatopics.worldbank.org/world-development-indicators/>.
- World Economic Forum. (2020). The Global Social Mobility report 2020. Equality, opportunity and a new economic imperative. *Cologny: World Economic Forum*.

- Younsi, Moheddine; Bechtini, Marwa. (2020). Economic growth, financial development, and income inequality in BRICS countries: Does Kuznets' inverted U-shaped curve exist? *Journal of the Knowledge Economy* 11: 721–742.
- Yu, Jung-Suk; Hassan, M. Kabir; Sanchez, Benito. (2012). A re-examination of financial development, stock markets development and economic growth. *Applied Economics* 44(27): 3479–3489.
- Zhang, Ruixin; Naceur, Sami Ben. (2019). Financial development, inequality, and poverty: Some international evidence. *International Review of Economics and Finance* 61(C): 1–16.



Intergovernmental Fiscal Transfers and Tax Collection of Indian States: Estimation from Panel Data Models

Sumit KUMAR,¹ Baljit KAUR²

¹Punjab School of Economics, Faculty of Economics and Business, Guru Nanak Dev University, Amritsar, India

e-mail: sumitbhardwaj024@gmail.com

²Punjab School of Economics, Faculty of Economics and Business, Guru Nanak Dev University, Amritsar, India

e-mail: Baljit.economics@gndu.ac.in

Abstract. This study tries to empirically estimate the effects of the composition of intergovernmental transfers on tax collection across the Indian states by using panel regression model. As intergovernmental transfers constitute almost 47 per cent in total revenue of the states, it could play a vital role in states' own tax collection. The impact of different channels of federal transfers on tax capacities is examined among 25 Indian states over the period from 1991-92 to 2017-18. The study also attempted to capture the asymmetric effect of various forms of transfers, but findings reveal that only state plan grant has a significant effect on its own tax collection. The empirical evidence suggests that the composition of intergovernmental transfers has a dampening effect on states' own tax revenue. Apart from transfers' variables, the study incorporates socio-economic and certain political variables to estimate states' own tax collections.

Keywords: intergovernmental transfers, political factors, state tax collection, Indian states

JEL Classification: H77, P35, P16, H71

1. Introduction

Intergovernmental transfers are considered a key fiscal tool used by the national government to provide more fiscal autonomy across state governments. The fundamental objective of any fiscal transfers is to curb fiscal imbalances by generating equitable transfers that would supplement the slackening of resources at the sub-national governments due to state-specific variations in socio-economic

and political conditions. To address these fiscal gaps among different layers of governments, the constitution has provisioned the institutional transfer mechanism to make decisions about the devolution of revenue resources from the Centre to the states. Therefore, the constitution of India recommends the appointment of finance commission every fifth year to give recommendations on such non-plan transfers. The Finance Commission's transfers have two main components, namely tax-sharing transfers and statutory grants. The former has contributed around 90 per cent to the aggregate transfers made by the agency. The latter part contributed the remaining share, which acts as specific grants to determine whether the states have revenue account imbalance after the devolution of tax revenues (Isaac et al., 2019).

In India, the aggregate federal transfers can be demarcated into two parts: statutory, or general-purpose transfers and discretionary, or specific-purpose transfers. Statutory transfers include two sub-components, that is, central tax devolution and statutory or non-plan grants. On the other hand, the discretionary component of transfers consists of state plan grants, central plan grants, and centrally sponsored schemes (CSS). Alternatively, the total central transfers can also be distinguished as formula-based and discretionary form.

The main economic justifications of such a sizeable devolution of resources are: first, the fiscal gaps existing between the levels of jurisdictions, such as vertical and horizontal fiscal gaps, and second, correcting the regional development gaps across sub-national jurisdictions (Rao, 2005). Intergovernmental transfers may also neutralize the effect of inter-jurisdictional fiscal externalities that occur when fiscal adjustments of one state will affect the fiscal behaviour of others (Dahlby, 1996). However, such a policy of redistributive mechanism would generate a perverse motivation that would lead to a fiscal profligacy problem at the lower level of governments (McCarten, 2001; Rao, 1998, 2005).

Until recently, the main emphasis of empirical studies has been on measuring the impact of intergovernmental transfers on the fiscal outcomes of state governments. In the traditional approach, it was believed that the lump-sum, or general-purpose transfers would lower tax revenue (Bradford and Oates, 1971b). However, empirical evidence suggests that lump-sum transfers from the centre lead to a greater stimulus for public expenditure relative to equivalent cut in taxes. This empirical phenomenon is known as the "flypaper effect" in public finance literature (Gramlich, 1998; Gramlich et al., 1973). However, the central transfers do not always follow the increasing path over time. In this context, state governments could respond differently with the fiscal measures while dealing with a decline in transfers compared to an increase in the same. This concept is known as the "asymmetric hypothesis" in the literature, and it has been empirically examined in many countries (Gramlich, 1987). In analysing the literature on the linkage between central transfers and fiscal outcomes, some of the most relevant studies have conveyed the idea that intergovernmental transfers ease the budgetary constraints

of the states and allow them to create the fungibility of their own resources (Borcherding et al., 1972; McGuire, 1978). Bradford and Oates (1971a–b) argued that due to the fungibility of public incomes, the unconditional fiscal transfers would release additional resources for local authorities to facilitate citizens in the form of tax reduction and therefore crowd-out local revenue efforts. In the same context, in a sample of municipalities in the USA, the study by Buettner and Wildasin (2006) found that intergovernmental transfers provide incentives to tax deductions at the local level.

However, some studies argued that subnational governments may use central resources in order to achieve desired fiscal outcomes (Prud'homme, 1995; Tanzi, 1995). Miyazaki (2016) analysed the impact of fiscal transfers on the fiscal behaviour of Japanese municipalities over the period from 1993 to 2008. By using a panel data model, the study indicates that an increasing proportion of aggregate equalization transfers lead to encouraging local authorities to generate higher revenue collection. Thus, central transfers indeed tended to increase the revenue efforts of local governments in Japan. Furthermore, recent studies by Caldeira and Rota-Graziosi (2014) also examined the “crowd-in” effect of central transfers which induce local tax collection. But the empirical investigations do not validate either argument properly.

In the context of India, the study by Jha et al. (1999) analysed tax efficiency across 15 Indian states from 1980-81 to 1992-93. The authors observed that the problem of moral hazard persists in the design of central transfers, implying that increasing intergovernmental transfers lead to lower tax efforts of state governments. Naganathan and Sivagnanam (2000) also assessed the effect of union fiscal transfers on the tax effort of 14 Indian states from 1970-71 to 1984-85. They found that central resource transfers have a negative and significant effect on the state's tax mobilization. By analysing the impact of sub-central jurisdictions on the tax effort of local jurisdictions, Rajaraman and Vasishtha (2000) examined such relationship in the case of Kerala for the period of 1993–94. They studied that aggregate and untied transfers have a significantly negative effect on the tax effort of local governments. Apart from this, non-plan grant has also adversely affected local tax collection. Further, Panda (2009) investigated the impact of transfers on the state's own revenue collection across 22 Indian states from 1980-81 to 2004-05. By using the fixed-effects regression model, the author found that federal transfers have a negative effect on own tax revenue, own non-tax revenue, and total own revenue of the states. Dash and Raja (2013) empirically examined the impact of conditional and unconditional transfers on the components of tax collection of 14 major Indian states over the period from 1981-82 to 2008-09. They suggested that conditional transfers have a negative effect on direct tax, while unconditional transfers have a negative effect on both tax categories (i.e. direct and indirect tax). Furthermore, the asymmetric variable has been found to be significant in each case,

which implies that the state reacts differently to increase in transfers compared to a loss in transfers. A more recent study by Mohanty et al. (2020) empirically investigated own revenue efforts and the relationship between central transfers and own revenue efforts, using panel regression approaches among 18 Indian states during the period from 2000-01 to 2016-17. Results indicate that among a sample of Indian states, Bihar, Uttar Pradesh, and Madhya Pradesh have emerged on the top. In addition, the study revealed that central tax devolution has a negative effect on own revenue efforts, suggesting that central tax devolution could not provide incentives to the states to raise their own revenue efforts.

Another line of research also deals with political factors along with other key economic and demographic variables affecting the revenue collection of the states. In this context, Arulampalam et al. (2009) used a panel dataset comprising 14 Indian states during the period from 1974-75 to 1996-97. They observed that those states which are both swing and aligned with the ruling party in the central government as per the last state election had managed to receive 16 per cent more federal transfers than those states that are non-aligned and non-swing. A further important study by Dash and Raja (2014) used many political factors such as government fragmentation, the strength of the opposition, ruling government, ideology of government, and the electoral cycle. They confirmed that each state's specific political determinant negatively affected each form of own revenue collection. Debnath and Battacharjee (2019) examined the impact of different channels of intergovernmental transfers on own tax efforts of Indian states over the period from 1990-91 to 2013-14. The empirical findings suggested that total transfers were found to exert a negative pressure on the states' own tax efforts. This might be due to the fact that states were likely to consider central transfers as dependence and are not utilizing these additional funds to finance their developmental activities. At the disaggregated level, conditional transfers were found to be positively associated with own tax effort, whereas unconditional transfers appeared to lower states' tax effort. Apart from this, the study also tested the asymmetric forms of transfers, which were found to alter own revenue efforts among the states. Overall, the study draws some conclusions that the share of conditional transfers could enhance own revenue efforts of state governments by considering some policy measures to make a sophisticated transfer system in the country. Recently, Taiwo (2022) empirically tested the relationship between own revenues and intergovernmental transfers at the sub-national level in Nigeria during the period of 2007–13. The findings reveal the negative relationship between transfers and own revenues of the states due to their dependence on central transfers. Furthermore, election year has been negatively associated with own revenues, whereas education level has influenced positively the own revenues of the states. Also, the study found that states were lagging in generating their revenues due to inefficiencies in their tax administration.

3. Data and Methodology

3.1. Data

This study is based on the balanced panel dataset, which consists of states' own tax revenues, the central transfers, and other key economic, demographic, and political variables for 25 Indian states during the period from 1991-92 to 2017-18. In this exercise, we seek to explore whether central funding has supplemented the tax revenue of Indian states. To do this, we have classified the central fiscal transfers into several parts: the share of central taxes, plan grants from the centre (i.e. state plan scheme, central plan scheme, centrally sponsored scheme and the northeast special plan schemes), non-plan grants from the centre, which consists of statutory grants, relief on account of natural calamities, and others (De, 2013; Rao and Srivastava, 2014). Since the study investigated the relationship between intergovernmental transfers and own tax collection, transfer-related variables are of interest. Asymmetric forms of transfer variables is also another set of variables to be dealt with. Apart from this, other control variables that cover socio-economic, demographic, fiscal, and political characteristics, i.e. fiscal space, tax complexity, development expenditure, internal debt, per capita income, the share of agriculture to total state domestic product (GSDP), political alignment, state election dummy, and Fiscal Responsibility and Budget Management (FRBM) dummy (this variable is taken to capture the implementation of FRBM legislation at the state level), are also considered. The selection of these variables is based on their usage in the literature (Dash and Raja, 2013; Panda, 2009). To adjust the inflation factor in each dataset, we have deflated all nominal data using state domestic product (SDP) deflator to get constant values.

Definition/Construction of Variables

The study is based on many significant variables such as socio-economic, demographic, fiscal, and political variables to determine the revenue-based fiscal outcome of the states. The detailed measurement of the variables and their respective sources are presented in *Table 1*.

Table 1. *Definition/measurement of variables*

Variables	Data Description	Source
Net State Domestic Product (NSDP)	Per capita income at constant price	<i>Handbook of statistics on Indian states</i> , RBI
Own Tax Revenue (SOTR)	States own tax revenue per capita	<i>State finances: A Study of Budgets</i> , RBI
Total Transfers (TT)	Total central transfers per capita	<i>State finances: A Study of Budgets</i> , RBI
Centre-tax Transfers (CT)	Central tax transfers per capita	<i>State finances: A Study of Budgets</i> , RBI

Variables	Data Description	Source
Statutory Grants (SG)	Statutory grants per capita	<i>State finances: A Study of Budgets</i> , RBI
Plan Grants (PG)	State plan grants per capita	<i>State finances: A Study of Budgets</i> , RBI
Discretionary Grants (DG)	Discretionary grants per capita	<i>State finances: A Study of Budgets</i> , RBI
Asymmetric variable (AV)	The asymmetric variables are expressed as $A_{it} = [T_{it} - T_{it-1}]$ if $T_{it} < T_{it-1} = 0$ otherwise. T_{it} stands for different types of transfers for state i in period t . The negative sign of A_{it} represents a decline in transfers in years and 0 otherwise.	<i>State finances: A Study of Budgets</i> , RBI
Fiscal Space (FS)	Ratio of total revenue receipts and the committed primary expenditure on revenue account	<i>Handbook of statistics on Indian states</i> , RBI
Own Tax Structure (HHI)	The Herfindahl–Hirschman Index calculates the complexity of the revenue structure.	<i>Handbook of statistics on Indian states</i> , RBI
Internal debt (ID)	Internal debt per capita	<i>Handbook of statistics on Indian states</i> , RBI
Development Expenditure (DE)	Development expenditure per capita	<i>Handbook of statistics on Indian states</i> , RBI
Share of the Agricultural Sector (SAS)	The Proportion of agriculture in SDP	<i>Handbook of statistics on Indian states</i> , RBI
Dependency Ratio (DR)	The ratio of people less than 15 years old or over 64 years of age to the working population aged between 15 and 64	<i>Handbook of statistics on Indian states</i> , RBI
Political Affiliation (PA)	Political affiliation measured by the number of days in a financial year, which centre and state belongs to one political party or one coalition and divided by 365 as expressed in percentage	<i>Statistical Reports</i> , ECI
Election Dummy (ED)	A binary variable that assumes 1 if the i^{th} year is election year	<i>Statistical Reports</i> , ECI
(FRBM) Dummy (FD)	A binary variable which equals 1 if the i^{th} year is from 2004 and 0 till 2003	<i>State finances: A Study of Budgets</i> , RBI

Source: authors' research

3.2. Methodology

The study has employed linear panel regressions to estimate the behaviour of revenue collection regarding the composition of federal transfers in 25 Indian states over the period from 1991-92 to 2017-18. One of the major advantages of the panel data technique is to capture unobserved heterogeneity existing across

the individual or cross-sectional units and provide an unbiased result with more degrees of freedom. In conducting empirical analysis, we have performed two linear panel regression models (i.e. fixed-effects and random-effects) to estimate the coefficients of variables in the equations. Finally, we have used two-way fixed-effects model, which is the most appropriate technique in the given dataset.

The following basic specification is used to measure the robust coefficients of variables, which have corrected the problem of autocorrelation and heterogeneity in the error term in equations, and the relationship among these variables has also been examined.

$$Y_{it} = \mu + \alpha_i + \beta X_{it} + \lambda_t + v_{it}; \quad i = 1, \dots, N, \text{ and } t = 1, \dots, T,$$

where subscript i refers to the states and t denotes the years. Here, μ is a constant term, and α_i captures an individual-specific heterogeneous effect. Y_{it} is the vector of a dependent variable, i.e. states' own tax collection. X is a vector of selected explanatory variables, λ_t is included to capture unobserved time series effects, and v_{it} is the error term in these models. The above equation deals with two-way fixed effects models that allow individual-specific unobserved heterogeneity (α_i) and unobserved time series effects, which are common to all Indian states. Therefore, the main advantage of this technique is permitting a limited form of endogeneity.

4. Empirical Results and Discussion

We have conducted an empirical exercise to see the influence of different forms of transfers on state governments' own tax capacities. At the outset, we performed the endogeneity test among the explanatory variables by estimating the correlation between the explanatory variables and the error term. Due to the absence of the endogeneity problem, we applied static panel regression models to obtain the coefficient values. Before selecting linear panel models, we found that the diagnostic condition of poolability is not present within the dataset. This means that not all states are homogeneous, and unobserved heterogeneity exists in cross-sectional or individual-specific units. Then we have executed two static linear panel regressions, that is, fixed-effects and random-effects. To check which model is most appropriate, we performed the Hausman test in this case. The statistical significance of the statistics of this test assumes that a fixed-effects model is the most suitable technique in each dataset. Finally, we have estimated the most appropriate fixed-effects model to analyse the result of the equation. Further, to tackle the multicollinearity problem among selected explanatory variables, we have performed a correlation analysis. Results show that there is no strong correlation among the variables (see: *Appendix*). Furthermore, we have also corrected the problems of autocorrelation and heteroscedasticity in the residual term and provided robust results in the analysis (*Table 2*).

Table 2 provides the estimates of the coefficients of intergovernmental transfers and their asymmetric effects along with economic and political factors to estimate the tax collection of the states. To do this, we have regressed the own tax revenue per capita with different components of transfers, asymmetric variables, and other key economic, demographic, and political variables (models 1 and 2). The coefficients of all different central transfer variables yielded a negative sign and statistical significance at 1 per cent level. This implies that all components of transfers influenced states' own tax collection negatively. Then we found another set of variables of interest, that is, one asymmetry variable that was statistically significant, which suggests that asymmetric behaviour exists in that component of transfers. The coefficient of asymmetric state plan grant shows a positive sign and is statistically significant at 1 per cent level, which indicates that the decrease in such transfers leads to an increase in own tax collection across the states. Hence, a "fiscal replacement" effect exists in this case. Another significant asymmetric variable, that is, discretionary grant has been found to be positive, but it has been observed to be insignificant, implying that decline in discretionary grant has not exerted any influence on states' own tax collection. Other non-discretionary forms of transfers, such as central tax devolution and statutory grants, are also reported to have negative signs, but they are not statistically significant. Hence, we can observe that decline in the conditional, or specific-purpose grants acts as an incentive for states to increase their own tax efforts to some extent, whereas the decrease in statutory or non-discretionary transfers has no significant effect on states' tax capacities.

Apart from this, we have also found the influence of key fiscal variables on states' own tax effort to be in accordance with their theoretical expectations. The coefficient of fiscal space is negative and statistically significant at the 1 per cent level, implying that it is negatively associated with tax collection. The coefficient of tax complexity measured by the Herfindahl–Hirschman Index (HHI) is also found to be negative and statistically significant at the 1 per cent level, which explains that increase in the complexity of tax structure would lead to decline in own tax collection. Furthermore, the coefficient of internal debt is positive at the 1 per cent significance level, implying that increase in internal debt would lead to an improved tax collection of the states, while the coefficient of development expenditure is also positive and significant at the 1 per cent, implying that it has contributed favourably to the same. Proxies related to tax bases, such as per capita income or the share of the agricultural sector, are found to have a similar sign to what has been expected. Per capita income is positive and statistically significant at the 1 per cent level, whereas the share of the agriculture reported a negative but statistically insignificant effect on states' own tax efforts. Dependency ratio is found to be positive and significant, indicating that it has contributed positively in the model.

In addition to the economic and demographic variables, we have incorporated some significant political variables while predicting states' own tax collection. This

means that there will be a decline in their own tax effort by the states due to the same party coordination with that of the centre, as it allows them to substitute such transfers for tax collection. As expected, political alignment has a negative sign, which is statistically significant at 10 per cent level, while election year in states is reported to be positive but insignificant, explaining that it has not contributed to the model. Lastly, Fiscal responsibility and budget management (FRBM) have been found to be positive and statistically significant (at 10 per cent level) but with no significant effect in the second model. This suggests that the implementation of fiscal rules (at the state level) seems to be positively associated with the states' own tax revenue.

Table 2. *Results of panel regression models: Channel-specific as well as aggregate transfers and revenue collection (from 1991-92 to 2017-18)*

	Own Tax Revenue (OTR)	
	Fixed Effect (1)	Fixed Effect (2)
Central tax transfers	-0.067*** (0.00)	-
Statutory grants	-0.193*** (0.00)	-
State plan grants	-0.276*** (0.00)	-
Discretionary grants	-0.103** (0.04)	-
Total transfers		-0.140*** (0.00)
Central tax – Asymmetry	-0.022 (0.27)	
Statutory grant – Asymmetry	-0.024 (0.57)	
State plan grant – Asymmetry	0.162*** (0.00)	
Discretionary grants – Asymmetry	0.066 (0.38)	
Total transfers asymmetry		0.004 (0.71)
Fiscal space	-11.61*** (0.00)	-13.53*** (0.00)
HHI – tax complexity	-6265.9*** (0.00)	-7220.5*** (0.00)
Internal debt	0.117*** (0.00)	0.121*** (0.00)

Own Tax Revenue (OTR)		
	Fixed Effect (1)	Fixed Effect (2)
Development expenditure	0.277*** (0.00)	0.258*** (0.00)
Per capita income	0.014*** (0.00)	0.014*** (0.00)
Agriculture sector	-87.08 (0.86)	-787.36 (0.13)
Dependency	3455.1*** (0.00)	3207.8*** (0.00)
Political affiliation	-1.51* (0.06)	-2.65*** (0.00)
Election dummy	87.86 (0.28)	39.35 (0.64)
FRBM dummy	298.61* (0.09)	301.49 (0.11)
Within R ²	0.61	0.56
Hausman test	245.78*** (0.00)	100.61*** (0.00)
F-statistic	53.32*** (0.00)	63.45*** (0.00)
Number of observations	673	673

Source: authors' estimations

Notes: ***, **, and * refer to significance level at 1%, 5%, and 10%, respectively, and p-values are presented in parenthesis.

Apart from this, we have examined the impact of aggregate transfers on states' own tax efforts (Model 2). The coefficient of aggregate transfers is found to be negative and statistically significant at 1 per cent level. This implies that an increase in central transfers tends to lower tax collection in Indian states. Hence, we can observe the existence of "fungibility" of the central funding that permits a lower authority to substitute some proportion of transfers for tax collection. Also, the asymmetric variable is found to be positive but not significant at 5 per cent, implying that decrease in the transfers would not affect states' own tax collection.

When we observed the other economic and political variables in the second specification, we found similar results as with Model 1. Results show that all key fiscal variables, such as fiscal space, tax complexity, internal debt, and development expenditure, are found to be significantly affecting tax revenue. Further, political variables also contributed significantly to states' tax collection. Interestingly, we have also observed that the magnitude of coefficients of all political variables is higher than any other economic variable, indicating that political variables have a larger effect on the tax revenue of the states.

5. Conclusions and Policy Implications

The present study attempted to empirically examine the effects of intergovernmental transfers at two levels – total and individual – on the states' own tax revenues. To be more precise, we have seen the impact of both increase and decrease in different channels of transfers and total transfers that affect the own tax collection of Indian states. The results of our study indicate that all forms of federal transfers are inversely related to the own tax collection of Indian states. This indicates that the increase in different forms of transfers does not act as an incentive for the states to increase their own tax collection. On the other hand, we have also analysed whether the declining component of transfers or asymmetric variables has influenced states' tax collection. In this context, we found the statistically significant positive sign of a conditional form of transfers that provides a better guidance for states to raise their own tax collection and finance their expenditure responsibilities. Hence, the findings of the study are similar to those of a more recent study by Taiwo (2022) in the sense that transfers exert a negative pressure on state governments, own revenues. However, the study is partially different from, e.g., that of Dash, Raja, Debnath, and Bhattacharjee (2019) in terms of the components of central transfers. Conditional transfers did not affect own tax revenue negatively, but in our study, all components of central transfers were adversely related to states' own tax revenue. Apart from these transfers, other key fiscal variables were also found to be significantly influencing own tax collection based on their theoretical reasoning. Further, it is also found that the political alignment variable has a larger impact on states' tax effort.

Overall, the empirical findings confirmed that intergovernmental transfers, both on the aggregate and the individual level, tend to create fiscal lethargy among the states and do not allow them to utilize their own resources efficiently. Therefore, the mechanism of central transfers should be designed on the principle of equalization so that the recipient states will not substitute the transfers with their own resources.

Conflict of interest

The authors declare that there is no conflict of interest regarding research, authorship, and publication of this article.

References

Arulampalam, W.; Dasgupta, S.; Dhillon, A.; Dutta, B. (2009). Electoral goals and center-state transfers: A theoretical model and empirical evidence from India.

- Journal of Development Economics* 88(1): 103–119. <https://doi.org/10.1016/j.jdeveco.2008.01.001>.
- Borcherding, T. E.; Deacon, R. T. (1972). The demand for the services of non-federal governments. *The American Economic Review* 62(5): 891–901. <https://doi.org/10.2307/1815207>.
- Bradford, D. F.; Oates, W. E. (1971a). The analysis of revenue sharing in a new approach to collective fiscal decisions. *The Quarterly Journal of Economics* 85 (3): 416–439. <https://doi.org/10.2307/1885931>.
- (1971b). Towards a predictive theory of intergovernmental grants. *The American Economic Review* 61 (2): 440–448.
- Buettner, T.; Wildasin, D. E. (2006). The dynamics of municipal fiscal adjustment. *Journal of Public Economics* 90(6–7): 1115–1132. <https://doi.org/10.1016/j.jpubeco.2005.09.002>.
- Caldeira, E.; Rota-Graziosi, G. (2014). The crowding-in effect of simple unconditional central grants on local own-source revenue: The case of Benin. *Journal of African Economies* 23(3): 361–387. <https://doi.org/10.1093/jae/eju003>.
- Dahlby, B. (1996). Fiscal externalities and the design of intergovernmental grants. *International Tax and Public Finance* 3: 397–412. <https://doi.org/10.1007/BF00418952>.
- Dash, B. B.; Raja, A. V. (2013). Intergovernmental transfers and tax collection in India: Does the composition of transfers matter? *Public Budgeting & Finance* 33(2): 93–116. <https://doi.org/10.1111/j.1540-5850.2013.12010.x>.
- (2014). Do political determinants affect revenue collection? Evidence from the Indian states. *International Review of Economics* 61: 253–278. <https://doi.org/10.1007/s12232-014-0210-z>.
- De, I. (2013). Book review: D. K. Srivastava and U. Shankar, Development and public finance: Essays in honour of Raja J. Chelliah. *Global Business Review* 14(1): 187–189. <https://doi.org/10.1177/0972150912466478>.
- Debnath, A.; Battacharjee, N. (2019). Central transfers and tax generation efforts of Indian states. *Economic and Political Weekly* 54(48): 29–35.
- Gramlich, E. M. (1977). Intergovernmental grants: A review of the empirical literature. In: Wallace E., Oates (ed.), *The political economy of fiscal federalism*. Lexington, MA: Lexington Books. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Intergovernmental+Grants%3A+A+Review+of+the+Empirical+Literature&btnG=.
- (1987). Federalism and federal deficit reduction. *National Tax Journal* 40(3): 299–313.
- Gramlich, E. M.; Galper, Stephen Goldfeld, S.; McGuire, Martin. (1973). State and local fiscal behavior and federal grant policy. *Brookings Papers on Economic Activity* 1973(1): 15–65. <https://doi.org/10.2307/2534084>.

- Jha, R.; Mohanty, M.; Chatterjee, S.; Chitkara, P. (1999). Tax efficiency in selected Indian states. *Empirical Economics* 24(4): 641–654. <https://doi.org/10.1007/s001810050077>.
- McCarten, W. J. (2001). The challenge of fiscal discipline in the Indian states. In: Rodden, Jonathan; Eskeland, Gunnar; Litvack, Jennie (eds). *Decentralization and hard budget constraints*. Cambridge, MA: MIT Press. 249–286.
- McGuire, M. (1978). A method for estimating the effect of a subsidy on the receiver's resource constraint: With an application to U.S. local governments 1964–1971. *Journal of Public Economics* 10(1): 25–44. [https://doi.org/10.1016/0047-2727\(78\)90003-8](https://doi.org/10.1016/0047-2727(78)90003-8).
- Miyazaki, T. (2016). Intergovernmental fiscal transfers and tax efforts : Evidence from Japan. *MPRA Paper 74337*.
- Mohanty, A.; Sethi, D.; Mohanty, A. R. (2020). Central transfer a curse or blessing? Evidence from the relative revenue effort of Indian States. *Australian Economic Review* 53(2): 214–227. <https://doi.org/10.1111/1467-8462.12358>.
- Naganathan, M.; Sivagnanam, K. J. (2000). Federal transfers and the tax efforts of the states in India. *Indian Economic Journal* 47(4): 101–110. <https://doi.org/10.1177/0019466220000412>.
- Panda, P. K. (2009). Central fiscal transfers and states' own-revenue efforts in India: Panel data models. *Margin: The Journal of Applied Economic Research* 3(3): 223–242. <https://doi.org/10.1177/097380100900300302>.
- Prud'homme, R. (1995). The dangers of decentralization. *The World Bank Research Observer* 10(2): 201–220. <https://doi.org/10.1093/wbro/10.2.201>.
- Rajaraman, I.; Vasishtha, G. (2000). Impact of grants on tax effort of local government. *Economic and Political Weekly* 35(33): 2943–2948. <http://www.jstor.org/stable/4409622%5Cnhttp://about.jstor.org/terms>.
- Rao, C. B.; Srivastava, D. K. (2014). Dependence of states on central transfers: State-wise analysis. *Global Business Review* 15(4): 695–717. <https://doi.org/10.1177/0972150914543241>.
- Rao, G. (1998). *Fiscal federalism in India*. New Delhi: Macmillan India.
- (2005). *Changing contours in fiscal federalism in India*. New Delhi: National Institute of Public Finance and Policy.
- Taiwo, K. (2022). Intergovernmental transfers and own revenues of subnational governments in Nigeria. *Hacienda Publica Espanola* 240(1): 31–59. <https://doi.org/10.7866/HPE-RPE.22.1.2>.
- Tanzi, V. (1995). Fiscal federalism and decentralization: A review of some efficiency and macroeconomic aspects. Washington: CDC: World Bank. https://mef.gob.pe/contenidos/pol_econ/documentos/Fiscal_Federalism_Decimalization.pdf. 295–316.
- Thomas Isaac, T. M.; Mohan, R.; Chakraborty, L. (2019). Challenges to Indian fiscal federalism. *Economic and Political Weekly* 54(9): 33–40.

Appendix

Correlation Coefficients of Explanatory Variables

	<i>pctx</i>	<i>pslg</i>	<i>pspg</i>	<i>pdg</i>	<i>cta</i>	<i>sia</i>	<i>spa</i>	<i>dga</i>	<i>hhi</i>	<i>pid</i>	<i>pde</i>	<i>fs</i>	<i>pci</i>	<i>agr</i>	<i>dep</i>	<i>ed</i>	<i>pa</i>	<i>fd</i>
<i>pctx</i>	0.289***																	
<i>pslg</i>	0.467***	0.521***																
<i>pdg</i>	0.556***	0.566***	0.676***															
<i>cta</i>	0.04	0.008	0.007	0.01														
<i>sia</i>	-0.116**	-0.04	-0.131***	-0.110*	0.311***													
<i>spa</i>	-0.560***	-0.195***	-0.156***	-0.336***	0.265***	0.182***												
<i>dga</i>	-0.177***	-0.164***	-0.175***	-0.100*	0.430***	0.371***	0.303***											
<i>hhi</i>	0.142***	0.068	0.148***	0.094*	0.099*	-0.055	-0.120**	-0.088*										
<i>pid</i>	0.351***	0.306***	0.204***	0.354***	0.090*	0.01	-0.167***	-0.076	0.146***									
<i>pde</i>	0.681***	0.527***	0.713***	0.656***	0.046	-0.096*	-0.324***	-0.176***	0.208***	0.545***								
<i>fs</i>	-0.225***	-0.167***	-0.077	-0.171***	-0.276***	-0.134***	0.031	-0.056	-0.104**	-0.420***	-0.289***							
<i>pci</i>	0.027	-0.168***	-0.007	0.042	-0.037	-0.016	-0.059	-0.011	0.249***	0.213***	0.301***	0.196***						
<i>agr</i>	-0.214***	-0.130***	-0.148***	-0.161***	-0.170***	-0.059	-0.022	-0.087*	-0.07	-0.281***	-0.360***	0.378***	-0.092*					
<i>dep</i>	-0.149***	-0.067	-0.055	-0.124**	-0.079*	-0.042	0.039	0.028	-0.028	-0.383***	-0.339***	0.409***	-0.429***	0.429***				
<i>ed</i>	-0.053	-0.039	0.028	-0.015	-0.084*	0.034	0.032	-0.01	0.002	-0.023	-0.033	-0.005	0	0.046	-0.001			
<i>pa</i>	-0.090*	-0.07	-0.043	-0.099*	0.021	0.059	0.073	0.057	0.124**	0.046	0.075	-0.003	0.202***	-0.109**	-0.101**	-0.034		
<i>fd</i>	0.274***	0.144***	0.111**	0.180***	0.123**	0.048	-0.075	-0.044	0.152***	0.328***	0.358***	-0.662***	-0.052	-0.364***	-0.409***	-0.039	0.124**	

Notes: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.

Abbreviations

<i>pctx</i> : tax transfers in per capita	<i>spa</i> : state plan grant asymmetry
<i>pslg</i> : statutory grants per capita	<i>dga</i> : discretionary grant asymmetry
<i>pspg</i> : state plan grants per capita	<i>hhi</i> : Herfindahl-Hirschman Index
<i>pdg</i> : discretionary grants per capita	<i>pid</i> : internal debt per capita
<i>cta</i> : central tax asymmetry	<i>pde</i> : developmental expenditure per capita
<i>sia</i> : statutory grant asymmetry	<i>fs</i> : fiscal space
	<i>pci</i> : per capita income
	<i>agr</i> : share of agriculture
	<i>dep</i> : dependency ratio
	<i>ed</i> : election dummy
	<i>pa</i> : political affiliation
	<i>fd</i> : FRBM dummy