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Joy of Missing Out (JOMO) in the Hotel Sector: A Quantitative Analysis of Guests' Attitudes, Behaviors, Service Perceptions and Willingness to Pay for Digital Disconnection Experiences

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Abstract

This paper examines the concept of Joy of Missing Out (JOMO) in the hotel sector through quantitative research focused on guests' attitudes, behaviors, and perceptions toward digital disconnection. Based on 200 respondents, the questionnaire data is analyzed by factor analysis, correlation, ANOVA, multiple regression, mediation (PROCESS model), and binary logistic regression. Results indicate that emotional benefits, digital perceptions, and age provide highly discriminative power to willingness to pay and probability of choosing a JOMO-related hotel service. These outcomes indicate the ever-increasing perception of the need for focused technology-free experiences and present significant data for hotels to develop digital detox services.

Keywords: JOMO, digital disconnection, hotel guest behavior, mindfulness travel, willingness to pay

Introduction

The Joy of Missing Out, or JOMO, encourages finding peace and embracing solitude. To put it briefly, it means disconnecting from all forms of media and accepting life as it is while reestablishing a connection with the present (Barry et al., 2023). Unlike FOMO, where conversely the Fear of Missing Out refers to the feeling that life is happening elsewhere while that individual is stuck at home and therefore missing out on everything (Przybylski et al., 2013), JOMO can be helpful because it really puts a greater focus on what an individual chooses to participate in, not what is pressured on (De Sousa, 2024). Given that Gen Z and even Millennials are "digital natives," JOMO is particularly relevant to them, since as a generation they have never known a life without social media due to the sense of having the continual pressure to be aware or know what is going on constantly (Kaswa & Kolapkar, 2024). This is what JOMO is really about—genuinely committing to that whole notion of promoting happiness and fulfillment, of deciding to miss out or skip an activity and instead to take care of oneself (De Sousa, 2024).

However, since people are social beings, the fear of exclusion has a biologically evolutionary foundation that stems from curiosity (Fioravanti et al., 2021; Przybylski et al., 2013). If an individual is missing out, it usually indicates that something is missing. And that is why an individual always seeks acceptance, social acceptability, and a sense of belonging as a result of their natural curiosity (Akbari et al., 2021). In such cases, avoiding FOMO and embracing JOMO will not happen with the snap of a finger, because first it requires accepting that sometimes something will always be missing. An individual who is eager to embrace JOMO as a mindful shift listens to what their mind and soul need, rather than what they should or are expected to do.

Moreover, most individuals who embrace JOMO nowadays seek to escape the pressure of constant connection and notifications that oversaturate them with information, especially from social media (Nguyen, 2023; Rautela & Sharm, 2022). Limiting social media and living in the present moment can only help an individual to embrace a slower, more intentional lifestyle with more focus on its goals and passions (Barry & Wong, 2020). The growing awareness of the negative effects from excessive technology usage on one's mental and emotional health has made JOMO increasingly relevant and now symbolizes a common desire for practices of mindfulness and a wellness culture (Chan et al., 2022). This means that, even if it is only for brief moments, individuals value their own well-being and look for opportunities to disconnect themselves from technology.

Namely, as JOMO is relished in everyday life, this mindful lifestyle is currently conquering the travel world as well (Wojcieszak-Zbierska, 2023; Putra, 2019). As such, in hotels, even though digitalization has been crucial in integrating and utilizing operations to prioritize guest preferences and offer personalization with mobile applications, self-service kiosks, smart room technology, etc., this same digital hyperconnectivity has led to a paradox: as much as technology aims for enhanced guest experiences, the more it detracts from the overall sense of relaxation and escape that many seek while staying in a hotel (Ozdemir & Goktas, 2021). The constant connection to technology undermines the purpose of a hotel stay and results in a feeling of a need for a vacation from vacation instead of providing a temporary retreat from the pressures of everyday life.

As more and more individuals become interested in experiencing this new travel trend (Wojcieszak-Zbierska, 2023; Putra, 2019), guests are actively searching for ways to disconnect from digital devices in order to relax and appreciate the present moment (Barry & Wong, 2020). However, hotels, which in recent years have been established to provide guests with ease and convenience through digital technology, find themselves in a position to redesign their services, offering a stay that promotes the importance of mental well-being, calmness, and mindfulness (Ozdemir & Goktas, 2021; Stankov et al., 2020).

Some hotels have begun to introduce digital detox programs, quiet zones, and nature escapes, and some even transform themselves into digital detox retreats as a response to this trend (Quaye, 2025). Such initiatives usually include rooms with no or limited Wi-Fi access, social media distractions, and activities like meditation, yoga, or nature walks (Conti & Farsari, 2024). The intention is to rejuvenate by appreciating the small joys of life so that they can experience better mental health, stronger relationships with other people, more productivity and efficiency, and greater focus (Vickery & Jackson, 2021). Digital detox does not mean entirely removing oneself from digital devices and the digital world; it means learning ways to use it more mindfully (Quaye, 2025; Vickery & Jackson, 2021; Kirtley, 2015).

Facilitating this need for guests has enabled hotels to become quite creative with digital detox programs. Kimpton Taconic Hotel in Manchester, Vermont, offers a "3-A-Day Program" where guests can leave their smartphone with hotel staff for 15 minutes of digital freedom per day during breakfast, lunch, and dinner time (Alderton, 2019). Grand Velas Riviera Maya in Mexico has a digital detox program where, if chosen, a concierge removes the TV from the room and instead leaves board games (Alderton, 2019).

Consequently, as JOMO hotel stays are trying to become a new holistic approach, relatively little research has been dedicated to understanding the specific impact of JOMO in the hotel sector. Therefore, this research aims to address the question of the JOMO concept within the context of guest behavior. Specifically, it aims to examine how hotel guests react to and experience the concept of JOMO through their digital and emotional attitudes, perceptions of hotel services that facilitate digital disconnection, and willingness to pay for such experience. The research objective seeks to determine:

- Define the emotional and psychological factors that guests associate with intentional disconnection while staying at a hotel.
- Examine guests' behavior and perception of digital connectivity and their active avoidance of digital distractions.
- Explore whether travel frequency affects the willingness to pay for a JOMO hotel experience.
- Determine the demographic and psychological factors that influence the willingness to pay for a JOMO hotel experience.
- Examine whether emotional benefit from digital disconnection mediates the relationship between digital connectivity and willingness to pay for a JOMO hotel experience.
- Analyze which psychological, behavioral and demographic factors influence the likelihood of choosing JOMO hotel services.

That being the case, several research questions are presented below in order to gain deeper, more complex, and more valid research, which will lead to clearer conclusions, better implications, and greater academic value.

1. Does the perceived emotional benefit from JOMO experiences in hotels correlate with conscious avoidance of digital distractions?
2. Does the frequency of travel affect the willingness to pay more for a premium JOMO experience?
3. Which psychographic variables influence the willingness to pay for JOMO experiences in hotels?
4. Does emotional benefit from digital distractions mediate the relationship between guests' digital behavior and their willingness to support and pay for JOMO-oriented hotel experiences?

5. Do attitudes toward digital distractions, emotional benefits, demand for digital hotel detox services, and age influence the likelihood of guests choosing JOMO hotel services?

Theoretical Framework

JOMO, or the Joy of Missing Out, stands in contrast to FOMO, which is the Fear of Missing Out. This concept of JOMO has emerged as a response to the growing awareness of the downsides of burnout, anxiety, and too much screen time (Barry et al., 2023). JOMO emphasizes more mindfulness and healthier embracement of well-being, digital detoxing, and solitude (De Sousa, 2024).

From a psychological perspective, JOMO can be associated with the Self-Determination Theory, which highlights how individuals can focus on their own values and goals without any outside pressure or distractions (Ryan & Deci, 2017). Taking the time to focus on values and clarify goals can really feel like a personal choice—it is all about seizing control over our time, attention, and overall well-being (Ryan & Deci, 2017). This is where the concept of JOMO comes into play, rooted in mindfulness theory. It encourages individuals to genuinely appreciate what they have right now, recognize their stand, and clear out the mental clutter (Chan et al., 2022).

Guests who wish to experience JOMO in the hotel sector are specifically looking for stays that focus on mental relaxation, excessive sensory reduction, and a slower lifestyle (Djafarova & Kim, 2025). This means that JOMO, besides being considered as a personal health aim, can be perceived as a strategic wellness approach from hotels.

Furthermore, in the context of JOMO, guests' preference leans towards reduced or minimal use of technology during their stay, which might create tension. Such a situation occurs because hotels thrive on using technological advancements to enable unprecedented levels of personalization for their guests (Ozdemir & Goktas, 2021), but now guests see technology as a source of stress rather than comfort. Therefore, it is crucial to understand the digital attitude and behavior of guests and for hotels to know when to emphasize connectivity in order to tailor services to each of their guests' preferences but also to recognize how and when digital disconnection is needed because it adds value to the guest experience (Arenas et al., 2022).

Recent research in the sector of hospitality reveals a tendency toward "slow travel," which means spending more time in a place to fully experience it, at a slower pace, to lower anxiety, stress, and advanced technology consumption (Manthiou et al., 2022). This approach supports the idea that JOMO-oriented guests seek deeper personal growth during their time at the hotel. Guests increasingly value mindful hotel experiences that help them find the right balance between social and productive engagement and prioritize activities that contribute positively to their lives (Barber & Deale, 2013). Hotels can provide guests with meaningful experiences by offering them a space where they can turn off their smartphones and other digital devices (Arenas et al., 2022). Adding health programs like yoga or meditation sessions might even make the process of getting to know themselves better (Conti & Farsari, 2024). Such being the case, hotels can provide a safe place for guests to relax and have an overall experience that improves their mental and emotional health.

Demographic factors also influence how guests perceive and pursue JOMO. Research suggests that digital natives like Millennials and Gen Z are becoming quite aware of the anxiety-induced feeling caused by technology overuse and FOMO in general, so they are leading a new change towards the JOMO era of unique experiences and disconnection (Pabon et al., 2025; Kaswa, A., & Kolapkar, 2024).

Methodology

This research employs a quantitative, cross-sectional research design to explore guests' attitudes, behaviors, service perceptions, and willingness to pay regarding digital disconnection, therefore analyzing the JOMO experience in hotels.

Data was collected through a structured online questionnaire with a sample size of 200 respondents. The questionnaire consisted of 20 closed-ended questions organized into four thematic groups using Likert-scale answers; however, 6 from the third group were categorized as polar questions:

1. Technology Usage and Preferences,
2. JOMO-Related Experiences,
3. Service and Hotel Offerings,
4. Personal Reflections on JOMO.

Demographic data were also collected, including age and travel habits.

Data analysis was conducted in SPSS and the PROCESS macro 5.0 by Andrew F. Hayes.

Furthermore, regarding the research questions and proposed hypothesis, the following statistical analyses will be used:

1. *Exploratory Factor Analysis* was implemented by means of Principal Component Analysis with Varimax rotation. Sampling adequacy was evaluated using the Kaiser-Meyer-Olkin measure and Bartlett's Test of Sphericity. There were six latent factors extracted for the three groups of thematic questions, each applicable to different concepts.
2. *Pearson Correlation Analysis* to determine if there is a relationship between factors such as emotional benefit and consciously avoiding digital distractions.
3. *ANOVA* to determine whether specific readiness for the JOMO hotel experience and frequency of travel have statistically significant differences.
4. *Multiple Regression* and *Mediation Analysis* using *PROCESS* Model 4 to determine whether factors such as low digital connectivity, perceived emotional benefits, and positive perception of future potential would emerge as significant predictors of willingness to pay a premium price. Meanwhile, mediation analyzed whether one variable (emotional benefit from digital distractions) mediates another variable (digital connectivity) and the outcome (willingness to pay). Indirect effects were tested through bootstrapping (5000 samples, 90% CI).
5. *Binary Logistic Regression Analysis* to predict the factors influencing hotel service.

Results

To analyze guests' attitudes, behaviors, and perceptions towards digital disconnection, a series of statistical analyses were conducted in SPSS. The analyses were employed in order to reveal the fundamental factor structure of guests' perceptions and examine the relationship between behavioral, psychological, and demographic variables.

The results presented in the following section are organized in correspondence with the research questions and hypotheses.

Table 1:

Demographic Distribution of Participants

Age Range				
	Frequency	Percent	Valid Percent	Cumulative Percent
Under 18	32	16.0	16.0	16.0
18-24	43	21.5	21.5	37.5
25-34	49	24.5	24.5	62.0
35-44	23	11.5	11.5	73.5
45-54	33	16.5	16.5	90.0
55+	20	10.0	10.0	100.0
Total	200	100.0	100.0	
How Often Do You Travel for Leisure?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Rarely	27	13.5	13.5	13.5
Occasionally	58	29.0	29.0	42.5
Frequently	96	48.0	48.0	90.5
Always	19	9.5	9.5	100.0
Total	200	100.0	100.0	

The questionnaire sample summarizes a diverse range of participant profiles in Table 1. Among age groups, the largest proportion is 25-34 years old (24.5%), followed by 18-24 years old (21.5%), 45-54 years old (16.5%), and under 18 (16%). 11.5% of respondents were between the ages of 35-44 years old, while 10% of respondents were 55 and older. When it comes to travel, 48% said they travel frequently, and 29% stated they travel occasionally.

Consecutively from the demographic representation, since the research is examining a new phenomenon, JOMO in a hotel context, to further reduce the complexity of the data, as a first step, an exploratory factor analysis was conducted before the hypothesis testing. This step enables the identification of coherent latent dimensions, which will offer structural logic for the analyses that follow.

Table 2:

Results of Exploratory Factor Analysis

FAC1_1 Digital Connectivity and Usage					
Questions/Topics: *Importance of access to digital devices during a hotel stay, Use of a smartphone or other devices for non-essential activities, Likelihood of disconnection while staying at a hotel*.					
No. of Q	Eigenvalue	% of Variance	KMO	Bartlett's Sig.	Rotated loadings
3	1.587	39.683%	0.575	.000	.739, .773, –.494
FAC1_2 Consciously Avoiding Digital Distractions					
Questions/Topics: *Actively looking for accommodation with minimal digital distractions*.					
No. of Q	Eigenvalue	% of Variance	KMO	Bartlett's Sig.	Rotated loadings
1	1.001	25.028%	/	/	.981
FAC2_1 Emotional Benefit / Perceived Value of JOMO					
Questions/Topics: *Feeling relaxation or less stress when disconnecting while staying in a hotel, Disconnection while staying in a hotel leads to better mental or physical well-being, Overall experience affected by digital environment*.					
No. of Q	Eigenvalue	% of Variance	KMO	Bartlett's Sig.	Rotated loadings
3	1.353	33.831%	0.550	.003	.711, .680, .619
FAC2_2 Demand for Digital Detox Services					
Questions/Topics: *Hotels offering spaces for relaxation or disconnection (e.g., nature walks, meditation rooms, technology-free activities)*.					
No. of Q	Eigenvalue	% of Variance	KMO	Bartlett's Sig.	Rotated loadings
1	1.050	26.258%	/	/	.908
FAC3_1 Positive Perception and Future Potential of JOMO					
Questions/Topics: *Support for the future of the concept and perception of value for JOMO experiences*.					
No. of Q	Eigenvalue	% of Variance	KMO	Bartlett's Sig.	Rotated loadings
2	1.513	37.961%	0.523	.000	.774, .749
FAC3_2 Specific Readiness for JOMO Hotel Experience					
Questions/Topics: *Intention to book and pay a premium price for a JOMO experience*.					
No. of Q	Eigenvalue	% of Variance	KMO	Bartlett's Sig.	Rotated loadings
2	1.016	25.258%	/	/	.793, .702

As presented in Table 2, six distinct factors were created across three thematic blocks. The Kaiser-Meyer-Olkin measure for the multi-groups ranges from 0.523 to 0.575, and Bartlett's test of sphericity was significant in all applicable cases ($p < 0.01$), confirming sampling adequacy. In addition, every one of the multi-item factors demonstrated good internal consistency (Cronbach's alpha), with values between α =.68 and .81.

To address RQ1: Does the perceived emotional benefit from JOMO experiences (FAC2_1) in hotels correlate with conscious avoidance of digital distractions (FAC1_2)?, the following hypotheses were proposed:

H01: Avoiding digital distractions is not positively correlated with the emotional benefit from JOMO experiences.

H11: Avoiding digital distractions is positively correlated with the emotional benefit from JOMO experiences.

Table 3:

Pearson Correlation Matrix for Key Variables

		Emotional Benefit / Perceived Value of JOMO	Consciously Avoiding Digital Distractions
Emotional Benefit / Perceived Value of JOMO	Pearson Correlation	1	.206**
	Sig. (2-tailed)		.003
	N	200	200
Consciously Avoiding Digital Distractions	Pearson Correlation	.206**	1
	Sig. (2-tailed)	.003	
	N	200	200
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 3 reveals a statistically significant positive (albeit weak) correlation ($r = .206$, $p = .003$) was identified between the perceived emotional benefit derived from JOMO experiences and the intentional avoidance of digital distractions.

Given that the p-value (.003) is below the conventional alpha levels of .05 and .01, we reject the null hypothesis (H01) and support the alternative hypothesis (H11), which proposes that the avoidance of digital distractions has a positive association with the emotional benefits resulting from JOMO experiences.

To address RQ2: Does the frequency of travel affect the willingness to pay more for a premium JOMO experience (FAC3_2)?, the following hypotheses were proposed:

H02: There is no difference in the willingness of frequent travelers to spend more for a premium JOMO hotel experience than that of less frequent travelers.

H12: The willingness of frequent travelers to spend more for a premium JOMO hotel experience is higher than that of less frequent travelers.

Table 4:

One-way ANOVA for Willingness to Pay for JOMO by Travel Frequency

Specific Readiness for JOMO Hotel Experience					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.284	4	2.571	2.657	.034
Within Groups	188.716	195	.968		
Total	199.000	199			

A one-way ANOVA was performed in order to examine the impact of travel frequency on guests' willingness to pay a premium for a JOMO hotel experience. The results from Table 4 demonstrate a statistically significant effect: $F(4,195) = 2.657$, $p = .034$, indicating that travel frequency affects the willingness to spend more on JOMO experiences; thus, reject the null hypothesis (H02) and support the alternative hypothesis (H12). Nonetheless, post-hoc tests did not indicate any statistically significant differences across distinct categories of travelers. This indicates that the variation in willingness to pay for a premium JOMO experience is spread across the groups.

To address RQ3: Which psychographic variables (FAC1_1, FAC2_1, FAC3_1) influence the willingness to pay for JOMO experiences in hotels?, the following hypotheses were proposed:

H03: Lower digital connectivity, perceived emotional benefit and value, and positive future potential of JOMO are not significant predictors of willingness to pay a premium price.

H13: Lower digital connectivity, perceived emotional benefit and value, and positive future potential of JOMO will be significant predictors of willingness to pay a premium price.

Table 5:

Regression Model for Predicting Willingness to Pay for JOMO Hotels

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.319E-16	.064		.000	1.000
Digital Connectivity and Usage	.272	.065	.272	4.158	.000
Emotional Benefit / Perceived Value of JOMO	.269	.065	.269	4.133	.000
Positive Perception and Future Potential of JOMO	.149	.064	.149	2.327	.021
a. Dependent Variable: Specific Readiness for JOMO Hotel Experience					

A multiple linear regression analysis was performed to evaluate if lower digital connectivity and usage, the perceived emotional benefit, and positive perception of JOMO influence the willingness to pay for a premium JOMO hotel experience. The entire model in Table 5 demonstrated statistical significance, $F(3, 196) = 16.875$, $p < .001$, accounting for 20.5% of the variance ($R^2 = .205$). All three predictors were statistically significant, rejecting the null hypothesis (H03) and supporting the alternative hypothesis (H13): lower digital connectivity and usage ($\beta = .272$, $p < .001$), perceived emotional benefit and value of JOMO ($\beta = .269$, $p < .001$), and positive perception and future potential of JOMO ($\beta = .149$, $p = .021$).

Subsequent to the multiple regression analysis, a PROCESS model was used to perform a mediation analysis to evaluate if the emotional benefits of digital distractions affect the relationship between being digitally connected and willingness to pay for a JOMO experience. It will allow us to explore not just if digital connectivity affects the outcome, but also how it does so.

To address RQ4: Does emotional benefit from digital distractions (FAC1_2) mediate the relationship between guests' digital connectivity (FAC1_1) and their willingness to support and pay for JOMO-oriented hotel experiences (FAC3_2)?, the following hypotheses were proposed:

H04: Emotional benefit from digital distractions does not mediate the relationship between digital connectivity and willingness to pay for JOMO.

H14: Emotional benefit from digital distractions significantly mediates the relationship between digital connectivity and willingness to pay for JOMO.

Table 6:

Mediation Model of the Relationship Between Digital Connectivity and Readiness for JOMO Through Digital Distractions

Component	**Description / Value**
Independent Variable (X)	FAC1_1 Digital Connectivity and Usage
Mediator (M)	FAC1_2 Consciously Avoiding Digital Distractions
Dependent Variable (Y)	FAC3_2 Specific Readiness for JOMO Hotel Experience

Path A (X → M)

Coefficient (β)	Standard Error (SE)	t-value	p-value	95% CI
0.3398	0.0668	5.0833	< .001	[0.2293, 0.4502]

Path B and Path C′ (M & X → Y)

Path	Predictor	β	SE	t	p	95% CI
Path B (M → Y)	FAC1_2	0.1615	0.0746	2.1656	.0315	[0.0383, 0.2848]
Path C′ (X → Y)	FAC1_1	0.0313	0.0746	0.4202	.6748	[−0.0919, 0.1546]

Indirect Effect (X → M → Y)

Effect	Boot SE	90% Boot CI	Significance
0.0549	0.0273	[0.0099, 0.0992]	Significant (CI ≠ 0)

A mediation analysis applying PROCESS Model 4 demonstrated in Table 6 a significant indirect influence of digital connectivity and usage (FAC1_1) on the willingness to pay for JOMO experiences (FAC3_2) via emotional benefit of digital distractions (FAC1_2), b = 0.0549, Boot SE = 0.0273, 90% CI [0.0099, 0.0992]. The direct impact was not significant, b = 0.0313, p = .675, suggesting complete mediation, thus supporting the alternative hypothesis (H14).

However, despite the impact size being modest to moderate, it possesses practical and psychological significance, especially in the hotel sector, where guest attitudes and behavior preferences tend to change on an ongoing basis. This indicates that widespread interest in avoiding digital distractions (FAC1_2) serves as a significant psychological link between favorable evaluations of the concept and the genuine intention to invest in such experiences. Consequently, digital distractions serve as a vital motivating role, turning *Abstract* opinions into tangible intentions.

To address RQ5: Do attitudes toward digital distractions (FAC1_2), emotional benefits (FAC2_1), demand for digital hotel detox services (FAC2_2), and age influence the likelihood of guests choosing JOMO hotel services?, the following hypotheses were proposed:

H05: Attitudes towards digital distractions, emotional benefits, demand for digital hotel detox services, and age do not have a statistically significant effect on the choice of JOMO hotel services.

H15: Attitudes towards digital distractions, emotional benefits, demand for digital hotel detox services, and age have a statistically significant effect on the choice of JOMO hotel services.

Table 7:

Binary Logistic Regression for Predicting Choice of JOMO Services

Predictor	**B**	**SE**	**Wald**	**p-value**	**Exp(B)**	**95% CI for Exp(B)**
Consciously Avoiding Digital Distractions	2.552	0.594	18.432	**.000**	12.85	3.988 – 41.402
Emotional Benefit / Perceived Value of JOMO	3.606	0.830	18.894	**.000**	36.82	6.955 – 195.021
Demand for Digital Detox Services	1.340	0.361	13.791	**.000**	3.82	1.881 – 7.757
Age	–1.623	0.654	6.157	**.013**	0.197	0.054 – 0.724
Nagelkerke R^2			.453			
Hosmer–Lemeshow test			p = .084			
Overall prediction accuracy			73.0%			

A binary logistic regression was conducted to evaluate the predictive relationship between digital distractions, emotional benefits, demand for digital hotel detox services, and age on the likelihood of choosing JOMO-related hotel services. The model in Table 7 demonstrated statistical significance, $\chi^2(4) = 82.530$, $p < .001$, and indicated a satisfactory fit (Hosmer–Lemeshow test, $p = .084$). The Nagelkerke R^2 value demonstrated that the model accounted for 45.3% of the variance in JOMO service choosing.

All four predictors demonstrated statistical significance. Higher scores on emotional benefit (Exp(B) = 36.82, $p < .001$), digital distractions (Exp(B) = 12.85, $p < .001$), and demand for digital detox services (Exp(B) = 3.82, $p < .001$) were significantly correlated with an increased likelihood of deciding on JOMO hotel services, supporting the alternative hypothesis (H15). Younger age groups demonstrated a higher likelihood of making this choice (Exp(B) = 0.197, $p = .013$).

Limitations

This research offers new insights regarding the JOMO phenomena in the hotel sector, yet a few limitations need to be addressed. First, the sample of 200 might be restrictive, thus limiting the generalizability of the findings. The questionnaire only explores age and frequency of travel. It provides no information about gender, financial status, or educational background, which might have influenced individuals' perceptions and opinions about JOMO.

Conclusion

This paper examined the concept of the Joy of Missing Out (JOMO) within the hotel sector by analyzing how guests perceive, experience, and respond to digital disconnection during their stay at the hotel. The primary objective was aimed at exploring if guests' willingness to pay for and engage in JOMO-related services is influenced by their emotions, digital behaviors, service perceptions, and demographic factors.

Research analyses that included exploratory factor analysis, correlation, ANOVA, multiple regression, mediation (PROCESS model 4), and binary logistic regression identified six distinct factors reflecting lower digital connectivity, emotional responses, and service-related preferences, among others. Results indicated that a guest's willingness to spend on premium experiences is significantly associated

with lower digital connectivity, higher emotional benefit, and a positive view of JOMO. Emotional benefit was identified to mediate in the connection between digital connectedness and willingness to pay. Age, attitudes, and service demand were identified as determinants in the selection of JOMO hotel services.

Ultimately, these results indicate that guests seek experiences that are more mindful and less dependent on technology. Which means hotels that recognize and address this need may promote themselves as wellness retreats.

Additionally, these results present several practical implications. Hotels are in a position to respond to this emerging guest base by developing JOMO-centric packages that feature rooms free of TV, optional digital detox experiences, and activities that foster mindfulness, such as yoga and nature activities. Likewise, focusing on younger guests (Gen Z or Millennials) as well as frequent travelers by offering them personalized, wellness-oriented experiences could increase their interest and satisfaction throughout their stay.

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Determining the Long Run Relationship Between Direct and Indirect Taxes and Economic Growth: Empirical Evidence From the Republic of North Macedonia

Abdulgafur Sinani

Abstract

The theoretical and empirical evidence unanimously emphasize that fiscal policy measures and instruments are essential for economic policymakers that aim to achieve macroeconomic equilibrium and boost economic growth in both developed and developing economies. Taking into consideration this crucial role of the fiscal policy for the economic development, this paper examines the relationship between direct taxes, indirect taxes, labor force and economic growth for the Republic of North Macedonia. Given the absence of a universal framework for implementing fiscal policy measures, this research explores how these policies can be adapted and harmonized to promote economic stability. While the mechanisms and channels for achieving economic policy objectives may share similarities across different economies, their application must be customized to reflect each country's unique macroeconomic conditions and aggregate trends. Employing regression analysis, including the Vector Error Correction Model (VECM) and co -integration methodology, the findings of this study highlight the critical role of fiscal policy in driving economic growth as well as reducing the unemployment rate in post transition economies such as the Republic of North Macedonia. This study also highlights the significance of strategically combining and aligning fiscal policy measures to meet the macroeconomic goals and as such it provides some recommendations for further development and changes in the fiscal policy and measures to be undertaken to ensure sustainable economic growth.

Keywords: Taxes, economic growth, fiscal policy, co – integration, VECM

Introduction

Nowadays, taking into consideration the consequences of the COVID-19 pandemic, as well as the recent Russian invasion of Ukraine, economic growth rates have been tested everywhere across European economies, including the Western Balkan region, events that have recently pushed the entire world into an economic and social crisis. On the other hand, the green and digital transition agenda emphasizes the need for well-designed and efficient tax systems which will provide sustainable fiscal revenues by also stimulating productivity and innovation, where indirectly will enhance and boost sustainable and inclusive growth.

It is well known that taxation is considered as a main instrument for generating public revenues, needed to provide public goods. Fasoranti (2013) highlights that the importance of tax lies in its ability to generate revenue for the government, influence the consumption trends and grow and regulate economy through its influence on vital aggregate economic variables. However, indirect and direct taxes have different effects on economic growth due to the way they impact individuals, businesses, and overall economic activity, but the effects of them on economic growth are interconnected. Moreover, direct taxes, imposed directly on income, wealth, and corporate profits, can influence individuals' incentives to work, invest, and innovate. Lower direct tax rates can foster entrepreneurship, capital formation, and efficient resource allocation, thereby potentially enhancing economic growth. However, excessive taxation may dampen these incentives and distort economic decisions. On the other hand, indirect taxes imposed on consumption and included in the prices of goods and services, impact consumer behavior and purchasing power. While they can be a stable source of government revenue, they may lead to reduced consumption and contribute to inflation. Indirect taxes are generally less distortionary than direct taxes, as they are less likely to directly influence productive activities and investment decisions. Nevertheless, the regressive nature of some indirect taxes raises equity concerns, as they disproportionately affect lower-income individuals. Thus, the optimal balance between direct and indirect taxes depends on their rates, and the broader economic structure. Governments strive to ensure that taxes provide necessary revenue without hindering economic incentives. A well-structured tax system contributes to innovation, entrepreneurship, and capital accumulation and supports sustainable and inclusive economic growth.

Having into consideration all above, the aim of this research paper is to investigate the long run effects of the direct and indirect taxes on the economic growth of the Republic of North Macedonia, by using quarterly time series data based on the

period 2000q1 to 2021q4. The study employs the technique of the Vector Error Correction model and the cointegration analysis to assess the effects of direct and indirect taxes on the economic growth for both long run and short run dynamics

The following section is dedicated to the relevant literature review of the effects of direct and indirect taxes on economic growth, while the third section reveals the research methodology and data specification used for the empirical analysis. The fourth section interprets the empirical findings, while the last section provides the main conclusions and recommendations based on the empirical findings for the case of the Republic of North Macedonia and in general for other economies in the region.

Literature Review

Although there is no consensus regarding the level of impact of direct and indirect taxes on economic growth, which varies across the development of economies, there exist plenty of research that has investigated the effects of direct and indirect taxes on the economic growth in both developed and developing economies with mixed and controversial findings.

Balasoiu et al. (2023), while analyzing the effects of direct taxation on the economic growth in the EU countries find that corporate income taxes have a significant negative impact on the economic growth for both clusters of high- and limited fiscal efficiency countries. Also, Popov and Zaharia (2021) in their study by analyzing the effects of income taxes on the economic growth of EU countries, during the time period 2013 – 2019 find that personal income tax and value-added tax rates did not significantly impact the economic growth, while corporate income tax has negatively impacted the economic growth of these countries.

Nguyen et al., (2021) analyzed the macroeconomic effects of income and consumption tax changes and have concluded that in the short run, if average income tax rate is decreased by 1% point, GDP immediately would increase by 0.78% after the tax changes. In addition, Gomis-Porqueras and Smith (2020) have examined the effects of income taxation on economic growth, where their findings have implied a negative correlation among income taxes and GDP, suggesting that higher income tax rates will decrease the incentives for individuals and companies to engage in economic activities like labor, savings, and investments.

In their paper, Ibraimi & Alili Sulejmani (2017) by using the co-integration methodology and VECM technique have analyzed the effects of indirect taxation on the

economic growth in the Republic of North Macedonia, for the period 2000 – 2016. Their findings imply that there exist positive effects of the indirect taxes on the GDP rate growth in North Macedonia, which is mainly due to the dominance of the taxes from consumption compared to other taxes in North Macedonia.

Martens and Morten (2013) in their study have investigated the effects of personal and corporate income taxes on the economy of the US, by utilizing the SVAR methodology. Their findings suggest that reductions in both personal and corporate income taxes have positive effects on GDP growth, with corporate tax changes having a more pronounced impact on business investment.

Arnold et al., (2011) have evaluated the impact of tax policies, including direct taxes, on economic recovery and growth. It emphasizes that well-designed tax reforms, such as lowering marginal tax rates, can promote economic recovery and long-term growth. The study also discusses the importance of addressing fiscal sustainability concerns while implementing pro-growth tax measures.

In his research Scarlet (2011) has examined the relationship between taxation and economic growth for the case of Jamaica for the time period 1990 - 2010, where findings conclude the existence of a strong positive nexus between indirect taxation and economic growth in the long run.

Nellor (2011) in his paper has analyzed the relationship between tax policy changes and economic growth during the 2000s. It finds that countries that reduced corporate and personal income tax rates experienced higher economic growth. However, the study also underscores the importance of considering revenue implications and budgetary constraints.

Arisoy and Unlukaplan (2010), have investigated the relationship between direct and indirect tax and economic growth for the case of Turkey, covering the time period 1968-2006, by using OLS technique, where findings suggest that real output is positively related to indirect tax revenue. Moreover, they suggested that indirect taxes are positively correlated with economic growth in the case of Turkey.

In their paper, Martinez-Vacquez et al (2009), have investigated the effects of direct and indirect forms of taxation yet the main question that still remained largely unanswered is the economic consequences of different mixes of direct and indirect taxes.

By using the unrestricted error correction model, Greenidge and Drakes (2009), have examined the relationship between tax policy and macroeconomic activities,

claiming that total tax and indirect taxes have a contractionary effect on the economy in both the short run and long run period.

Duncan and Peter (2008) in their study developed a measurement of progressive income tax especially in the Personal Income Tax (PIT) rate by employing data for 35 countries over the period 1981-2005, where findings suggested that PIT could promote more equal distribution of income via its progressive characteristics.

Widmalm (2001) in his study reveals that personal income tax has negative impact on economic growth while corporate income tax does not have any significant impact on economic growth. Further, this study assumes that tax structures are not changed during the entire analyzed period and the structure of tax revenues in all countries covered by the empirical analysis remains the same.

In summary, the literature on the effects of direct and indirect taxes on economic growth underscores the importance of tax policy design in influencing incentives for work, investment, entrepreneurship, and overall economic activity. While there is no one-size-fits-all answer, empirical evidence and theoretical insights suggest that well-structured direct and indirect tax policies can contribute to sustainable and inclusive economic growth.

Research Methodology and Data

For addressing the main goal of this paper, i,e., analyzing the effects of direct and indirect taxes on the economic growth in the Republic of North Macedonia for the time period – 2000q1- 2021q4, this paper employs the Vector error correction model technique to determine the long run relationship between direct, indirect taxes and economic growth.

Bearing in consideration the Solow (1956) growth model, where the variations in the rates of labor force and population, savings, physical capital and technological advancement, human capital determine the growth, some of these variables are included in the following equation representing the baseline model of this empirical study:

$$\ln(GDP)_t = \beta_0 + \beta_1 ln\,(IndirTax)_t + \beta_2 ln(DirTax)_t + \beta_3 \ln\,(Gfcf)_t + \beta_4 \ln\,(Lfpr)_t + \varepsilon_t$$

Where real GDP growth rate is defined as the dependent variable, while as independent variables are: Direct taxes, Indirect taxes, Gross Fixed Capital Formation as % of GDP and Labor Force Participation Rate.

The secondary time-series data are taken from the official reports from the Ministry of Finance and Central Bank of the Republic of North Macedonia.

Initially, the data have been analyzed for their unit root to check if the time – series are stationary in their level, where the Augmented Dickey Fuller test has been used in this regard.

Empirical Findings

The first step consists of the analysis of the unit root of the variables through Augmented Dickey Fuller test, however, to execute the test it is necessary to determine the optimal lag structure of the variables included in the analysis. In this regard, the following table illustrates the results of the optimal lag length based on the following four FPE, AIC, HQIC and SBIC information criteria.

Table 1:

Lag structure

Lag	FPE	AIC	HQIC	SBIC
0	5.8e-11	-9.38292	-9.32476	-9.23823
1	1.8e-14	-17.4385	-17.0895	-16.5703*
2	1.3e-14	-17.7851	-17.1453	-16.1935
3	1.1e-14	-17.9955	-17.0648	-15.6804
4	3.0e-15*	-19.298*	-18.0766*	-16.2595

Based on the three information criteria AIC, HQIC and FPE the optimal lag length is determined to be four, which is in line with the literature suggestions that AIC can be used as better criteria for quarterly time series data. The next (Table 2) presents the results of the Augmented Dickey Fuller test for stationarity.

Table 2:

Unit root - Augmented Dickey Fuller test

	Variable	**Augmented Dickey Fuller**	**Comment**
Levels	lnGDPreal	-1.034 (-2.904) MacKinnon approximate p-value for Z(t) = 0.7407	H0 accepted H1 rejected
	lnDirtax	-2.788 (-2.904) MacKinnon approximate p-value for Z(t) = 0.0600	H0 accepted H1 rejected
	lnIndirTax	-1.551 (-2.904) MacKinnon approximate p-value for Z(t) = 0.5080	H0 accepted H1 rejected
	lngfcf	-1.931 (-2.904) MacKinnon approximate p-value for Z(t) = 0.3176	H0 accepted H1 rejected
	lnLFPR	-1.746 (-2.904) MacKinnon approximate p-value for Z(t) = 0.4076	H0 accepted H1 rejected
First difference	ΔlnGDPreal	-3.464 (-2.904) MacKinnon approximate p-value for Z(t) = 0.0090	H0 rejected H1 accepted
	ΔlnDirTax	-5.555 (-2.904) MacKinnon approximate p-value for Z(t) = 0.0000	H0 rejected H1 accepted
	ΔlnIndirTax	-5.284 (-2.908) MacKinnon approximate p-value for Z(t) = 0.0000	H0 rejected H1 accepted
	Δlngfcf	-4.218 (-2.904) MacKinnon approximate p-value for Z(t) = 0.0006	H0 rejected H1 accepted
	ΔlnLFPR	-5.985 (-2.904) MacKinnon approximate p-value for Z(t) = 0.0000	H0 rejected H1 accepted

Augmented Dickey Fuller test results suggest that all the variables are non-stationary at their level i.e. having unit root, but they turn stationarity at their first difference. Such results imply Moreover, such results imply the usage of the co-integration methodology where it is suggested that there exists at least one co-integrated vector, and for this reason Johansen test for co-integration is used to check if there is a long run relationship between direct taxes, indirect taxes and economic growth in the Republic of North Macedonia.

Results from the co-integration analysis by utilizing the Johansen –Juselius test are presented in (Table 3) showing the results from the trace test (λ-trace) and maximum eigenvalues test (λ- max) statistics which are used to demonstrate the existence of long run equilibrium among the model. The null hypothesis of no co-integration (r=0) based on both the trace test and the maximum eigenvalues test among *lnGDP, lnDirTax, lnIndirTax, lngfcf* and *lnLfpr* have been rejected at 5% level of significance.

Table 3:

Johansen co-integration test of co-integration

Maximum rank	**eigenvalue**	λ **trace**	λ **max**
0		77.6826	68.52
1	0.40472	33.5915*	47.21
2	0.18180	16.5367	29.68
3	0.12450	5.2350	15.41
4	0.04861	0.9997	3.76
5		0.01169	
Nr. of observations = 85 Nr of lags = 4			

Since the results of the Johansen – Juselius test imply the existence of at least one co-integrating vector, thus the existence of the long – run relationship between the direct taxes, indirect taxes and economic growth, Vector Error Correction Model framework have been used, which is defined as a restricted VAR model for non-stationary series that are known to be co-integrated. By following the Barro (1990) methodology, this paper uses the following VECM equation:

$$\Delta lnGDPreal = \beta_0 + \sum_{k=1}^{r} \alpha_k \phi_{k,t-1} + \sum_{k=1}^{r} \alpha_{1i} \Delta lnGDP_{t-1} + \sum_{k=1}^{r} \alpha_{2i} \Delta lnDirTax_{t-1} +$$
$$\sum_{k=1}^{r} \alpha_{3i} \Delta lnIndirTax_{t-1} + \sum_{k=1}^{r} \alpha_{4i} \Delta lngfcf_{t-1} + \sum_{k=1}^{r} \alpha_{5i} \Delta lnLfpr_{t-1} + \varepsilon_t$$

Table 4 represents VECM results regarding the long run relationship between lnDirTax, lnIndirTax, lngfcf, lnLFPR and the dependent variable lnGDPreal. The coefficients in the table report the long run parameters of the model.

Table 4:

Vector error correction model – VECM

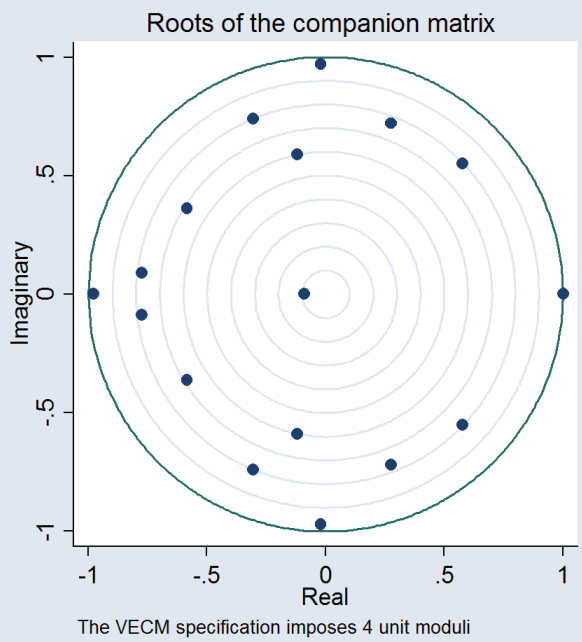
VARIABLE (one co-integration)	B
ΔlnGDPreal	1.000
ΔlnDirTax	- 0.0739 (0.453)
ΔlnIndirTax	0.3713 * (0.000)
Δlngfcf	0.089 (0.653)
ΔlnLFPR	1.913 * (0.000)
Nr. of observations: 83 Log likelihood = 850.6534 Note: β – co-integrating vector; 1.000 – co-integrating vector is normalized with respect to the variable. (*) represent the probability value;	

Finally, from the results that are attained from the Vector error correction model, it can be advocated that there exist a strong and statistically significant positive long run relationship between economic growth and indirect taxes, while on the other side the findings imply a statistically insignificant long-run relationship between economic growth and direct taxes in the case of the Republic of North Macedonia. In addition, there is no evidence for a strong and statistically significant relationship between Gross fixed capital formation and economic growth; while labor force participation rate has a positive effect on the economic growth in the long – run period.

Additionally, post-estimation tests have been used in order to check the stability, residual autocorrelation and test for normally distributed disturbances, where the following graph represents the stability of the Vector error correction model, implying the acceptance of the null hypothesis, thus that the model is stable.

Figure 1:

Stability of VECM



Conclusion

This research article tried to shed light on the long-run effects of direct and indirect taxes on economic growth in the Republic of North Macedonia, by utilizing quarterly time-series data from 2000Q1 to 2021Q4. Employing cointegration analysis and Vector Error Correction Model (VECM), the empirical analysis based on the Johansen-Juselius cointegration test reveals the presence of at least one cointegrating vector, indicating a long-run relationship among real GDP growth, direct taxes, indirect taxes, gross fixed capital formation, and labor force participation rate.

The VECM results demonstrate a statistically significant positive long-run nexus between indirect taxes and economic growth, highlighting their role as a main driver of GDP growth. On the other side, direct taxes show no significant long-run impact on economic growth, due to the tax structure in North Macedonia, where indirect taxes, particularly those on consumption, dominate the composition compared to the direct taxes. These outcomes are in line with neoclassical growth theory and many existing empirical studies (such as Arisoy&Unlukaplan, 2010; Ibraimi & Alili Sulejmani, 2017), which highlight the relatively lower distortionary effects of indirect taxes on productive activities compared to that of the direct taxes. Furthermore, the analysis reveals a positive influence of labor force participation on growth, while gross fixed capital formation shows no significant effect, suggesting potential inefficiencies in capital allocation or external constraints on investment.

This research contributes to the existing literature by providing clear evidence from a small economy such as Republic of North Macedonia, emphasizing the dependent nature of tax-growth dynamics which is also faced by challenges such as the consequences of the COVID-19 pandemic and geopolitical disruptions. However, the main limitation of this study is on the time context, which encompasses tax regime shifts in 2006, 2017, and 2020 (e.g., transitions between flat and progressive income tax systems). These changes, though incorporated, may not fully capture long-run effects.

Based on these findings, the following policy recommendations are proposed to enhance economic growth in North Macedonia:

- **Optimize the Tax composition**: Policymakers should prioritize indirect taxes as a revenue source while minimizing reliance on direct taxes.
- **Enhance Tax Administration**: Implement transparent reforms to improve tax collection efficiency, reduce evasion, and increase voluntary compliance.
- **Promote Growth Fiscal Measures**: Align tax policies with broader macroeconomic objectives by introducing targeted incentives, such as reduced corporate tax rates for innovative sectors or R&D credits, to stimulate private investment and entrepreneurship.
- **Equity and Inclusivity**: To integrate progressive elements into the system, ensuring that growth benefits are distributed inclusively across income groups.
- **Monitor External Shocks**: Given the vulnerability of small open economies to global events, regular testing of tax policies against scenarios like inflation or supply chain disruptions is advisable.

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Abstract

The financial performance of the municipalities is very important because it shows how decentralization is functioning in practice and whether local governments are coping with the responsibilities that have been transferred to them. In recent years, municipalities have been given much greater responsibilities – from public services to infrastructure projects and at the same time they were given much greater financial freedom. The Republic of North Macedonia is an interesting example of this, because the decentralization process in our country began relatively early and is constantly being evolved over the years. Therefore, the aim of this research χ to compare municipalities in the Republic of North Macedonia through the financial performance management index (FPMI) for the period 2021–2023. The results of the FPMI model show that there are clear and lasting differences among municipalities in Macedonia in the way they manage their financial position in the period 2021–2023. Municipalities with stronger own-source revenues and more active capital investment generally achieve better results. Those with limited fiscal space face greater difficulties and tend to rely more heavily on intergovernmental transfers. This paper adds to the existing literature in a way that unlike the private sector in which the assessment of the financial condition of companies has been extensively researched, research on the assessment of the financial condition of local self-government units (LSGUs) is insufficient, especially when it comes to a small and underdeveloped country like the Republic of North Macedonia.

Keywords: financial indicators, municipalities, Republic of North Macedonia, fiscal decentralization, financial performance management index (FPMI)

Introduction

In a period of increased financial instability and uncertainty, many local governments in developing countries face the almost impossible task of financing the local infrastructure and facilities needed to meet the basic needs of a growing urban population. Local finances often suffer from the inability to generate revenues, often limited by inadequate regulatory frameworks or unfavorable political structures, creating a vicious circle of budget shortfalls, stifling urban conditions, and economic stagnation. A large number of municipalities, especially in developing countries, depend mostly on central government transfers.

For sustainable and responsible fiscal policy, municipalities in developing countries must use an increasing percentage of their own financial resources from tax and non-tax revenues collected through user taxes and fees.

Local governments are closest to citizens, so delegating more responsibilities to the local level and providing more funds is a step forward in creating more functional municipalities and more efficient service delivery. They take care of many important areas that directly affect the lives of citizens. They are responsible for education, social protection, environmental protection, utilities, sports and recreation, fire protection, etc., so it is very important for them to have stable finances.

Since the beginning of July 2005 and with the adoption of the Law on Financing of Local Self-Government Units (2004), a period of fiscal decentralization has begun. Fiscal decentralization actually represents the financial independence of the LSGUs in the Republic of North Macedonia.

The goal of fiscal decentralization is to create conditions for LSGUs to mobilize financial resources through their own source revenues, such as local taxes, fees, and charges, but also through transfers from the central government and through their own borrowing. The experience of these 15 years shows that the process of fiscal decentralization is a long-term and gradual process that is often accompanied by fiscal instability and a lack of financial resources, which generates inequality among municipalities. This situation is most often a consequence of insufficient realization of own revenues as well as an insufficient percentage of transfers from other levels of government to cover the expenditures of the LSGUs.

The possibilities and solutions for improving the financial capacities of local governments should be sought in the structure of the revenues and expenditures of municipalities and the possibility of their optimization. This would also make them

more competitive on the capital market if they were to borrow, which would enable greater and more efficient economic development in the future, and thus the opportunity to fulfill their basic function of providing better living conditions for citizens, as emphasized by the authors Oates (1999), as well as Bird and Smart (2010).

Due to the great importance of the financial stability of local governments, the purpose of this research is to compare municipalities in the Republic of North Macedonia through the FPMI index for the period 2021–2023.

This paper adds to the existing literature in a way that, unlike the private sector, in which the assessment of the financial condition of companies has been extensively researched, research on the assessment of the financial condition of LSGUs is insufficient, especially when it comes to a small and underdeveloped country like the Republic of North Macedonia.

Literature Review

Fiscal decentralization is a topic that has been lingering in public finances for years. It is often presented as a universal solution for many problems in the public sector, but the truth is that things are not that simple. The basic idea is, roughly speaking, to give more power to the local level – more money, more responsibilities, more right to decide.

Theorists such as Bahl and Linn (1992) and Oates (1999) have long argued that when municipalities have greater decision-making autonomy, the services they provide become better, closer to the real needs of people, and a kind of natural accountability is created. Later, other authors continue to develop the same line of argument. They wrote that transparency was improving, that resources were being spent more wisely, and that citizens were having more influence over the money spent. And this appears logical – when decisions are made closer to the people, there is a greater chance that the public resources will be allocated towards well-justified purposes . But, as with all good ideas, there is a "but." Decentralization without capacity – without trained people, without functional systems, without a good administrative structure – can very easily create chaos. No theory can fix that. In some countries, municipalities get responsibilities but don't have enough revenues. Others get a huge amount of resources but don't have enough control over spending.

Bird and Smart (2010) emphasize that true accountability exists only when the revenues are generated locally, not when the state always "patches" the financial gaps. Shah (2006) speaks of the need for performance-based systems, while Rodden (2004) warns against so-called "soft budget constraints", when municipalities know that even if they make mistakes, the central government will bail them out. Because of these risks, many countries have been trying, in recent years, to measure what exactly is happening at the local level.

As a result, various indices emerge – including the FPMI – to provide quantitative evidence of where the problems are and where some progress is being achieved. It is often mentioned in the literature that successful decentralization depends not only on the transfer of competencies but also on whether local institutions can manage the funds they receive. Smoke (2015) says that the allocation of functions is only one part, and that the real challenge is the capacity to manage those functions.The World Bank (2020) and OECD (2022) consistently emphasize that transparency and data monitoring are the foundation for sound fiscal management under decentralization.

On the other hand, Koprić, Marčetić, and Škarica (2021) emphasize that stable financial rules and professional staff are equally important. Indices like FPMI are used precisely to bring order to that "forest" of data. If anything has value, it is the ability to see how financially healthy a municipality is: whether it has revenues, whether it spends rationally, whether it invests, and whether it borrows too much. At the international level, these indicators have long been used for comparison between countries, but also between municipalities within the same country. More recent analyses in our country, such as those by Kostadinovska and Risteska (2022), indicate that if local government wants to be stable, then it must have clear, measurable indicators. Without measures, there is no real accountability.

Research by Rodden (2006) shows that differences between municipalities can be very large even when they all operate under the same legal framework. Therefore, in this paper, we pose the first hypothesis:

H1: Municipalities in the Republic of North Macedonia are likely to have significant differences in financial performance in the period 2021–2023.

Regarding revenues, Oates (1999) points out that municipalities with greater financial autonomy operate more efficiently. Our State Audit Office (2022) also notes that many municipalities have a problem with low levels of own revenues. Therefore, we expect:

H2: A higher share of own-source revenues means better financial performance of the municipalities in the Republic of North Macedonia.

Many authors confirm the thesis that, unlike the current operational expenditures of municipalities, capital expenditures are much more significant when it comes to stimulating the growth and development of municipalities, as well as in terms of strengthening their financial capacities. Capital expenditures represent the only profitable spending for municipalities, because capital investments have the potential to generate their own revenues in the future.

H3: The increase in profitable capital expenditures has a positive impact on strengthening the financial performance of the municipalities in the Republic of North Macedonia.

According to the World Bank (2019), sustainable borrowing implies that local governments should not borrow more than they can repay in order not to jeopardize their financial stability.

H4: High levels of indebtedness negatively impact the financial performance of the municipalities in the Republic of North Macedonia.

Methodology

This research applied the FPMI in order to assess the efficiency of the financial performance of the municipalities in the Republic of North Macedonia in the period 2021-2023. Simply put, FPMI attempts to answer a very practical problem: how does a municipality fare financially, both in the short and long term? Instead of everyone interpreting the numbers in their own way, the index takes key financial indicators, processes them in the same way, and creates a single, unified value. This allows for easy comparisons — both between municipalities and over time.

In order for the FPMI index to be calculated for every municipality, each indicator is converted to a scale from 0 to 1, and then all the resulting values are averaged. Since every indicator is important to us — be it liquidity, income, debt, capital investments — they all receive equal weight. The formula used for calculating the FPMI is the following:

$$FPMI_{it=} \frac{\sum_k wk*N(X_{kit})}{\sum_k wk}, \quad (1)$$

,where $FPMI_{it}$ denotes the fiscal performance index for municipality i in year t; X_{kit} represents the observed value of the k-th financial indicator; $N(X_{kit})$ is the normalized score of that indicator and wk denotes the weight assigned to each variable.

Normalization, or converting numbers to a common scale, is necessary because municipalities are different; some are very large, others very small, taxes are different, and both revenues and expenditures range in very different amounts. With the Min–Max method, each value is compared to the lowest and highest value across all municipalities. This way, all data gets an "equal chance" to reflect the real situation. For indicators where higher values are desirable — such as own revenues, capital expenditures, or the current financial balance — normalization is moving in a positive direction. Conversely, for indicators that show weaker performance when increasing — like debt or budget deficit — the value must be inverted for the score to remain comparable. The formula applied for normalization of the five indicators is the following:

$$N(Xkit)=1-\frac{X_{kit}-\min(X_k)}{\max(X_k)-\min(X_k)} \quad (2)$$

Notable, the FPMI index covers exactly the five areas that best capture the municipality's financial "health": how much revenue it generates on its own (OS/TR), how much it invests in capital long-term projects (CE/TE), how liquid it is (CR), how much debt it has (D/TR) and whether it keeps its expenses under control (BB/TT).

After we calculate the FPMI, each municipality is categorized under three groups, such as weak, moderate, or good. This is not just a theoretical determination; such groupings are often used by international organizations when monitoring local governments in different countries.

In order for the research to be conducted, we took publicly available data from the Ministry of Finance, municipal budgets, and reports related to fiscal transparency (PEFA), for the period 2021-2023. Additionally, because we build our research around a representative sample of municipalities in the Republic of North Macedonia, we selected 16 municipalities which fall under three structured criteria: amount of approved last year's municipal budget, number of residents, and type of municipality (urban or rural).

Results

The Financial Performance Management Index (FPMI) was created to make it easier to compare how municipalities manage their finances under fiscal decentralization. It uses five basic indicators — own-source revenues (OS/TR), capital spending (CE/TE), liquidity, debt levels (D/TR), and the budget balance (BB/TT). When these indicators are brought together into one score, the index shows how financially stable a municipality is and how well it handles its resources. Table 1 shows an overview of the indicators that make up the FPMI, by municipality, for the period 2021-2023. The trend symbols presented in Table 1 reflect whether the municipality's financial performance has improved, stagnated, or deteriorated over the period 2021–2023, while the band classification (Weak, Moderate, Good) represents the municipality's current performance level based on the FPMI value. Based on the FPMI scores, municipalities were grouped into three performance categories: those with values below 0.40 were classified as 'Weak', municipalities with values between 0.40 and 0.59 as 'Moderate', and municipalities with FPMI values of 0.60 and above as 'Good'. This combined approach allows for a simultaneous assessment of both the dynamic evolution and the current financial position of each municipality.

Table 1:

Overview of indicators (FPMI), by municipality, for the period 2021-2023

Municipality	OS/TR	CE/TE	CR	D/TR	BB/TB	Trend	Band
Gostivar	0.61	0.30	1.36	0.04	0.00	—	Weak
Ohrid	0.76	0.31	1.50	0.11	0.06	▲	Moderate
Bitola	0.58	0.45	1.72	0.08	0.02	—	Moderate
Kavadarci	0.55	0.44	1.49	0.34	0.01	▼	Weak
Strumica	0.64	0.45	1.85	0.16	0.04	▲	Moderate
Shtip	0.64	0,32	1.46	0.03	0.07	—	Moderate

Kriva Palanka	0.27	0.36	1.25	0.22	0.00	▲	Weak
Aerodrom	0.71	0.24	1.32	0,00	0.01	▼	Weak
Bogovinje	0.47	0.37	1.64	0.00	0.01	▲	Moderate
Debrca	0.27	0.42	1.62	0.05	0.09	—	Moderate
Novaci	0.14	0.40	0.84	0.04	0.02	—	Weak
Rosoman	0.24	0.63	1.84	0.00	0.04	▲	Good
Konche	0.06	0.46	0.91	0.00	0.05	▼	Weak
Zrnovci	0.23	0.40	1.67	0.31	0.34	▼	Weak
Rankovce	0.21	0.46	1.99	0.00	0.05	▼	Moderate
Zelenikovo	0.30	0.44	1.92	0.43	0.00	▲	Weak
Average values	0.42	0.41	1.33	0.09	0.05		

The indicator of own revenues in relation to total revenues shows us own taxes and revenues as a share of total revenues. The low values obtained as a result for this indicator indicate the dependence of municipalities on other sources of financing, which, in the case of municipalities in the Republic of North Macedonia, are funds provided by transfers from the central government. If the indicator shows a higher percentage, it indicates that the municipality provides sufficient own funds to cover its expenses, and thus shows a higher degree of self-sustainability. From Table 1, we can see that the average rate of participation of own revenues in total revenues in the period 2021-2023 is around 0.42. This means that around 42% of the total revenues of municipalities are obtained by collecting mainly tax funds from the population. The Municipality of Ohrid shows the highest value for this indicator with 76%. With this data, it can be concluded that the Municipality of Ohrid and all other municipalities that generate more than half of their revenues through tax collection are financially more self-sustainable compared to municipalities that do not generate even half of their total revenues from taxes. The tax revenue indicator

in relation to total revenues for the Municipality of Konce is only 6%, and for the Municipalities of Rankovce and Zrnovci it is around 20%. This is a very low value for the indicator and indicates complete dependence on other sources of financing for these municipalities, reducing their ability for self-sustainability to the lowest level.

From Table 1 it can be seen that the average value of the indicator for capital expenditures in relation to total expenditures is 41%. The Municipality of Rosoman allocates the largest portion of its funds for capital investments with 62%, while the Municipality of Aerodrom allocates the least funds for this type of expenditure with only 24%. As many as 15 municipalities from the representative sample record a rate of average capital expenditures in relation to total expenditures that is less than 50%. Municipalities in the Republic of North Macedonia must find a way to reduce their current operating costs and direct their funds into capital investments that will strengthen their financial capacity. However, it should be noted that not all capital investments have had the opportunity to generate revenue. Therefore, it should be ensured that the trend of increasing capital expenditures is directed towards real investments that will generate revenue in the future or improve the overall living conditions in the municipality.

In continuation of Table 1, values for the indicator of current operating revenues in relation to current operating expenses (liquidity indicator) of the municipalities from the representative sample for the period from 2021 to 2023 are shown. The higher the values for this indicator, the more funds the municipality has left for spending after covering its current operating costs. These funds could then be used for capital investments that would directly improve the financial capacity of the municipality. Accordingly, higher values for the liquidity indicator indicate financially stable and liquid municipalities. The municipalities of Rankovce, Zelenikovo and Bitola show the highest liquidity rate. Two municipalities included in the analysis do not generate enough current operating revenues to cover their current operating expenses, which is why their liquidity rate is less than 1. These are the municipalities of Novaci and Konce.

From the data obtained in this research, it can be noted that the municipalities in our country are either debt-free, such as the Municipalities of Aerodrom, Bogovinje, Rosoman, Konce and Rankove, or are averagely indebted, such as the Municipality of Zelenikovo with as much as 43% and the Municipality of Kavadarci with 34%, the Municipality of Zrnovci with 31% and the Municipality of Kriva Palanka with 22%. The low indebtedness of the remaining municipalities in the Republic of

North Macedonia does not reflect the strong financial capacities of the municipalities. From the analysis so far, we have already concluded that the municipalities do not generate enough of their own funds, which makes their financial capacities relatively weak. The low indebtedness of municipalities is mainly a reflection of their weak financial capacities, which makes them insufficiently creditworthy for borrowing, as there is a risk that they will not generate sufficient funds in the future to be able to repay the borrowed funds. Borrowing money from the municipality to cover its current operating costs is not smart at all and should not be implemented.

Additionally, we can note that the average amount of budget balance in relation to the total balance of the analyzed municipalities for the period from 2021 to 2023 is 5%. The largest amount of budget surplus is achieved by the Municipality of Zrnovci, and the smallest by the Municipalities of Aerodrom and Bogovinje. From here, we can draw a very positive conclusion that all municipalities in the representative sample generate more revenue than expenditure, and no municipality shows a budget deficit in the period from 2021 to 2023.

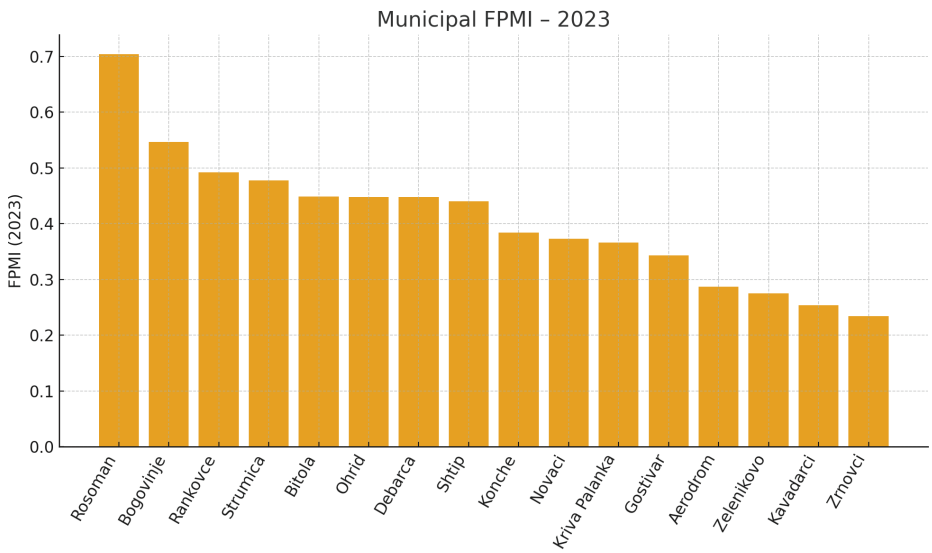
The trend lines that are part of the FPMI analysis show that the municipalities of Ohrid, Strumica, Kriva Palanka, Bogovinje, Rosolman, and Zelenikovo are recording an improvement in their financial performance, but, on the contrary, the municipalities of Kavadarci, Aerodrom, Konce and Rankovce, in the period 2021-2023, have worsened their financial stability and independence.

The results of the FPMI model show that there are clear and lasting differences among municipalities in Macedonia in the way they manage their financial position in the period 2021–2023, which is visually presented in Figure 1.

Muncipality Rosoman is at the top of the table, with the highest index (0.70). This means that the municipality operates very stably, it demonstrates good liquidity, low debt levels, and balanced spending. It also manages to maintain a solid base of its own revenues and continuously invests in infrastructure – a strong sign of financial sustainability. On the other side of the graph we have the Municipalities Kavadarci (0.27) and Zrnovci (0.24). These municipalities have the lowest FPMI score in the analyzed period and a strong dependence on central transfers. The municipalities of Strumica (0.48), Bitola (0.45), Ohrid (0.44), Debarca (0.44), and Shtip (0.43) are in the middle of the scores scale. These municipalities show solid yet moderate results overall. They generally keep their costs under control and maintain stable liquidity, but their progress in capital investment and broadening their revenue base is noticeably slower.

Figure 1:

Ranking of municipalities by FPMI in 2023



With FPMI scores from 0.24 to 0.70, we can conclude that there are significant differences between the municipalities in the Republic of North Macedonia. The average FPMI of around 0.43 indicates that most municipalities are at an intermediate level, while only a few of them manage to achieve high standards. These results also support the idea that municipalities with more financial autonomy and careful management of debt and spending tend to achieve stronger overall financial performance.

Conclusion

The analysis conducted in this research achieved its primary goal, namely to compare municipalities in the Republic of North Macedonia through the FPMI index for the period 2021–2023. Urban municipalities generate far more of their own revenues than rural municipalities. This disparity in the financial capacities of municipalities affects the quality of life and the quality of public goods and services that the municipality is obligated to provide to its citizens. Therefore, municipalities with lower total revenues are not able to provide equal living conditions as financially stronger municipalities could, which in some cases leads to the centrali-

zation of the population in certain municipalities or regions. These arguments confirm hypotheses H1 and H2.

Municipalities use the majority of their revenues to cover their current operating costs. This is an inefficient way of spending municipal money, at the expense of insufficient capital expenditures that will yield future financial benefits. Therefore, municipalities that have solid amounts of profitable capital investments are also more financially stable, which confirms hypothesis H3.

The weak financial capacities and low level of generated own revenues of municipalities lead to their weak creditworthiness and limited sources of borrowing. The low level of generated own revenues categorizes municipalities as inadequate for borrowing due to the risk that they will not be able to generate sufficient financial resources in the future to be able to repay the borrowed funds. Due to the inability to borrow and collect additional funds to carry out its obligations and responsibilities, the central government maintains its financial stability through transfers to municipalities; therefore, we are unable to accept or reject hypothesis H4.

Several practical recommendations follow from these findings. First, municipalities should have more financial independence and a wider revenue base, particularly by improving the collection of property taxes and utility charges. Second, capital projects need to be carefully prepared and carried out in a transparent manner so they can generate long-term value. Third, borrowing should remain strictly controlled and limited to investments that can produce measurable returns. Fourth, regular monitoring of financial results—using instruments such as the FPMI—can help strengthen financial discipline and identify problems early. Finally, greater transparency and accountability would improve public trust and provide stronger support for the decentralization process.

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Growth Without Equity: Evidence of Non-Inclusive Economic Growth in the Balkans

Ivana Beciragic

Abstract

In the context of ever-evolving economic insecurities that threaten the global economic well-being, and focusing on the implications for the Balkans, this paper aims to investigate the relationship between economic growth and poverty in this region. The paper covers the period from 2006 to 2021 for the following countries: Albania, Bulgaria, Greece, Croatia, North Macedonia, Montenegro, Romania, Serbia, Slovenia, and Kosovo. The research explores whether economic growth in the region has been inclusive by estimating bidirectional panel regression models. The results of the model show that GDP growth is associated with a rising income share of the poorest 20%. On the other hand, in the control model, when the variables' position is swapped, the income share of the poorest 20% seems to be associated with rising economic growth. To test the directional predictive power, the Granger test was introduced. The results from the Granger causality test show that the trend in economic growth truly predicts the trend of the income share of the poorest 20%. In contrast, the income share of the poorest does not Granger-cause GDP growth, suggesting that the relationship is unidirectional. The positive and statistically significant coefficient suggests that GDP growth does impact improving the income share of the poorest 20%, but the low value of the coefficient shows that this effect is relatively modest in magnitude. This means that growth alone contributes to inclusion, but not strongly or quickly enough to ensure equity. The observed relationship supports the idea of non-inclusive growth, where benefits do not automatically trickle down to the poorest.

Keywords: Inclusive Growth; Poverty; Granger Causality; Balkan Economies; Panel Data Analysis

Introduction

We live in times of global uncertainties. Still unable to reach pre-2008 levels of economic growth, the world experienced the pandemic crisis in 2020, which was followed by an energy crisis and an inflation crisis that was initially caused by the pandemic but later exacerbated by the war in Ukraine. At the time of writing this paper, the global trade system faces severe disruptions caused by the new tariffs imposed by the Trump administration. In addition to Trump's unpredictable policies that may significantly impact global supply chains and prices, we are on the brink of an AI transformation of markets, the economy, and society. It is difficult to imagine tomorrow's economy; some views are optimistic, emphasizing productivity gains and technological innovation, while others are even concerning, warning that the benefits of technology-driven growth may not be evenly distributed and could widen existing inequalities.

All this puts additional pressure on governments to adapt their policies towards improving the economic well-being of their citizens. The more the country has strong institutions and robust welfare systems, the easier it is to mitigate the shocks that may arise from these turbulent times. Unfortunately, both institutions and welfare systems in Balkan countries need improvements. This makes the countries from this region especially vulnerable to such external conditions, global demand shifts, instability from geopolitical aspects, etc. There is also the problem of uncertainty about their integration into the European Union. Another challenge is the gap in technology innovation and digitalization between the region and the developed economies. Having this in mind, we should ask the question of whether these countries could integrate into the new AI-driven world or if they will continue to lag behind, further deepening the inequality.

The reasons for the low inclusivity of economic growth in the Balkan countries are multidimensional. Firstly, the growth in these countries tends to be concentrated in a few specific sectors, such as construction, the financial sector, or telecommunications, that are capital-intensive, instead of labour-intensive. Naturally, the economic benefits end up with the owners of that capital, rather than the workers. At the same time, Balkan countries are characterized by weak redistribution systems, meaning that the trickle-down effect is lacking, i.e., the fruits of the growth do not trickle down to the poorer parts of the population. This is especially concerning given that a big portion of the GDP falls out to personal consumption, and a poor population makes for poor consumers and weak markets. When tax systems are not progressive, this additionally contributes to a limited fiscal space. Last but not

least, the region is also known for the brain-drain problem, which contributes to a lack of skills on the labour market, aging of the population, and general apathy about the future of the human capital.

Despite sharing these properties, the Balkans still remain an important case study for inclusive growth because it is a region of heterogeneity regarding both economic growth and income inequality. Also, some of the countries are EU members, while others are not.

This paper covers the period from 2006 to 2021 for the following countries: Albania, Bulgaria, Greece, Croatia, North Macedonia, Montenegro, Romania, Serbia, Slovenia, and Kosovo. We are using World Bank data and analyzing the relationship between indicators such as GDP growth (%) and income share held by the poorest 20% as a proxy.

Lack of available and harmonized data for this region poses methodological challenges and contributes to the small number of empirical studies. There is a difference in statistical coverage, and national statistical offices are not synchronized regarding their methodology in data collection and production. To avoid the "garbage in – garbage out" problem, we used harmonized data coming from the same database – that is, the World Bank Database available online. In the future, when data are available for longer periods of time, it would be useful to repeat this econometric exercise and compare its results.

To investigate this research question, bidirectional panel regression models are applied, and Granger causality tests are used to detect both the direction and strength of influence between growth and poverty. This evidence-based insight from the recent past should inform researchers and policymakers as they confront the welfare challenges that lie ahead.

Literature Review

Several studies have examined the inclusiveness of economic growth in the Western Balkans and broader European context. Mansi et al. (2020) employ a panel fixed effects model for EU and Western Balkan countries (2009–2018). They find that GDP per capita and income inequality are major drivers of poverty, with economic growth having a particularly strong influence in the Western Balkans due to their lower baseline levels of development. They argue that unemployment and governance factors, including corruption and administrative inefficiencies, play a crucial role in shaping poverty outcomes.

Panek and Zwierzchowski (2022) are using indicators such as PEGR (Poverty Equivalent Growth Rate) and RPPG (Rate of Pro-Poor Growth) to analyze whether economic growth in the Balkans has been pro-poor in the period from 2012 to 2017. They find that the Balkan countries differ in this respect, i.e., the growth is pro-poor in Croatia and Slovenia, but it does not support the most vulnerable in Bulgaria and Greece. This leads to the conclusion that periods of GDP expansion matter little to those countries that have persistent and structural inequality.

Banda et al. (2022) examine the impact of poverty and education on GDP across the Western Balkans, covering the period starting from the early nineties up to the pandemic crisis. Using panel data regression, they found a statistically significant and negative effect of poverty levels on growth. This indirectly suggests that high poverty can limit both productivity and the development of human capital. The results from this study accentuate the importance of educational reforms and higher redistribution.

Another study analyzes the impact of foreign direct investments on poverty outcomes in the Western Balkans. This is important because, for a long time, the public discourse recognized FDI as a driver of both growth and employment. This study by Topalli et al. (2021) showed that foreign direct investment reduces poverty in the Western Balkans through job creation, inflow of capital from foreign countries, and other types of spillovers in productive sectors. However, the study accentuates that these effects depend on the quality of the institutions in the host country, the level of corruption, and the flexibility of the labor market.

In addition, World Bank (2022) reports provide updated descriptive insights: while growth rebounded post-COVID, high inflation threatens poverty reduction trends. Labor shortages and wage-productivity gaps persist, suggesting structural challenges that go beyond short-term growth fluctuations.

Taken together, these studies demonstrate that growth has the potential to reduce poverty, but its impact is highly context-dependent. Growth is not sufficient on its own, especially in transition economies where structural inequalities limit the benefits of expansion. Redistribution systems in the Balkans often lag behind those in Western Europe, weakening the transmission mechanism through which growth should translate into rising living standards for vulnerable groups.

Author(s)	Year	Topic	Method	Key Findings
Mansi et al.	2020	Poverty and its drivers in the EU and Western Balkans (2009-2018)	Fixed effects panel regression; PGLS; descriptive analysis	Income inequality and GDP per capita significantly influence poverty in both regions. In WB, GDP per capita has a much stronger (negative) effect. Unemployment and governance are also key drivers. Education and investment are less consistently significant.
Panek & Zwierzchowski	2022	Pro-poor growth in 6 Balkan countries (2012–2017)	PEGR, PPGI, RPPG, stochastic dominance, EU-SILC panel data	Growth was pro-poor in Croatia, Romania, and Slovenia; non-pro-poor or mixed in Bulgaria, Greece, and Serbia. The effect depends on the poverty indicator (incidence, depth, severity). During recessions, inequality sometimes decreases, favoring the poor. Measures do not always give consistent results.
Banda et al.	2022	Impact of poverty and education on GDP in Western Balkans (1990–2020);	Panel data econometrics via EViews; FE model based on the Hausman test	Significant negative effect of poverty and positive effect of education on GDP. Also, unemployment and inequality negatively affect growth. Emphasizes the importance of quality education and context-specific policy design for the region.

Author(s)	Year	Topic	Method	Key Findings
Topalli et al.	2021	The effect of FDI on poverty in the Western Balkans	Panel data (2002–2021); Fixed Effects & Dynamic GMM estimation	FDI has a significant negative effect on poverty, meaning it contributes to poverty reduction. HDI, investment and economic freedom, labor participation, and remittances also reduce poverty. Corruption increases it. GMM results are consistent and robust across poverty headcount, poverty gap, and Gini index indicators.
World Bank	2022	Economic growth, labor, and poverty in the Western Balkans	Descriptive analysis with projections	Growth rebounded post-COVID, reaching 3.4% in 2022. Poverty declined slightly, but high inflation—especially in food and energy—threatens this trend. Without government intervention, the number of poor would increase sharply. Labor shortages and wage-productivity gaps persist.

Descriptive Analysis

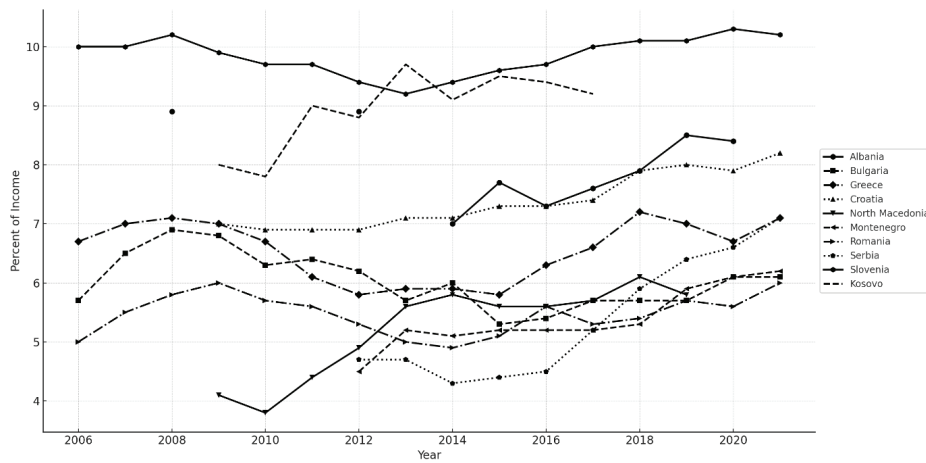
As a proxy for measuring poverty in the selected Balkan countries, the indicator income percentage of the poorest 20% of the population was used. The indicator is available in the World Bank's online database. Looking at Figure 1, it is noticeable that the income share held by the poorest 20% varies significantly between countries. Not surprisingly, Slovenia shows the highest percentage of 10.2% - a sign of effective redistribution. The lowest percentage of income held by the poorest

20% of the population is recorded in Romania at 6%, reflecting higher inequality. The regional average for the analyzed countries is 7.27%, with Serbia showing the strongest improvement over time, with a 2.5 percentage point increase.

These differences may result from variations in redistribution systems, different levels of social transfers, labor market structures, and demographic characteristics. Slovenia's success can be partially attributed to strong unions, a higher minimum wage, and a robust welfare model inherited from its Yugoslav past and aligned with EU standards.

Figure 1:

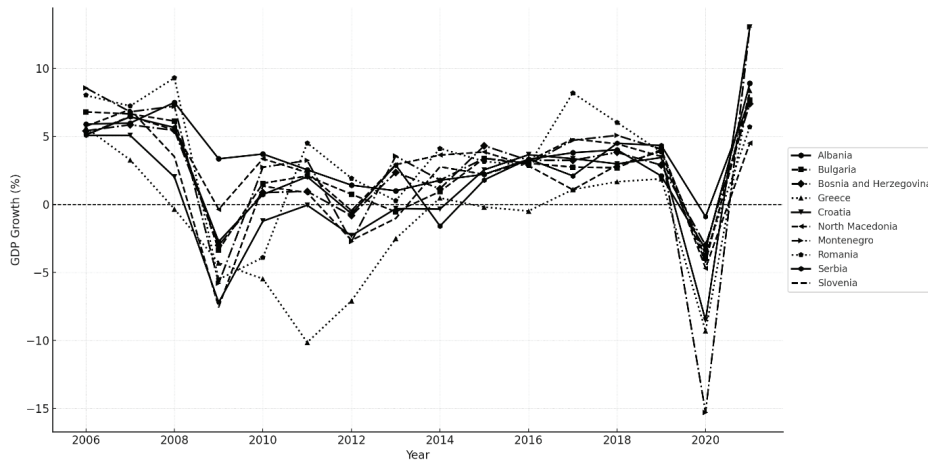
Income share held by the poorest 20% of the population (2006-2021)



Looking at GDP growth, the 2019 data, before the big disruption caused by the pandemic, shows a regional average of 3.52%, which is notably lower than pre-2006 levels. Kosovo had the highest growth at 4.76%, mostly driven by infrastructure and consumption. On the other hand, Greece had the lowest GDP growth at 1.88%, still recovering from its prolonged debt crisis.

Figure 2:

GDP growth in the Balkan countries (2006-2021)



Growth rates across the region are volatile and heavily influenced by external shocks. Countries like Albania and Montenegro rely heavily on tourism, which collapsed during the pandemic. Others, like North Macedonia and Serbia, depend significantly on external demand from the EU. GDP growth is generally weaker when comparing 2019 to pre-crisis 2006 levels. This slowdown reflects structural challenges such as low productivity, labor emigration, and slow adoption of technological innovation.

Methodology and Results

To test the research question "Is the economic growth inclusive in the Balkans – measured by its effects on the poorest population?", the model employed in this paper is the bidirectional panel regression model accompanied by a Granger causality test. The variables that were used were the following: 1) as a proxy for poverty – Income Share Held by Lowest 20% of the Population; 2) GDP growth (annual %). Both variables can be found online at the World Bank Database. It should be noted that some of the missing values for the income share held by the poorest 20% of the population have been interpolated. In our models, the variables were abbreviated as PVR and GDP, respectively.

To check the stationarity of the variables, an IPS unit root test (Im–Pesaran–Shin) was applied. The first difference was used for the PVR variable. Estimation of both fixed effect and random effects models followed, using the Hausman test. The results from the Hausman test showed that the random effects model is suitable.

In addition, standard errors were clustered at the country level to account for within-country serial correlation and heteroskedasticity. This allowed for a robust estimator.

The following two models were estimated:

Model 1: Poverty as the dependent variable

$$\Delta PVR_{it} = \alpha + \beta \cdot GDP_{it} + u_i + \varepsilon_{it}$$

Model 2: GDP growth as the dependent variable

$$GDP_{it} = \alpha + \beta \cdot \Delta PVR_{it} + u_i + \varepsilon_{it}$$

The reason behind testing the bidirectional model is to test if there is a mutual influence between GDP growth and poverty. This is crucial because economic growth might influence poverty levels, and poverty might in turn affect growth capacity (e.g., through labor productivity, education, etc.). Tables 1 and 2 show the results obtained for the models.

Table 1:

Results from Model 1

Variable	Coef.	Std. Err.	p-value	95% Confidence Interval
GDP	**0.0238**	0.0086	**0.005**	[0.0070, 0.0406]
_cons	0.0201	0.0382	0.599	[–0.0549, 0.0951]

Table 2:

Results from Model 2

Variable	Coef.	Std. Err.	p-value	95% Confidence Interval
dPVR	**2.680**	0.823	**0.001**	[1.067, 4.293]
_cons	2.253	0.268	0.000	[1.728, 2.777]

The results from model 1 show that a one percentage point increase in GDP growth is associated with a 0.0238 percentage point increase in the income share of the poorest 20% (PVR). This relationship is statistically significant at the 5% level (p = 0.005).

The results from model 2 show that a one percentage point increase in the income share of the poorest 20% is associated with a 2.68 percentage point increase in GDP growth, statistically significant at the 1% level (p = 0.001).

The results shown above indicate a bidirectional relationship between the variables, as expected. This is why we proceed to test the causality between the variables using the Granger causality test. The results are shown in Table 3.

Table 3:

Results from the Granger causality test

Equation	Excluded Variable	χ^2	p-value	Conclusion
PVR	GDP	6.369	0.012	Reject H_0 → GDP Granger-causes PVR
GDP	PVR	3.053	0.081	Do not reject H_0 → PVR does not Granger-cause GDP

The results from the Granger causality test show that GDP growth Granger-causes changes in PVR (p = 0.012), i.e., past values of GDP help predict changes in the income share of the poorest 20%. On the other hand, changes in PVR do not Granger-cause GDP (p = 0.081), i.e., past values of PVR do not predict GDP growth in a statistically significant way. The causal flow appears unidirectional: economic growth drives changes in income among the poorest, but not the other way around. In other words, poverty reduction alone doesn't fuel growth in this region (at least in the short term).

Despite these results, the desired effect of decreasing poverty levels with increased economic growth is missing. This can be explained by the low coefficient in Model 1 (0.02).

Conclusion

In order to test the relationship between economic growth and poverty in the Balkan countries and provide evidence-based conclusions about the level of inclusivity of the economic growth, this paper tested a bidirectional panel regression model. Using stationary variables and robust estimators, we have used the Hausman test, which indicated that the random effects model was adequate for the sample. The countries in the sample are the following: Albania, Bulgaria, Greece, Croatia, North Macedonia, Montenegro, Romania, Serbia, Slovenia, and Kosovo. The paper covers the period from 2006 to 2021.

The results from the panel regression models showed a bidirectional relationship between GDP growth and the income share held by the poorest 20% of the popula-

tion. The results from the Granger causality test showed a unidirectional causality, indicating that economic growth improves poverty outcomes. However, the coefficient of 0.02 suggests that, even though economic growth has a positive effect on poverty of 20%, that effect is very modest. Growth contributes to inclusion, but not strongly or quickly enough to ensure equity. The observed relationship supports the concept of non-inclusive growth, where the benefits of expansion do not automatically trickle down to the poorest.

GDP growth alone has not translated into greater equality. Structural reforms are therefore needed to make growth more inclusive. Countries should not only focus on expanding output but also on building resilience and strengthening redistribution mechanisms to protect vulnerable groups in times of crisis. Market forces alone do not guarantee equity. Redistribution and targeted public policies are essential. The results show that economic growth moves in the right direction, but the magnitude is insufficient. With the right interventions, however, the Balkans could unlock a more powerful and sustainable poverty-reducing effect.

Countries should not only focus on economic growth but also on building resilience and strengthening redistribution mechanisms to protect vulnerable groups in times of crisis and enable every citizen to contribute to economic development.

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A Study of the Determinants of Capital Structure of Selected Cement Companies in India

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BALKAN JOURNALS

Abstract

Capital structure poses many challenges for companies. An appropriate mix of equity and debt is one of the most premeditated decisions for any organization. A wrong decision may hamper the growth of the company. There are many factors that must be taken into cognizance in determining the right mix of equity and debt. The Indian cement industry consists of a large number of small and big firms; however, 23 listed prominent cement companies are selected to identify relevant determinants of capital structure in the present study. Based on the analysis, it was found that factors such as growth, asset tangibility, tax rate, profitability, liquidity, size, cost of debt, and interest coverage ratio have a significant impact on the capital structure of the selected cement companies.

Keywords: Cement Industry, Capital Structure, Determinants of Capital Structure

Introduction

Capital structure is a combination of debt and equity capital that the company uses to finance its assets, operations, and future growth (Baker & Martin, 2011). It is the ratio between owner's funds and borrowed funds, i.e., long-term sources of funds. Owner's funds include share capital, preference share capital, reserves and surplus or retained earnings, and borrowed funds include long-term debts such as bonds, loans from banks and other financial institutions (Bhayani, 2005).

Capital structure refers to the amount of debt and/or equity used by a company to finance its operations and finance its assets. The proportion of debt to equity is a strategic choice of corporate managers (Niresh & Velnampy, 2012). This is usually expressed as a debt-to-equity ratio or debt-to-equity. Debt and equity funds are used to finance business operations, capital expenditures, acquisitions, and other investments. These decisions are very crucial for any firm, whether to raise funds from debt or equity, as both sources have specific cost of capital and affect the value of the firm (Jain & Khalsa, 2019).

The most appropriate capital structure for an organization is one of the most debated issues. While some arguments state that capital structure is not relevant for the valuation of a company's securities or the risk of investing in them, others comment that capital structures increasingly affect both value and risk. The optimal capital structure is constantly evolving, and successful business leaders must constantly consider factors such as the company and its management, government regulations, societal trends and the state of capital markets and industry dynamics (Handoo & Sharma, 2014). The term "capital structure" represents the share of capital that a company uses in its operation. Companies either use equity or debt or a combination of these to finance assets. The paper on capital structure was originally presented by Modigliani and Miller (1958).

Capital structure has been recognized as a significant factor that considerably affects the profitability of companies. A company's profitability is a key factor in measuring performance and enhancing its reputation. It also increases the value of both investors and owners. However, the profitability of a company is affected by many internal and external factors. Among these factors that significantly influence the profitability of companies is their capital structure (Sdhiq & Sher, 2014; Babbar & Singh, 2024).

The most appropriate financial structure of the organization is the most debated question. While some controversies suggest that financial performance is not critical to in-

forming or investing in corporate securities, others point out that capital formation has always had a significant impact on both value and risk. The ideal financial structure is constantly evolving, and successful corporate leaders must constantly consider factors such as corporate governance, economy, public administration, social customs, financial market conditions and industry flexibility (Handoo & Sharma, 2014).

Literature Review

Theories of capital structure, such as Trade-Off Theory, Pecking Order Theory, and Agency Theory, offer key insights into the capital structure of the firms. According to the Trade-Off Theory, firms weigh the advantages of debt-related tax benefits against the risks of financial distress and bankruptcy, shaping their leverage decisions. Modigliani and Miller (1963) highlighted the importance of tax shields, while subsequent research emphasized the costs associated with higher debt levels. The Pecking Order Theory, proposed by Myers and Majluf (1984), explains that firms prefer internal funding over debt and equity due to concerns about information asymmetry, making profitability and retained earnings significant determinants of leverage. Agency Theory focuses on conflicts of interest between stakeholders, suggesting that factors such as asset structure and managerial incentives influence financing decisions. Empirical studies of capital structure show that variables like firm size, profitability, and growth opportunities interact with these theoretical perspectives, providing a framework for understanding capital structure choices across different sectors of industry Ranjan and Zingals (1995).

Modigliani and Miller (1958) developed the capital structure irrelevance theory. They argued that under ideal marketing conditions, a company's capital structure does not affect its total value. Since the value of a company is calculated as the present value of future cash flows, the capital structure cannot affect it. They did not consider the taxes while analysing the data to develop their theory. Later on, this assumption was considered impractical, and in their subsequent research, Modigliani and Miller (1963) revised their view by taking into account corporate income tax and concluded that interest payments of debt are tax-deductible. It generates a tax shield that increases the firm's value as leverage rises. Under this revised framework, they emphasized that the firm must employ maximum debt to maximise the firm's value. In the process, they challenge the results of their irrelevance theory.

Modigliani and Miller (1977) later modified their earlier research work of 1963. Their new analysis includes personal taxes on both equity and debt income. In the

new analysis, personal taxes were divided into two categories: the tax on income from holding shares and the tax on income from debt securities. They demonstrated that when personal taxes are considered along with corporate tax, the net tax advantage of debt may be reduced or may become zero under certain conditions. In this, they further mentioned that leverage may be beneficial at the aggregate or macro level, an optimal capital structure may not exist at the firm (micro) level.

In contrast to tax-based explanations of the capital structure, there is another well-known theory called agency theory, proposed by Jensen and Meckling (1976). Their theory emphasized conflicts of interest among actors, i.e., managers, shareholders, and debt holders. They argued that capital structure influences the firm value through agency costs, including monitoring costs, bonding costs, and residual losses. They suggested that a debt can serve as a disciplinary mechanism by limiting managerial discretion and reducing free cash flows, but excessive leverage may encourage risk shifting and underinvestment. It is therefore necessary for the firm to have a good capital structure that balances debt benefits against the rising agency costs.

The notion of optimum capital structure is also expressed by Myers (1984), who was based on the notion of asymmetric information. Myers and Majluf (1984) added that if investors do not know more than company insiders when issuing shares, it can lead to mispricing. Inequality can be avoided if the business uses external financing, then low debt, and finally equity to fund new financing. The endowment theory proposed by Jensen (1986) states that firms will invest in large projects or bad advice that reduces corporate ownership, a problem that can be alleviated by borrowing more or paying more to fix it. Driffield and Pal (2001) studied the trend of capital structure in Indian companies from 1989 to 1997 and found that the main source of finance for businesses is debt and other borrowings. Song and Hang (2005) studied 6,000 Swedish companies to find out the factors that best suit the capital structure and concluded that Swedish firms are very reluctant about the amount of debt and the level of leverage when choosing a capital structure mix.

Niresh and Velnampy (2012) drew a link between capital structure and productivity and reasoned that capital structure has an adverse effect, in addition to debt, on value and ROE. This study was conducted on banks that are extremely supportive of the banking industry. Panigarhi (2013) investigated adverse working capital and profitability and found that low working capital leads to a bad liquid position within the organization, which is not at all desirable. There is a positive relationship between working capital and profitability, but this is not true in all cases. The study

found that there is a positive relationship between working capital and profitability. Revenues are higher in the case of higher working capital and vice versa.

Rajan and Zingales (1995) found that size, growth, profitability, and tangible assets are significant determinants of the capital structure of US companies. Lima (2009), Sayeed (2011), Siddiqui (2012), and Hossain and Ali (2012) argued that growth rate, tangibility, operating leverage, debt service capacity, age, and size of managerial ownership have significant effects on capital structure decisions. Kumar (2014) studied the capital structure of SMEs. The results showed that long-term investments accounted for roughly two-thirds of the total amount compared to short-term investments. As firms showed a greater reliance on equity financing, the associated financial risks were relatively low. It was found that companies were not using their debt in a way that would greatly benefit shareholders, as the highest profit margin was demonstrated. Jain and Khalsa (2019) studied the capital structure pattern of Indian companies, and an attempt was made to find out the capital structure pattern followed by blue-chip companies.

Based on the above literature review, it is found that different studies have been done on the determinants of the capital structure, but they are different in terms of context, research units, and no recent study has been conducted on the determinants of capital structure in the cement industry.

Table 1:

Determinant wise Summary of Review of Literature on the Determinants of Capital Structure

Authors / Determinants	1	2	3	4	5	6	7	8	9	10	11	12	13	14	No. of determinants
Asset Structure	Y	N	N	N	N	N	N	N	Y	Y	N	Y	N	Y	5
Corporate Size	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	12
Profitability	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	13
Age	N	Y	N	Y	Y	N	N	N	N	N	Y	N	N	Y	5
Value of Asset	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	1
Business Risk	Y	Y	N	Y	N	N	N	N	Y	N	Y	N	N	N	5
Dividend Policy	N	Y	N	N	N	N	N	N	N	N	Y	N	N	N	2

Debt Service capacity	Y	N	Y	N	Y	N	N	N	N	N	Y	N	N	N	4
Non-Debt Tax Shield	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	12
Managerial Ownership	N	N	Y	N	N	N	N	N	N	N	Y	N	N	N	2
Agency Cost	N	N	Y	N	N	N	N	N	Y	N	N	N	Y	N	3
Liquidity Ratio	N	N	Y	Y	Y	N	N	N	Y	N	Y	N	N	N	5
Growth	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	13
Asset Tangibility	N	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N	8
Debt Tax Shield	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	1
Financial Cost	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	1
Free Cash Flow	N	N	Y	N	N	N	N	N	N	N	Y	N	Y	N	3
Cost of Debt	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	1
Financial Distress	N	N	N	N	Y	N	Y	N	Y	N	N	N	Y	Y	5
Tax Rate	N	N	N	N	Y	N	Y	Y	Y	Y	N	N	Y	N	6
Volatility	N	N	N	N	N	N	N	Y	N	Y	N	Y	N	N	3
Industry Classification	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	2
Uniqueness	N	N	N	N	N	N	N	N	N	Y	N	Y	N	Y	3
Inflation	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	1
GDP	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	1
Signalling	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	1

Sources: 1. Bhayani (2005): 2. Sibindi (2016): 3. Hossain & Hossain (2015) 4. Sinha & Samanta (2014): 5. Handoo & Sharma (2014): 6. Song (2005) 7. Qi Song 8. Bauer (2004): 9. Modugu (2015): 10. Mishra (2011): 11. Chaddha & Sharma (2015): 12. Titman & et.al (1988): 13. De Miguel et.al (2001): 14. Bhaduri (2002)

It is evident from Table 1 that the most commonly used determinants of capital structure are growth, corporate size, non-tax debt shield (NDTS), and profitability, and the least commonly used determinants are managerial ownership, financial cost, free cash flow, volatility, and industry classification. Based on the above analysis in the present study, 10 determinants have been identified. These are growth,

asset tangibility, size, cost of debt, liquidity, profitability, tax rate, age, non-tax debt shield, and interest coverage ratio. Based on the above review of literature, this study is undertaken to investigate the factors affecting the capital structure decisions and to analyse the relationship of selected determinants of capital structure with total debt, short-term debt, and long-term debt.

Research Methodology

This section presents the context of the study, research objectives, research questions, and hypothesis, the data used, as well as the research design.

Context

Capital structure decisions are very crucial decisions for any organization. The choice of capital structure is the most fundamental issue of the financial framework of a business activity. In this paper, factors affecting the capital structure decisions have been studied to help firms make capital structure decisions. The cement industry has been chosen as not many studies are available in this sector and this sector has a very significant role in India's GDP.

Research Objectives: As mentioned above, the determinants of capital structure are studied by many researchers. These studies are different in many contexts, such as the number of determinants, time horizon, research units, and industry. Based on the literature review, the following objectives are identified for the present study to investigate the factors affecting the capital structure decisions.

- To study and analyse the relationship of selected determinants of capital structure on total debt.
- To study and analyse the relationship of selected determinants of capital structure on long-term debt.
- To study and analyse the relationship of selected determinants of capital structure on short-term debt.

The objectives have been divided into various models for the sake of better investigations. The sample comprises Indian cement companies, considering three dependent variables namely short-term debt, long-term debt, and total debt, and 10 independent variables, namely growth rate, tangibility ratio, tax rate, profitability ratio, liquidity ratio, size of company, cost of debt, age of the company, non-tax debt shield, and interest coverage ratio.

The objectives will be studied in the context of 3 Models (i) **Total debt Model:** Indian cement companies and total debt: To understand the impact of each independent variable while raising total debts of Indian cement companies. **(ii) Long Term debt Model**: Indian cement companies and long-term debt: To understand the impact of each independent variable while raising long term debts for Indian cement companies. (iii) **Short Term debt Model:** Indian cement companies and short-term debt: To understand the impact of each independent variable while raising short term debts for Indian cement companies.

Research Questions: The present study is an attempt to find a possible answer to the following research questions

- RQ1: What are the important determinants of capital structure?
- RQ2: How do the determinants impact the Total debts, long term debt and short-term debt?
- RQ3: Which factors influence the capital structure decisions most?
- RQ4: Which factors do not influence the capital structure?

Research Hypotheses: Based on the review of literature research hypotheses of the present study are in line with research objectives and research questions and are listed as under.

H_o1: There is no significant impact of firm specific factors on total debt to asset ratio.

H_o2: There is no significant impact of firm specific factors on long term debt to asset ratio

H_o3: There is no significant impact of firm specific factors on short term debt to asset ratio

Research Design

The research design of this research paper is explanatory, considering three regression models. It is based on secondary data compiled from websites such as Money Control, Business Standard, and annual reports of the companies, but is also sufficient to justify saying that the design is conclusive.

The multiple regression analysis is done to assess the impact of determinants of capital structure on total debts, long term debts and short-term debts. The functional form of multiple regression equations is as follows:

Model 1: Impact of determinants on total debts

$$Total\ Debt = \beta_0 + \beta_1 Growth\ rate + \beta_2 Tangibility\ ratio + \beta_3 Tax\ rate + \beta_4 Profitability\ ratio + \beta_5 Liquidity\ ratio + \beta_6 Size\ of\ the\ company + \beta_7 Cost\ of\ debt + \beta_8 Age\ of\ the\ company + \beta_9 NTDS + \beta_{10} Interest\ coverage\ ratio + \varepsilon$$

where Total debt is the dependent variable and from X_1 to X_{10} are independent variables such as X_1 = Growth rate and X_2 = Tangibility ratio, X_3 = Tax rate, X_4 = Profitability ratio, X_5 = Liquidity ratio, X_6 = Size of the company, X_7 = Cost of debt, X_8 = Age of the company, X_9 = NTDS (Non-Tax Debt Shield), and X_{10} = Interest coverage ratio and is the error term.

Model 2: Impact of determinants on long term debts

$$Long\ Term\ Debt = \beta_0 + \beta_1 Growth\ rate + \beta_2 Tangibility\ ratio + \beta_3 Tax\ rate + \beta_4 Profitability\ ratio + \beta_5 Liquidity\ ratio + \beta_6 Size\ of\ the\ company + \beta_7 Cost\ of\ debt + \beta_8 Age\ of\ the\ company + \beta_9 NTDS + \beta_{10} Interest\ coverage\ ratio + \varepsilon$$

where long term debt is the dependent variable and from X_1 to X_{10} are independent variables such as, X_1 = Growth rate and X_2 = Tangibility ratio, X_3 = Tax rate, X_4 = Profitability ratio, X_5 = Liquidity ratio, X_6 = Size of the company, X_7 = Cost of debt, X_8 = Age of the company, X_9 = NTDS (Non-Tax Debt Shield), and X_{10} = Interest coverage ratio and is the error term.

Model 3: Impact of determinants on short term debts

$$Short\ Term\ Debt = \beta_0 + \beta_1 Growth\ rate + \beta_2 Tangibility\ ratio + \beta_3 Tax\ rate + \beta_4 Profitability\ ratio + \beta_5 Liquidity\ ratio + \beta_6 Size\ of\ the\ company + \beta_7 Cost\ of\ debt + \beta_8 Age\ of\ the\ company + \beta_9 NTDS + \beta_{10} Interest\ coverage\ ratio + \varepsilon$$

where Short term debt is the dependent variable and from X_1 to X_{10} are independent variables such as , X_1 = Growth rate and X_2 = Tangibility ratio, X_3 = Tax rate, X_4

= Profitability ratio, X_5 = Liquidity ratio, X_6 = Size of the company, X_7 = Cost of debt, X_8 = Age of the company, X_9 = NTDS (Non-Tax Debt Shield), and X_{10} = Interest coverage ratio and is the error term.

Data: The data for this study, drawn from 23 Indian cement companies (Appendix) listed on the National Stock Exchange, spans 18 years from 2003-04 to 2020-21. The selection criteria for these companies were based on the availability of consistent data. The primary sources of data include annual reports and financial websites such as Money Control, Business Standard, and Yahoo Finance. Statistical analyses, including descriptive statistics, were conducted, with key computations involving variables such as total debt ratio, long-term debt ratio, short-term debt ratio, growth rate, asset tangibility, firm size, cost of debt, liquidity ratio, profitability ratio, tax rate, age, non-tax debt shield, and interest coverage ratio. To examine the impact of independent variables on dependent variables, correlation and multiple regression analysis were employed using SPSS version 25. The dependent variables—total debt, long-term debt, and short-term debt—were analyzed in relation to 10 determinants: growth, asset tangibility, firm size, cost of debt, liquidity, profitability, tax rate, age, non-tax debt shield, and interest coverage ratio. The results of the analyses are presented in tabular form to provide clear insights into the relationships between these variables.

Brief of dependent variables: Three different measurements of capital structure, i.e., Total Debt Ratio, Long Term Debt Ratio, and Short-Term Debt Ratio, have been used as dependent variables, based on their book values, as mentioned above. A brief explanation of these dependent variables is given as follows.

- Total Debt Ratio = Total Debt/ Total Asset. The debt ratio measures how well borrowed funds support a company's assets.
- Long Term Debt Ratio= Long Term Debts/Total Assets. It indicates the percentage of total assets of the companies that are financed by long-term debt.
- Short Term Debt Ratio= Short Term Debt/ Total Assets. This ratio indicates whether a company can meet its immediate financial obligations. Calculated as short-term borrowings against total assets.

Brief description of 10 Independent Variables: The study is based on 10 independent variables as determinants of capital structure. These determinants are explained in brief in the following, along with a brief support from existing literature.

(i) Growth Rate: The functional formula for calculating the growth rate of a company is ((present-past)/ past) or (Total Assets of current year-Total Assets of Previous Year)/ Total Assets in Previous Year. Companies with a high growth rate are relatively large and have the capacity to implement expansion projects, creating new product lines, acquisitions of other companies, and efficient maintenance and replacement of existing assets. Companies with high growth rates and high cash flow volatility have an incentive to deleverage their capital structure over time. Growth is measured using the growth rate of total assets. Growth rate is also measured as the rate of change in wealth. The growth rate as the determinants of the capital structure is studied by Rajan and Zingales (1995), Barclay and Smith (2005), Ahmed et al (2010), Bhayani (2005), Sibindi (2016), Hossain and Hossain (2015), Sinha and Samanta (2014), Handoo and Sharma (2014), Song (2005), Bauer (2004), Modugu (2015), Mishra (2011), Chaddha & Sharma (2015), Titman & et.al (1988), and Bhaduri (2002) besides others.

(ii) Asset Tangibility: The asset tangibility is defined as total fixed assets divided by total assets, wherein total assets are the total of tangible and intangible assets. Tangible assets that are land, buildings, machinery, equipment, etc are more easily acquired by the companies following the path of acquisition. The intangible assets cannot be acquired so easily (Frank & Goyal, 2009). The asset tangibility is studied in the context of capital structure, debt capacity, and bankruptcy is studied in the past by Sibindi (2016), Hossain and Hossain (2015), Sinha and Samanta (2014), Handoo and Sharma (2014), Ahmed and Abbas, 2011), Song (2005), Bauer (2004), Chaddha and Sharma (2015).

(iii) Size of the company: It is measured as the natural log of total assets. It is incorporated as a determinant to compare financial stress in companies with respect to their size (total assets). The size of the company is included as a determinant of capital structure, investment decisions, and raising debt in the past by Marsh (1982), Bennett and Donnelly (1993), Bhayani (2005), Sibindi (2016), Sinha and Samanta (2014), Handoo and Sharma (2014), Song (2005), Bauer (2004), Modugu (2015), Mishra (2011), Chaddha and Sharma (2015), Titman et al, (1988), Bhaduri (2002).

(iv) Cost of Debt: Cost of debt is measured as interest before tax divided by long term debts. Cost of debt is defined as the cost to the company, which is the effective interest rate that a company must pay on its current debt. Handoo and Sharma (2014) studied this as a determinant with pre-tax interest/long-term debt, i.e., a measure of borrowing costs. It is the least used determinant. Even Kumar et al

(2017) reported one article on the cement industry in their review paper on capital structure for the period 1972 to 2013.

(v) Liquidity: Liquidity is calculated as the ratio of total current assets to total current liabilities. It is studied as a determinant of capital structure by many researchers including Hossain and Ali (2012), Hossain and Hossain (2015), Sinha and Samanta (2014), Handoo and Sharma (2014), Modugu (2015), and Chaddha and Sharma (2015).

(vi) Profitability: The profitability is measured as operating margin (earnings before interest and taxes (EBIT) / total assets). Baral (2004) mentioned that profitable firms have better capacity to borrow, and providers of debt will be willing to provide funds to profitable companies. In addition, profitability as a determinant of capital structure studied by many researchers including Bhayani (2005), Sibindi (2016), Hossain and Hossain (2015), Sinha and Samanta (2014), Handoo and Sharma (2014), Song (2005), Bauer (2004), Modugu (2015), Mishra (2011), Chaddha and Sharma (2015), Titman & et al, (1988), Bhaduri (2002).

(vii) Tax Rate: It is computed as [(tax expenses / profit before tax) *100]. Many variations in the computation of tax exits in practice, such as the inclusion of personal income as a determinant of capital structure by Modigliani and Miller (1977). The other researchers who incorporated tax rate as a determinant of capital structure are Handoo and Sharma (2014), Song (2005), Bauer (2004), Modugu (2015), Mishra (2011), and Miguel et al. (2001).

(viii) Age: Age refers to the number of years since the start of the company. It is used as a dummy variable in the studies by all researchers. In the current study, it is also used as a dummy variable with a value of 1 if the company was founded less than 40 years ago, and 0 otherwise. Ahmed and Aris (2015) also studied age as a determinant of capital structure and discovered the negative relationship between age and capital structure.

(ix) Non-Tax Debt Shield: Non-tax debt shield is measured as depreciation or amortization divided by total assets. The non-debt tax as an indicator is a direct estimate of the non-debt tax shelter relative to total assets and studied by Bhayani (2005), Sibindi (2016), Hossain and Hossain (2015), Sinha and Samanta (2014), Song (2005), Bauer (2004), Chaddha and Sharma (2015), Titman et al, (1988), Miguel et al, (2001), and Bhaduri (2002). DeAngelo and Masulis (1980) propose the ideal capital structure used in the tax-protected companies and non-lending companies.

(x) Interest Coverage Ratio: The interest coverage ratio is calculated as the company's earnings before interest and taxes (EBIT) divided by its interest expense during a given period. The interest rate ratio is used to determine how easily a company can repay the interest on its debt. This factor is also studied as a determinant of the capital structure (Siddiqui, 2012; Lima, 2009; Bhayani, 2005; Hossain & Hossain, 2015; Handoo & Sharma, 2014).

Results and Discussions

The results of the analysis are presented in this section. As mentioned earlier, descriptive analysis, correlation analysis, and multiple regression analysis have been done on dependent and independent variables. The descriptive analysis is shown in Table 2, the results of correlation analysis are presented in Table 3, and the results of multiple regression analysis are presented in Tables 4 and 7. Here, models are named with the names of dependent variables.

Descriptive Analysis

Descriptive statistics of the measurement of capital structure (total debt ratio, long-term debt ratio, and short-term debt ratio) and determinants (growth, tangibility, tax rate, profitability, liquidity, size, cost of debt, age, NTDS, interest coverage ratio) of 23 selected cement companies are presented in Table 2 in the context of research objectives.

Table 2:

Descriptive Analysis of Dependent and Independent Variables

Variables	Range	Minimum	Maximum	Mean	Std. Error
Growth Rate	1376.58	-40.72	1335.86	16.8450	3.43
Tang.	0.95	0.00	0.95	0.57	0.00
Tax Rate	1155.95	-441.67	714.29	21.88	3.00
Pro.	114.22	-24.56	89.66	5.74	0.38
Liq.	336.90	-3.22	333.68	2.18	0.80
Size	8.96	2.34	11.29	7.48	0.08
COD	471.96	0.00	471.96	23.55	2.47
Age	136.00	11.00	147.00	46.94	1.30
NTDS	49.71	0.00	49.71	4.74	0.29

Variables	Range	Minimum	Maximum	Mean	Std. Error
ICR	239.98	-1.80	238.18	12.63	1.05
TDR	208.94	16.57	225.51	58.09	1.06
LTR	79.46	0.00	79.46	28.91	0.81
STR	159.84	0.30	160.14	29.21	0.77

Author's Calculations

The descriptive statistics reveal significant variability in several variables. Growth Rate shows a wide range (1376.58) with a high standard deviation (69.70), indicating substantial differences in companies' performance, with some experiencing extreme growth and others facing declines. Tangibility averages at 0.57, suggesting 57% of assets are tangible, with minimal variation (Std. Dev. 0.15). Tax Rate exhibits considerable variation (Range: 1155.95), with a mean of 21.88, reflecting fluctuations in tax obligations across firms or periods. Profitability (Pro.) has a modest average (5.74) and limited variation (Std. Dev. 7.80). Liquidity (Liq.) shows a mean of 2.18 and a relatively high range (336.90), indicating differing financial stability among firms. Size has a moderate range (8.96) and a mean of 7.48, reflecting relatively similar company scales. Cost of Debt (COD), with a mean of 23.55 and a range of 471.96, indicates diverse borrowing costs. Age shows a wide range (136 years) but an average of 46.94 years, indicating a mix of established and newer firms. Non-tax debt shield (NTDS) and Interest Coverage Ratio (ICR) also exhibit considerable variation, with means of 4.74 and 12.63, respectively. Total Debt Ratio (TDR), Long-Term Ratio (LTR), and Short-Term Ratio (STR) have means of 58.09, 28.91, and 29.21, with moderate variability, indicating differences in debt structure among the companies.

Correlation Analysis

Correlation between two variables measures the degree of linear association between them. In this paper, the correlation analysis is undertaken to find out the relationship between capital structure (Total debt, long-term debt, and short-term debt) and determinants (growth, tangibility, tax rate, profitability, liquidity, size, cost of debt, age, NTDS, interest coverage ratio) (Table 3).

Table 3:

Relationship between Capital structure and determinants through Correlation Analysis

	Growth rate	Tang.	Tax Rate	Pro.	Liq.	Size	Cod	Age	NTDS	ICR	TDR	LTDR	STDR
Growth rate	1	.078	.024	.053	-.010	-.027	-.035	-.072	-.037	.056	.011	.082	-.072
Tangibility	.078	1	-.057	-.072	-.198**	-.146**	-.267**	-.076	.169**	-.121*	.200**	.421**	-.171**
Tax Rate	.024	-.057	1	.031	.013	.014	.002	.025	.026	.016	-.168**	-.102*	-.137**
Profitability	.053	-.072	.031	1	-.028	-.040	.009	-.058	-.047	.428**	-.257**	-.301**	-.035
Liquidity	-.010	-.198**	.013	-.028	1	-.096*	-.019	-.003	-.042	-.008	-.023	.071	-.107*
Size	-.027	-.146**	.014	-.040	-.096*	1	.158**	.077	-.392**	-.014	-.193**	-.039	-.226**
Cod	-.035	-.267**	.002	.009	-.019	.158**	1	-.082	.016	.085	-.256**	-.315**	-.025
Age	-.072	-.076	.025	-.058	-.003	.077	-.082	1	-.219**	.063	-.055	-.197**	.132**
NTDS	-.037	.169**	.026	-.047	-.042	-.392**	.016	-.219**	1	-.056	.082	.038	.073
ICR	.056	-.121*	.016	.428**	-.008	-.014	.085	.063	-.056	1	-.370**	-.377**	-.117*
TDR	.011	.200**	-.168**	-.257**	-.023	-.193**	-.256**	-.055	.082	-.370**	1	.698**	.656**
LTDR	.082	.421**	-.102*	-.301**	.071	-.039	-.315**	-.197**	.038	-.377**	.698**	1	-.079
STDR	-.072	-.171**	-.137**	-.035	-.107*	-.226**	-.025	.132**	.073	-.117*	.656**	-.079	1

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)
Author's calculations

The correlation matrix reveals weak and strong relationships among variables. Growth Rate shows weak correlations, with a slight positive association with LTDR (0.082) and ICR (0.056), indicating limited dependence on these factors. Tangibility is positively correlated with TDR (0.200), LTDR (0.421), and NTDS (0.169) but negatively with liquidity (-0.198) and COD (-0.267), suggesting firms with higher tangible assets rely more on debt while being less liquid and facing lower borrowing costs. Tax Rate is negatively related to TDR (-0.168) and STDR (-0.137), implying that higher tax rates are linked to lower debt levels. Profitability is strongly associ-

ated with better ICR (0.428) and negatively with debt measures like TDR (-0.257) and LTDR (-0.301), indicating that more profitable firms maintain better interest coverage and lower debt reliance. Liquidity negatively correlates with Tangibility (-0.198) and STDR (-0.107), showing that more liquid firms tend to have fewer tangible assets and less short-term debt. Larger firms (Size) rely less on NTDS (-0.392) and STDR (-0.226) and have lower Tangibility (-0.146). Age has a slight positive correlation with STDR (0.132) and a negative one with LTDR (-0.197), favouring short-term debt over long-term debt as firms mature. ICR is negatively correlated with TDR (-0.370) and LTDR (-0.377), indicating that firms with better interest coverage ratios use less debt. Debt measures like TDR, LTDR, and STDR are highly intercorrelated, reflecting their interconnected nature in the debt structure. These relationships highlight how firm characteristics, liquidity, profitability, and debt structure interact.

Multiple Regression Analysis

Total Debt Model: Table 4 depicts the regression analysis that highlights the determinants of the Total Debt Ratio in the Total Debt Model. Among the independent variables, Profitability (-0.203, p=0.000), Liquidity (-0.144, p=0.002), Size (-0.157, p=0.002), Cost of Debt (-0.198, p=0.000), and Interest Coverage Ratio (ICR) (-0.228, p=0.000) have significant negative relationships with the total debt ratio, leading to the rejection of their null hypotheses. This suggests that firms with higher profitability, liquidity, size, higher cost of debt, and better interest coverage ratios tend to use less debt. Conversely, variables like Growth Rate (0.034, p=0.437), Tangibility (0.054, p=0.275), Tax Rate (-0.063, p=0.145), Age (0.021, p=0.687), and Non-Tax Debt Shields (NTDS) (0.026, p=0.608) show no significant impact on total debt ratio, as their null hypotheses are not rejected. These findings indicate that while firm-specific financial and operational characteristics significantly influence debt levels, factors like growth, tangibility, and tax shields play a limited role in determining total debt usage.

Long-term Debt Model:

Table 5 depicts the regression analysis for the Long-Term Debt Model that reveals significant relationships for several determinants. Growth Rate (0.084, p=0.043), Tangibility (0.339, p=0.000), Profitability (-0.094, p=0.049), Cost of Debt (-0.211, p=0.000), and Interest Coverage Ratio (ICR) (-0.278, p=0.000) show statistically

significant impacts, leading to the rejection of their null hypotheses. Growth Rate and Tangibility positively influence the long-term debt ratio, suggesting that firms with higher growth rates and more tangible assets are more likely to use long-term debt. Conversely, Profitability, Cost of Debt, and ICR negatively affect long-term debt, indicating that profitable firms, with lower borrowing costs, and with better interest coverage ratios, tend to use less long-term debt. Variables such as Liquidity (0.026, p=0.551), Size (0.052, p=0.274), Age (-0.020, p=0.680), and Non-Tax Debt Shields (NTDS) (0.002, p=0.974) have no significant impact on the long-term debt ratio, as their null hypotheses are not rejected. These findings highlight the importance of growth potential, asset tangibility, profitability, borrowing costs, and debt serviceability in determining long-term debt usage, while other factors play a minimal role.

Short term debt Model: Table 6 depicts the regression analysis for the Short-Term Debt Model that identifies significant determinants influencing the short-term debt ratio. Tangibility (-0.318, p=0.000), Profitability (-0.175, p=0.001), Liquidity (-0.238, p=0.000), and Size (-0.289, p=0.000) exhibit significant negative relationships with short-term debt, leading to the rejection of their null hypotheses. These results suggest that firms with higher tangible assets, greater profitability, better liquidity, and larger size are less reliant on short-term debt. On the other hand, variables such as Growth Rate (-0.047, p=0.300), Tax Rate (-0.025, p=0.581), Cost of Debt (-0.048, p=0.336), Age (0.052, p=0.330), Non-Tax Debt Shields (NTDS) (0.036, p=0.499), and Interest Coverage Ratio (ICR) (-0.020, p=0.720) do not show significant effects on short-term debt, as their null hypotheses are not rejected. This indicates that while firm characteristics like asset composition, profitability, liquidity, and size are key determinants of short-term debt usage, other factors such as growth, tax rates, borrowing costs, and age have a minimal impact in this context.

Table 4:

Regression Coefficients and 't-statistics' and p-values of 10 determinants (independent variables) with total debt ratio in Total Debt Model

Model	Unstandardized Regression Coefficient Beta ± SE (β)	Standardized Regression Coefficient Beta	Sig.	Null Hypotheses Result
Constant	78.523±8.357		0.000	
Growth Rate	0.010±0.012	0.034	0.437	Not rejected
Tangibility	7.422±6.784	0.054	0.275	Not rejected
Tax Rate	-0.024±0.016	-0.063	0.145	Not rejected
Profitability	-0.615±0.154	-0.203	0.000	Rejected
Liquidity	-2.284±0.717	-0.144	0.002	Rejected
Size	-1.985±0.626	-0.157	0.002	Rejected
Cost Of Debt	-0.078±0.019	-0.198	0.000	Rejected
Age	1.016±2.525	0.021	0.687	Not rejected
NTDS	0.093±0.181	0.026	0.608	Not rejected
Interest Coverage Ratio	-0.211±0.048	-0.228	0.000	Rejected
Source: data collected from annual reports and coefficients estimated through MS Excel and SPSS by author(s)				

Table 5:

Regression Coefficients and 't-statistics' and p-values of 10 determinants (independent variables) with long term debt ratio in Long Term Debt Model

Model	Unstandardized Regression Coefficient Beta ± SE (β)	Standardized Regression Coefficient Beta	p-value.	Null Hypotheses Result
Constant	9.130±6.309		0.149	
Growth Rate	0.019±0.009	0.084	0.043	Rejected
Tangibility	36.953±5.121	0.339	0.000	Rejected
Tax Rate	-0.022±0.012	-0.072	0.080	Rejected
Profitability	-0.227±0.116	-0.094	0.049	Rejected
Liquidity	0.323±0.541	0.026	0.551	Not rejected

Model	Unstandardized Regression Coefficient Beta ± SE (β)	Standardized Regression Coefficient Beta	p-value.	Null Hypotheses Result
Size	0.518±0.473	0.052	0.274	Not rejected
Cost Of Debt	-0.066±0.014	-0.211	0.000	Rejected
Age	-0.786±1.906	-0.020	0.680	Not rejected
NTDS	0.004±0.137	0.002	0.974	Not rejected
Interest Coverage Ratio	-0.204±0.036	-0.278	0.000	Rejected
Source: data collected from annual reports and coefficients estimated through MS Excel and SPSS by author(s)				

Table 6:

Regression Coefficients and 't-statistics' and p-values of 10 determinants (independent variables) with short-term debt ratio in Short Term Debt Model

Model	Unstandardized Regression Coefficient Beta ± SE (β)	Standardized Regression Coefficient Beta	p-value.	Null Hypotheses Result
Constant	69.851±6.010		0.000	
Growth Rate	-0.009±0.009	-0.047	0.300	Not rejected
Tangibility	-30.110±4.878	-0.318	0.000	Rejected
Tax Rate	-0.007±0.012	-0.025	0.581	Not rejected
Profitability	-0.366±0.110	-0.175	0.001	Rejected
Liquidity	-2.600±0.515	-0.238	0.000	Rejected
Size	-2.507±0.450	-0.289	0.000	Rejected
Cost Of Debt	-0.013±0.014	-0.048	0.336	Not rejected
Age	1.769±1.816	0.052	0.330	Not rejected
NTDS	0.088±0.130	0.036	0.499	Not rejected
Interest Coverage Ratio	-0.012±0.035	-0.020	0.720	Not rejected
Source: data collected from annual reports and coefficients estimated through MS Excel and SPSS by author (s)				

Table 7:

Model Summary of Capital Structure

Model	R	R-square	Adjusted R-square	Std, Error	p-value
Total debt Model	0.544	0.296	0.277	17.26	0.00
Long Term debt Model	0.599	0.358	0.341	13.03	0.00
Short Term debt Model	0.478	0.228	0.208	12.41	0.00
Source: By Author (s)					

Table 7 presents the results of multiple R, coefficient of determination (R Square), adjusted R Square, Standard Error, and p-values of the three models of capital structure. It is evident from the table that the 29.60%, 35.80%, and 22.80% variation in the dependent variables, i.e., Total debt ratio, Long- term debt ratio, and short-term ratio, is explained by the 10 determinants. Though the values of adjusted R-squares are not very high, they are significant for all three models, as evidenced by the p-values, which are approximately zero in all three models. Hence, it can be concluded that multiple regression equations significantly explain the variability of dependent variables.

Table 8:

Summary of combined Results of all three capital structure models of selected Indian cement companies

Determinants	Total debt	Long term debt	Short term debt
Growth Rate	Negative	Positive	Negative
Tangibility	Negative	Positive	Positive
Tax Rate	Negative	Positive	Negative
Profitability	Positive	Positive	Positive
Liquidity	Positive	Negative	Positive
Size	Positive	Negative	Positive
Cost Of Debt	Positive	Positive	Negative
Age	Negative	Negative	Negative
NTDS	Negative	Negative	Negative
Interest Coverage Ratio	Positive	Positive	Negative
Source: data collected from annual reports and coefficients estimated through MS Excel and SPSS by author(s)			

Table 8 shows the combined results of all three models of capital structure, and it is evident from the table that firms with higher growth rates tend to avoid total and short-term debt but prefer long-term debt to finance investments. High tangibility discourages total debt but supports both long-term and short-term debt by providing collateral. Higher tax rates reduce total and short-term debt but encourage long-term debt for tax-shield benefits. Profitable firms generally support all types of debt due to their ability to manage obligations. Firms with higher liquidity use more total and short-term debt but avoid long-term debt, indicating a preference for flexibility. Larger firms access more total and short-term debt but often avoid long-term debt, relying instead on internal funds. High costs of debt are associated with increased total and long-term debt but reduced short-term borrowing. Older firms prefer internal financing, avoiding all types of debt due to established reserves. The presence of non-debt tax shields decreases reliance on debt, including long-term and short-term, by reducing the need for debt-related tax advantages. Lastly, a high interest coverage ratio supports total and long-term debt while discouraging short-term debt, reflecting a preference for stable, long-term financing. These patterns align with financial theories, reflecting firms' strategic preferences in capital structure.

Conclusion

The findings of the study will contribute towards a better understanding of the capital structure of select Indian cement companies. The study includes testing hypotheses with respect to regression coefficient of three models wherein dependent variables or effects are total debt ratio, long term debt ratio, and short-term debt ratio and 10 independent variables (determinants) or causes are growth, asset tangibility, tax rate, profitability, liquidity, size of the firm, cost of debt, age of the firm, non-tax deduction shield and interest coverage ratio with a view to study impact of these determinants on capital structure.

Based on multiple regression analysis, it is inferred that profitability, liquidity, size of firm, cost of debt, and interest coverage ratio impact total debt ratio significantly, while growth, tangibility, tax rate, age, and non-tax debt shield have an insignificant impact on total debt ratio. Similarly, growth, asset tangibility, tax rate, profitability, cost of debt, and interest coverage ratio have a significant impact on long-term debt. On the other hand, factors such as liquidity, size of the firm, age of the firm, and non-tax debt shield do not have a significant impact on the long-term debt ratio. Multiple regression equation with short term debt ratio (as dependent

variable) concludes that regression coefficients of asset tangibility, profitability, liquidity, and size of the company are found significant, while regression coefficients of growth rate, tax rate, cost of debt, age of firm, non- tax debt shield, and interest coverage ratio have non-significant regression coefficients. It means that for raising short-term debt as part of the capital structure of the firms, asset tangibility, profitability, liquidity, and size of the company play a significant role, while other determinants' role is non-significant statistically.

Another important finding of the study is that profitability is the only determinant that has a significant impact on the capital structure, whether using total debt ratio, long-term debt ratio, or short-term debt ratio models. Age of the firm and non-debt tax shield are the determinants that did not impact the capital structure significantly, whether using the total debt ratio model, long-term debt ratio model, or short-term debt ratio models.

This research has important implications for financial managers and decision makers in the cement industry. It is suggested that financial managers should give higher weight to the determinants that have a significant impact on the capital structure while taking into account the other determinants that do not significantly impact capital structure. Such analysis may help firms in the cement industry in maximising the wealth of investors.

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Appendix

List of Indian Cement Companies selected for study				
S.N.	Name of the company	Traded at	Year of Estab-lishment	Web site
1	UltraTech Cement	NSE & BSE	1983	http://www.ultratechcement.com/
2	Ambuja Cements	NSE & BSE	1983	http://www.ambujacement.com/
3	Shree Cement	NSE & BSE	1979	https://www.shreecement.com/
4	ACC Limited	NSE & BSE	1936	http://www.acclimited.com/
5	RAMCO Cements Lim-ited	NSE & BSE	1961	https://www.ramcocements.in/
6	JK Cement	NSE & BSE	1974	https://www.jkcement.com/
7	JK Laxmi Cement	NSE & BSE	1938	https://www.jklakshmicement.com/
8	Heidelburg Materials	NSE & BSE	1874	https://www.heidelbergmaterials.com
9	India Cements	NSE & BSE	1946	https://www.indiacements.co.in/
10	HIL Limited	NSE & BSE	1946	https://hil.in
11	Jai Prakash Associated Limited	NSE & BSE	1979	http://www.jalindia.com/
12	Ramco Industries Lim-ited	NSE & BSE	1965	http://www.ramcoindltd.com/
13	Sagar Cements Limited	NSE & BSE	1981	https://sagarcements.in/
14	KCP Cement	NSE & BSE	1941	http://www.kcp.co.in/
15	Sanghi Cements Limited	NSE & BSE	1991	https://www.sanghicement.com/
16	Shree Digvijay Cement Company Limited	NSE & BSE	1942	https://www.digvijaycement.com
17	Visaka Industries Ltd.	NSE & BSE	1981	https://www.visaka.com
18	NCL Industries Ltd.	NSE & BSE	1979	https://nclind.com/
19	Mangalam Cement Limited	NSE & BSE	1976	https://www.mangalamcement.com/
20	Deccan Cements Ltd.	NSE & BSE	1979	https://www.deccancements.com
21	Shree Keshav Cements and Infra Limited	BSE only	1993	https://www.keshavcement.com/
22	Prism Johnson Limited	NSE & BSE	1992	https://www.prismjohnson.in
23	Kesoram Industries Ltd.	NSE & BSE	1969	https://www.kesocorp.com/
www.ibef.org/industry/cement-india.aspx				

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BALKAN JOURNALS

Pre & Post-Merger Financial & Operational Performance of Public Sector Banks-An Analysis

Anjali Gupta, Netra Pal Singh, Saraswati Tewatia

Abstract:

In India, the Public Sector Banks (PSBs) play a crucial role in the financial system that promotes financial growth and delivers core banking facilities to customers. With a view to gaining stronger financial recapturing abilities, operational improvement, and managing the surging non-performing assets (NPAs), the government has used mergers as a mechanism in PSBs in India. This paper presents the financial performance of Public Sector Banks, pre- and post-merger periods, using DuPont Analysis with emphasis on the important key performance indicators such as Return on Equity (ROE), Return on Assets (ROA), and efficiency of operational performance. The analysis covers data points between 2008 and 2024 that are subjected to statistical tests, such as the Wilcoxon Signed-Rank Test, to evaluate the difference between pre-post performance.

Based on the analysis, effective integration has been observed with improvement in profitability, operational efficiency, and financial stability in the post-merger period in the State Bank of India (SBI), Bank of Baroda (BOB), and others. Banks such as Punjab National Bank (PNB) and Union Bank of India, on the other hand, are grappling with shrinking profitability, increasing NPAs, and uneven ROE, which indicate the difficulties in handling inherited weaknesses and management processes inefficiencies. The study asserts that despite these facts, mergers could prove beneficial to PSBs, but the success depends on proper post-merger integration, operational rationalization, and adequate governance to achieve long-term financial sustainability.

Introduction

In India, the Public Sector Banks (PSBs) hold a key position in the financial system of the country and contribute greatly to the economic growth of the country. PSBs provide all the essential banking services to all citizens under the all-inclusive growth policies of the Government of India. In the past years, several mergers have taken place among public sector banks with different objectives. In all cases, the government strived to reinforce the banking sector and enhance its financial stability, which in turn helps in the growth of the economy. The f mergers in the banking sector, particularly in PSBs, are likely to generate synergies, operational efficiency, and ultimately financial performance. Nonetheless, the real effects of these mergers on the financial performance are a matter of subject of scholarly research. The Reserve Bank of India (RBI) has been advocating in recent years that the emergence of underperforming banks is possible through mergers. The strategy is generally driven by the need to reduce the increasing rate of non-performing assets (NPAs), improve operating efficiencies, and achieve better financial stability under a competitive and pressurized banking framework. This is possible if the number of public sector banks is manageable.

The DuPont model is used to determine the productivity of a financial institution. It was developed during the mid-1900s by Brown (1918) to review a greater level of monetary information. The mathematical model of DuPont is the correlation between profitability and the ratio of return on equity (ROE), and it is determined by the ratio of return on assets (ROA). A company's financial performance can be measured using several types of financial ratios, such as performance, liquidity, profitability, and leverage ratios. Saunders (2000) elaborates that the DuPont model of financial analysis consists of three elements of ROE, namely: net profit margin, asset turnover ratio, and equity multiplier. The net profit margin shows the profitability by taking into consideration all the expenses, whereas total asset turnover indicates the effectiveness of the company in the use of assets to make sales. Equity multiplier reflects the amount of debt funding that goes into purchasing assets, and when the ratio is higher, it implies higher stress of the debt. Boshkoska (2017) employed DuPont analysis to assess the performance of businesses operating in the pharmaceutical industry. In addition, the research of Rogova (2014) shows that DuPont analysis is an effective tool in determining the factors of efficiency leading to investment appeal. Vanniarajan and Joseph (2007) used the model to analyse the performance of banks. Prendergast (2006) used a modified version of the DuPont model and noted its advantages in analysing financial

matters in businesses. DuPont analysis is one of the tools that is also important in determining the financial performance of banks. The DuPont model can break Return on Equity (ROE) into a detailed analysis of its drivers, where one can examine the examination of its fundamental causes of financial performance. The DuPont model provides information about how a bank operates, the level of profitability in the bank, and leverage using ROE components such as profit margin, asset turnover, and leverage. When applied in the context of mergers, the model may be beneficial to compare the financial health of PSBs prior to and post-merger consolidation. Baptista et al. (2021) used DuPont analysis to deconstruct ROE and compare shareholder values across banks. Seble and Sahoo (2021) have analysed pre-post-merger financials using DuPont analysis for the period 2015-19. Sharma and Mahapatra (2022) concluded that private banks in India perform better than Public sector banks by implementing technology and better cost management using the DuPont Model. Therefore, it can be termed as an effective way of determining the shareholder wealth as it disaggregates the sources of return on equity (ROE). Rotating around the most important aspects of financial performance, ROE makes it possible to consider the strengths and weaknesses of the organization under consideration.

Literature Review

The DuPont model is well known as a model used to assess the financial well-being of the firm, with far-reaching studies demonstrating its applicability in various sectors as well as geographical locations. DuPont Analysis is an effective indicator of financial performance, and researchers find it to be one of their preferred options (Altahtamouni et al., 2018; Bunea et al., 2019; Burja & Mărginean, 2014; Gitayuda Boy, 2020). According to Mangiero (2004). They identified three significant benefits of DuPont Analysis to firms. First, DuPont analysis separates components of the return on equity (ROE), and firms can learn about the factors that contribute to making profits and measure their performance over the years. Second, it determines the growth potential by using sustainable growth analysis, which is critical to business valuation. Third, DuPont analysis lends credence to earnings forecasting through the projection of future growth in earnings. In addition, DuPont analysis is also an effective benchmark to consider the variations of ROE and forecast the existing values (Altahtamouni et al., 2018). ROE is an overall indicator of financial performance that guides important operating, investing, and financing decisions (Burja & Mărginean, 2014; Kim, 2016; Sheela & Karthikeyan, 2012).

The indicators that have a major impact on the ROE are price-earnings (PE) ratio, total asset turnover (TAT), and the multiplier of equity, as identified by Bunea et al. (2019) and Kharatyan et al. (2017). Likewise, a significant number of studies have analysed the effects of the financial performance of mergers and acquisitions (M&A) in the banking sector, frequently by using financial ratios to quantify the efficiency and profitability impacts in a post-merger environment (Ramachandran, 2022; Shah & Parmar, 2021; Paul, 2017; Shenoy & V.T., 2021; Kumar et al., 2019; Ladha, 2017; Lohia et Daniya et al. (2016), Georgios and Georgios (2011), Lotto (2016), Rahman et al. (2018), and Vidhya and Ravichandran (2018). They observed that mergers and acquisitions had an overall positive influence on the financial performance, including the ROE, attributed to the better cost management, efficient use of organizational assets, and financial leverage, although these studies pointed out a lack in the ROA or no improvement in the performance due to an external factor like a financial crisis (Akinyomi & Olutoye, 2014; Bao, 2017)

According to several studies, Merger enhances financial performance. Rani et al. (2013) studied 383 Indian companies involved in M&A between 2003 and used the DuPont analysis and paired t-tests to determine the significance of M&A that improved operating performance. Lakhawani et al. (2017) analysed 24 companies that participated in M&A in 2006. They used the weighted and unloaded DuPont and the ARIMA model. Sinha et al. (2010) generated similar results: the financial performance after M&A was recorded to have improved in Indian firms based on the scale of ratio analysis and the Wilcoxon signed-rank test. Nonetheless, other researchers suggest that better performance is not a constant outcome of M&A. As an example, dealing with companies in India, Gupta and Banerjee (2017) examined seven firms that were involved in M&A, conducted ratio analysis and paired t-tests, and discovered an abridgment in profits after alteration. Verma and Sharma (2014) used 59 Indian firms that performed M&A throughout the period of 2001-2008 using ratio analysis, Ordinary Least Squares (OLS) regression, and augmented Dickey-Fuller tests, and concluded that M&A did not enhance operating performance. Kumar (2009) evaluated 30 firms that had completed M&A between 1999 and 2002 by making a comparison of financial performance using DuPont and other analytical tools and found that there was a reduction in financial performance after M&A activities.

All in all, though the DuPont model is a reliable instrument of financial performance analysis, and especially its use as a ROE tracking tool, the effects of a merger on the financial performance of a company seem to be conditional and depend on

economic circumstances, conditions of the industry in which a company operates, and other firm-specific aspects.

Objective of the Study

This study aims to understand the financial performance of Public Sector Banks (PSBs) using the DuPont Model. It focuses on how profitability, efficiency, and capital structure affect key indicators like ROE and ROA. The study also looks at the differences in performance before and after mergers to see their impact on the banks' overall financial health.

1. To analyse the financial performance of Public Sector Banks (PSBs) using the DuPont Model.

2. To compare the Return on Equity (ROE) of PSBs in the pre-merger and post-merger periods.

3. To analyse the impact of Net Profit Margin and Total Asset Turnover ratio on Return on Assets.

4. To examine the relative contribution of operational efficiency, investment management, and capital structure to achieving return on equity (ROE).

5. To assess the role of ROE and ROA in evaluating the profitability of public sector banks through the DuPont model.

6. To evaluate the impact of Return on Assets and Equity Multiplier on Return on Equity.

Research Questions

The following research questions have been formulated to achieve the study objectives. These questions aim to provide a clear understanding of the financial performance of PSBs and the effects of mergers on profitability, operational efficiency, and capital structure.

1. How is the financial performance of Public Sector Banks (PSBs) evaluated using the DuPont Model?
2. What are the differences in Return on Equity (ROE) of Public Sector Banks (PSBs) between the pre-merger and post-merger periods?

3. To what extent do Net Profit Margin and Total Asset Turnover ratio influence return on assets (ROA) in Public Sector Banks?
4. What is the relative contribution of operational efficiency, investment management, and capital structure to achieving ROE?
5. How do ROE and ROA help in assessing profitability in the public sector banks using the DuPont model?
6. What is the impact of Return on Assets and Equity Multiplier on Return on Equity?

Research Methodology

Research Design

This study employs a quantitative research approach based on secondary data to assess the financial and operational performance of Indian public sector banks (PSBs) before and after mergers. The study utilizes descriptive and inferential statistics to investigate the most important key performance indicators (KPIs), such as the profitability of the company, quality of assets, effectiveness, and financial stability. The study will help in understanding the detailed analysis of the impact of the merger in the short-term and long-term. The analysis is done for three periods, i.e., pre-merger, base year, and post-merger. This holistic layout makes sure that the findings will be more useful.

Data Collection

The study will be based on secondary data collected from open-access websites, such as banks' annual reports, financial databases available in the market, databases such as Money Control, and research sites of the stock market. This dataset is captured for a time span of 17 years, 2008- 2024, which is sufficient to find out trends. The data obtained in the process on the metrics of banks such as deposits, advances, CASA ratios, non-performing assets (NPAs), profitability indicators (ROE and ROA), and operational parameters like a branch network and staff strength, hence providing a wholesome foundation of the analysis. The details of mergers in public sector banks are given in Table 1.

Data Analysis

The research uses the DuPont model to evaluate the impact of mergers on profitability and long-term sustainability, along with non-parametric tests. The structure of patterns and variability across key performance indicators (KPIs) is described using descriptive statistics, mean, standard deviation, and standard error. To measure statistical significance, a non-parametric test, the Wilcoxon Signed-Rank Test, is used; it compares operational and financial measures before and after the mergers. The analysis is aided by SPSS and Microsoft Excel for performing statistical calculations, visualization, and tests of hypotheses. Therefore, a methodological framework is appropriate to provide a consistent evaluation of the consequences of the mergers based on the shifts in profitability, operational efficiency, and fiscal stability.

Table 1:

List of Merged Indian Public Sector Banks

S.No.	Merged into (Anchor Banks)	Banks Merged	Merger year
1	State Bank of India	State Bank of Bikaner and Jaipur	1st April, 2017
		State Bank of Hyderabad	
		State Bank of Mysore	
		State Bank of Patiala	
		State Bank of Travancore	
		Bhartiya Mahila Bank	
2	Bank of Baroda	Dena Bank	1st April, 2019
		Vijaya Bank	
3	Canara Bank	Syndicate Bank	1st April, 2020
4	Indian Bank	Allahabad Bank	1st April, 2020
5	Punjab National Bank	Oriental Bank of Commerce	1st April, 2020
		United Bank of India	
6	Union Bank of India	Andhra Bank	1st April, 2020
		Corporation Bank	
Adapted from (Rawat, n.d.; Mishra, 2026; Moneyview, 2026; BankBazaar, n.d.)			

Analysis and Results

The paper uses the DuPont Model (3- and 5-step variation- Fig. 1, Fig. 2), in order to deconstruct and decompose Return on Equity (ROE). The 3- step model decomposes ROE into Net Profit Margin, Total Asset Turnover, and Equity Multiplier, and the five-step model further divides it into Operating Margin, Interest Burden, and Tax Burden in order to have a more detailed approach to ROE. Indicators of profitability (ROE, ROA, Net Interest Margins(NIM)), asset quality (Gross NPA and Net NPA ratios, Slippage Ratios, Provision Coverage), operation efficiency (Cost-to-Income Ratio, CASA Ratio, Yield on Advances), and financial (Deposits, Advances, and Total Asset Turnover) are some of the key financial parameters assessed.

This research design will offer constructive ideas on the effectiveness of mergers in enhancing the financial performance of PSBs since it focuses on a longer duration and subjects data to a comprehensive analysis.

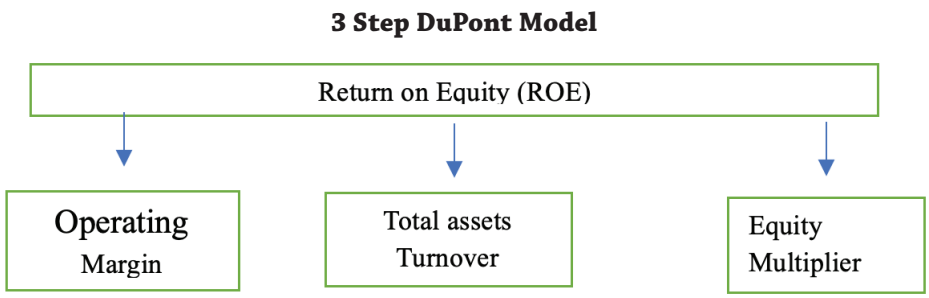


Fig.1. Component of ROE

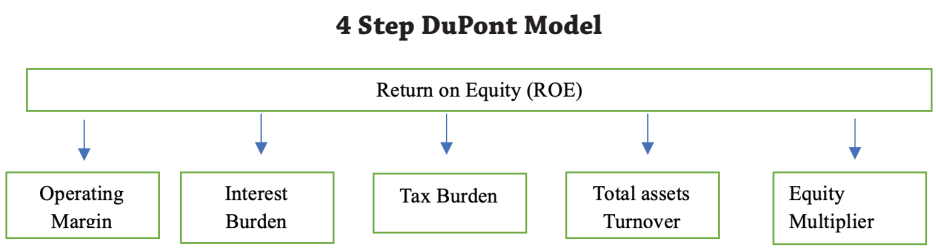


Fig. 2. Component of ROE

Analysis & Interpretation of State Bank of India (SBI)

This section presents an analysis of the State Bank of India based on DuPont Analysis. As can be seen from the data given in Table 1, the State Bank of India absorbed many public sector banks that were not performing to expectations. It is worth mentioning that SBI is one of the largest banks in India. The analysed data collected from different sources are given in Tables 2 and 3.

Table 2:

ROE Analysis of SBI Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.11	0.11	0.10	0.12	0.11	0.09	0.06	0.07	0.05	0.00	-0.01	0.01	0.05	0.06	0.09	0.12	0.16
Total Asset Turnover	0.08	0.08	0.08	0.07	0.08	0.09	0.09	0.10	0.09	0.09	0.08	0.09	0.09	0.08	0.08	0.08	0.07
Equity Multiplier	16.79	18.04	17.46	17.23	17.23	17.06	16.26	16.73	17.02	15.86	15.70	16.58	16.72	17.58	17.54	16.59	15.64
ROE	0.15	0.15	0.14	0.15	0.15	0.15	0.10	0.11	0.07	0.00	-0.02	0.01	0.07	0.09	0.12	0.17	0.16
Adapted from (Top Stock Research, n.d.; Money Control, n.d: Annual Report of the bank, n.d.)																	

Table 3:

ROE Analysis of SBI Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.75	0.78	0.73	0.78	0.71	0.62	0.60	0.59	0.57	0.50	0.46	0.48	0.49	0.47	0.47	0.55	0.74
Interest Burden	0.22	0.22	0.22	0.23	0.23	0.21	0.15	0.18	0.12	0.03	-0.02	0.03	0.13	0.20	0.26	0.30	0.29
Tax Burden	0.65	0.62	0.64	0.67	0.67	0.69	0.72	0.65	0.70	-0.08	1.72	0.61	0.81	0.66	0.73	0.71	0.76
Total Assets Turnover	0.08	0.08	0.08	0.07	0.08	0.09	0.09	0.10	0.09	0.09	0.08	0.09	0.09	0.08	0.08	0.08	0.07
Equity Multiplier	16.79	18.04	17.46	17.23	17.23	17.06	16.26	16.73	17.02	15.86	15.70	16.58	16.72	17.58	17.54	16.59	15.64
ROE	0.15	0.15	0.14	0.15	0.15	0.15	0.10	0.11	0.07	0.00	-0.02	0.01	0.07	0.09	0.12	0.17	0.16
ROA	0.87	0.84	0.81	0.87	0.87	0.86	0.60	0.65	0.41	-0.01	-0.12	0.08	0.43	0.50	0.68	0.95	1.07
Adapted from (Top Stock Research, n.d.; Money Control, n.d.: Annual Report of the bank, n.d.)																	

Table 2 presents ROE for the State Bank of India (SBI), as evaluated using the DuPont model. It can be seen from the data given in Table 2 that ROE was primarily affected by variations in Net Profit Margin during the pre-merger, base year, and post-merger years. The Total Asset Turnover and Equity Multiplier were quite steady; the Net Profit Margin experienced a sharp drop in 2017, which resulted in zero ROE. With the recovery of Net Profit Margin in the post-merger years, the increase in ROE was significant. This indicates that profitability emerged as the most dominant determinant of ROE, followed by capital structure, whereas operational efficiency exerted the least influence on ROE. These two indicators, ROE and ROA, go hand in hand in describing the financial performance and profitability of the bank.

Table 3 shows that the financial performance of SBI, measured with the help of an extended DuPont model, was quite different during the pre-merger, base year, and post-merger periods. During the pre-merger period, the ROE was stable with the help of a stable operating margin, average interest and tax load, and a high equity multiplier. In 2017 (base year), ROE was zero, largely because of the steep decline in interest and tax burdens, in spite of constant operational efficiency. The recovery of the ROE in the post-merger was aided by a gradual increase in the Operating Margin, TAX Burden, and ROA. The study's findings reveal that profitability determinants such as operating margin, interest burden, and tax Burden exert a greater influence on SBI's Return on Equity (ROE) than operational efficiency or capital structure. This suggests that profitability constitutes the principal driver of both ROE and Return on Assets (ROA), whereas efficiency and leverage contribute comparatively less. These results are consistent with the research objectives, underscoring the pivotal role of profitability in shaping the bank's financial performance. It can be seen further that the financial performance of SBI has improved drastically after the merger, with a robust revival in profitability, efficiency, and financial stability.

Analysis & Interpretation of Bank of Baroda (BOB)

This section presents DuPont analysis for the Bank of Baroda. Two public sector banks, i.e., Dena Bank and Vijaya Bank, were merged with Bank of Baroda. Like SBI, this merger had an impact on the performance of Bank of Baroda. The data and analysis are presented in Tables 4 and 5 for the Bank of Baroda.

Table 4:

ROE Analysis of Bank of Baroda Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger											Base Year	Post Merger				
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.08	0.09	0.11	0.07	0.07	0.12	0.11	0.08	-0.10	0.03	-0.04	0.02	0.01	0.02	0.09	0.13	0.16
Total Asset Turnover	0.11	0.11	0.10	0.16	0.16	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07
Equity Multiplier	16.16	17.38	18.09	16.04	16.04	16.81	17.86	17.47	16.26	16.70	16.06	16.41	15.77	14.60	14.59	14.52	13.71
ROE	0.14	0.18	0.20	0.18	0.18	0.14	0.13	0.09	-0.12	0.04	-0.04	0.02	0.01	0.02	0.08	0.14	0.16
Adapted from (Top Stock Research, n.d.; Money Control, n.d: Annual Report of the bank, n.d.)																	

Table 5:

ROE Analysis of Bank of Baroda Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger											Base Year	Post Merger				
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.52	0.53	0.55	0.34	0.34	0.71	0.71	0.68	0.52	0.60	0.50	0.55	0.56	0.50	0.53	0.59	0.00
Interest Burden	0.23	0.26	0.29	0.25	0.25	0.18	0.18	0.17	-0.12	0.10	0.00	0.05	-0.02	0.14	0.22	0.32	51.46
Tax Burden	0.66	0.67	0.72	0.83	0.83	0.91	0.82	0.64	1.60	0.59	23.18	0.71	-0.76	0.23	0.77	0.71	1.02
Total Assets Turnover	0.11	0.11	0.10	0.16	0.16	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07
Equity Multiplier	16.16	17.38	18.09	16.04	16.04	16.81	17.86	17.47	16.26	16.70	16.06	16.41	15.77	14.60	14.59	14.52	13.71
ROE	0.14	0.18	0.20	0.18	0.18	0.14	0.13	0.09	-0.12	0.04	-0.04	0.02	0.01	0.02	0.08	0.14	0.16
ROA	0.84	1.03	1.12	1.14	1.14	0.85	0.73	0.52	-0.73	0.25	-0.26	0.13	0.08	0.12	0.57	0.96	1.13
Adapted from (Top Stock Research, n.d.; Money Control, n.d.: Annual Report of the bank, n.d.)																	

It can be seen from the results given in Table 4 and Table 5 that the Net Profit Margin and Operating Margin have been varying significantly, and, in 2016, there was a significant reduction in the Net Profit Margin, and ROE was impacted negatively by the Net Profit Margin in 2016. Nevertheless, the Total Asset Turnover did not

change, which means that the company was efficient in its operations in the long run. The Equity Multiplier indicated a steady drop after the merger, indicating a conservative capital structure during the recent years. These trends were reflected in ROE, which plunged into negative numbers in 2016 but has been steadily increasing since the merger, reaching 0.16 in 2024. The additional 5-step model identifies the changes in Interest Burden and Tax Burden that also had a significant impact on ROE and ROA, particularly in the base year and the initial years of post-merger. On the whole, profitability ratios, in particular, Net and Operating Margins influenced the value of ROE, whereas the capital structure and efficiency ratios demonstrated their relative contribution to the financial performance and profitability of the Bank of Baroda.

Overall, the financial performance of Bank of Baroda was rather volatile after the merger but strengthened considerably by 2024, as the ROE, ROA, and other key ratios recovered, which means that the organization found its level and is on a positive trend following the initial failure.

Analysis & Interpretation of Canara Bank

This section presents DuPont analysis for Canara Bank. One public sector bank, i.e., Syndicate Bank, was merged with Canara Bank. Like SBI and Bank of Baroda, this merger had an impact on the performance of Canara Bank. The data and analysis are presented in Tables 6 and 7 for Canara Bank.

Table 6:

ROE Analysis of Canara Bank Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger												Base Year	Post Merger			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.07	0.06	0.09	0.05	0.05	0.08	0.06	0.06	-0.05	0.03	-0.08	0.01	-0.03	0.03	0.06	0.10	0.14
Total Asset Turnover	0.14	0.13	0.12	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07
Equity Multiplier	21.25	21.15	20.70	18.57	18.57	16.66	16.61	17.19	17.39	17.19	17.11	18.89	17.99	18.90	17.98	17.69	16.66
ROE	0.21	0.18	0.22	0.09	0.09	0.12	0.09	0.09	-0.08	0.04	-0.11	0.01	-0.05	0.04	0.08	0.14	0.17
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Table 7:

ROE Analysis of Canara Bank Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger												Base Year	Post Merger			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.51	0.50	0.53	0.65	0.65	0.20	0.20	0.19	0.19	0.15	0.14	0.04	0.12	0.08	0.09	0.60	0.79
Interest Burden	0.17	0.16	0.21	0.28	0.24	0.51	0.37	0.40	-0.33	0.23	-0.97	-0.91	-0.20	0.52	1.13	0.22	0.23
Tax Burden	0.84	0.79	0.77	0.30	0.34	0.78	0.80	0.78	0.88	0.71	0.64	-0.26	1.34	0.70	0.63	0.75	0.75
Total Assets Turnover	0.14	0.13	0.12	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07
Equity Multiplier	21.25	21.15	20.70	18.57	18.57	16.66	16.61	17.19	17.39	17.19	17.11	18.89	17.99	18.90	17.98	17.69	16.66
ROE	0.21	0.18	0.22	0.09	0.09	0.12	0.09	0.09	-0.08	0.04	-0.11	0.01	-0.05	0.04	0.08	0.14	0.17
ROA	1.00	0.78	0.46	0.23	-0.27	0.08	-0.65	0.21	-0.47	0.51	0.52	0.70	0.49	0.49	1.05	0.86	1.00
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Tables 6 and 7 depict the Return on Equity (ROE) analysis of Canara Bank based on the 3-step and 5-step DuPont analysis of Canara Bank pre-merger, base year, and post-merger. It can be inferred from the analysis of tables 6 and 7 that there was a large variation in the Net Profit Margin and Operating Margin, and some years, like 2016 and 2018, recorded negative margins that impacted profitability negatively. In spite of these fluctuations, the Total Asset Turnover has been quite steady, albeit quite low, indicating that there is not much efficiency in using the assets. An Equity Multiplier showed the slow reduction in the years following the merger that indicates the more conservative approach is applied to capital structure. ROE followed these patterns, where it was negatively valued at times, but it gradually improved after the merger to 17% in 2024. The 5-step DuPont analysis also points out that the movement of Interest Burden and Tax Burden also contributed significantly to changing the ROE and Return on Assets (ROA), especially in unstable times.

Overall, the profitability, leverage, and assets management of the Canara Bank collectively dictated the financial performance of the bank, with its profitability ratios making the most significant difference in the ROE according to the DuPont analysis. Canara Bank was resilient and recovered after the merger and gradually made progress in terms of profitability and efficiency despite the early instability.

Analysis & Interpretation of Indian Bank

This section presents DuPont analysis for the Indian Bank. One public sector bank, i.e., Allahabad Bank was merged with Canara Bank. Like SBI, Canara Bank, and Bank of Baroda, this merger had an impact on the performance of Canara Bank. The data and analysis are presented in Tables 8 and 9 for the Indian Bank.

Table 8:

ROE Analysis of Indian Bank Using 3-step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger												Base Year	Post Merger			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.12	0.11	0.13	0.17	0.13	0.10	0.07	0.06	0.04	0.08	0.06	0.02	0.03	0.07	0.09	0.10	0.13
Total Asset Turnover	0.12	0.13	0.12	0.09	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.08
Equity Multiplier	14.03	14.01	14.12	14.35	14.52	13.48	13.37	12.84	12.37	12.53	13.52	14.22	13.62	15.92	15.00	14.41	13.21
ROE	0.21	0.21	0.22	0.21	0.18	0.13	0.08	0.07	0.04	0.08	0.07	0.02	0.03	0.08	0.09	0.11	0.14
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Table 9:

ROE Analysis of Indian Bank Using 5-step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger												Base Year	Post Merger			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.53	0.54	0.56	0.76	0.75	0.74	0.75	0.75	0.71	0.70	0.63	0.59	0.62	0.58	0.55	0.58	0.63
Interest Burden	0.29	0.30	0.34	0.33	0.23	0.16	0.12	0.11	0.07	0.32	0.41	0.02	0.09	0.11	0.13	0.20	0.28
Tax Burden	0.82	0.70	0.66	0.65	0.77	0.87	0.79	0.69	0.75	0.35	0.25	1.13	0.55	1.03	1.23	0.89	0.74
Total Assets Turnover	0.12	0.13	0.12	0.09	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.08
Equity Multiplier	14.03	14.01	14.12	14.35	14.52	13.48	13.37	12.84	12.37	12.53	13.52	14.22	13.62	15.92	15.00	14.41	13.21
ROE	0.21	0.21	0.22	0.21	0.18	0.13	0.08	0.07	0.04	0.08	0.07	0.02	0.03	0.08	0.09	0.11	0.14
ROA	1.48	1.49	1.55	1.43	1.25	0.97	0.62	0.53	0.35	0.65	0.50	0.11	0.24	0.48	0.59	0.75	1.06
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Tables 8 and 9 show the ROE analysis of Indian Bank based on the 3-step and 5-step DuPont models in terms of pre-merger, base year, and post-merger. It can be seen from the analysis presented in Tables 8 and 9 that the Net Profit Margin was positive, which shows that the company has been profitable on a regular basis, and the Total Asset Turnover was holding steady but low, which demonstrates the low efficiency of assets. The Equity Multiplier declined a little bit following the merger, which indicated less financial leverage. In turn, ROE varied with a decrease in difficult years but an increase in the post-merger period to 14% in 2024. The 5-step model indicated a high Operating Margin, but the fluctuation in Interest and Tax Burdens affected net profits. Return on Assets (ROA) also improved, which indicates that assets are used better. Overall, the financial performance of Indian Bank improved after the merger, and the DuPont model helps to see the combination of profitability, asset management, and capital structure that impacts the shareholder returns.

Analysis & Interpretation of Punjab National Bank (PNB)

This section presents DuPont analysis for Punjab National Bank. It can be seen from Table 1 that two public sector banks, i.e., Oriental Bank of Commerce and United Bank of India, were merged with PNB. Like other banks, this merger had an impact on the performance of PNB. The data and analysis are presented in Tables 10 and 11 for Punjab National Bank.

Table 10:

ROE Analysis of PNB Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger												Base Year	Post Merger			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.09	0.10	0.11	0.15	0.12	0.10	0.07	0.06	-0.06	0.02	-0.22	-0.17	0.01	0.02	0.04	0.03	0.08
Total Asset Turnover	0.12	0.13	0.12	0.08	0.09	0.10	0.09	0.09	0.08	0.08	0.07	0.08	0.08	0.07	0.07	0.07	0.07
Equity Multiplier	17.66	18.06	17.64	18.28	16.95	14.41	14.92	14.93	17.05	16.99	18.34	17.15	13.33	13.83	13.72	14.52	14.34
ROE	0.19	0.23	0.23	0.22	0.18	0.14	0.09	0.08	-0.09	0.02	-0.30	-0.22	0.01	0.02	0.04	0.03	0.08
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Table 11:

ROE Analysis of PNB Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger												Base Year	Post Merger			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.53	0.54	0.55	0.71	0.74	0.73	0.67	0.65	0.50	0.60	0.25	0.33	0.59	0.58	0.58	0.56	0.71
Interest Burden	0.34	0.31	0.32	0.29	0.22	0.20	0.06	0.11	-0.38	-0.13	-0.86	-0.43	0.03	0.07	0.17	0.09	0.17
Tax Burden	0.52	0.59	0.64	0.71	0.75	0.71	1.86	0.84	0.34	-0.20	1.04	1.19	0.28	0.55	0.42	0.63	0.62
Total Assets Turnover	0.12	0.13	0.12	0.08	0.09	0.10	0.09	0.09	0.08	0.08	0.07	0.08	0.08	0.07	0.07	0.07	0.07
Equity Multiplier	17.66	18.06	17.64	18.28	16.95	14.41	14.92	14.93	17.05	16.99	18.34	17.15	13.33	13.83	13.72	14.52	14.34
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

It can be inferred from Table 10 and Table 11 that the net profit margin of PNB varied during the years and became negative in the period between 2016 and 2019, slowly recovering in the post-merger period in the case of the 3-point Du-Pont analysis. The total asset turnover did not change much during this period, but the equity multiplier, a measure of financial leverage of the bank, dropped slightly following the merger. All these factors contributed to the total ROE that reflected the fluctuations in profitability, efficiency of asset utilization, and leverage. The 5-step DuPont model analysis indicates that operating margin, interest burden, tax burden, asset turnover, and equity multiplier contributed to ROE. The model shows that there were times when PNB encountered a big challenge in terms of interest and tax expenditures, which weighed down on profitability. Nonetheless, this did not drastically reduce the operating margin of the bank, and with increases in the asset efficiency as well as leverage, the ROE bounced back slowly following the merger. On the whole, analysis has revealed that PNB has been striving to strengthen its financial health by controlling operational and financial aspects of transitioning to the merger.

Overall, the financial performance of PNB indicates that it has huge difficulties in sustaining profitability and ROE after the merger. Despite the indicators of recovery by the year 2024, the bank is still performing worse compared to the pre-merger period, and it should continue to make efforts to stabilize its profitability and leverage.

Analysis & Interpretation of Union Bank of India (UBI)

This section presents DuPont analysis for Union Bank of India. It can be seen from Table 1 that two public sector banks, i.e., Andhra Bank and Corporation Bank, were merged with UBI. Like other banks, this merger had an impact on the performance of UBI. The data and analysis are presented in Tables 12 and 13 for UBI.

Table 12:

ROE Analysis of Union Bank of India Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger												Base Year	Post Merger			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.09	0.09	0.09	0.11	0.08	0.08	0.05	0.05	0.04	0.01	-0.14	-0.07	-0.07	0.03	0.06	0.09	0.14
Total Asset Turnover	0.13	0.12	0.11	0.07	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07
Equity Multiplier	22.10	22.87	22.20	23.16	19.86	17.95	18.94	19.28	17.67	19.33	19.45	18.58	16.34	16.72	16.85	16.35	14.35
ROE	0.25	0.24	0.24	0.19	0.13	0.12	0.09	0.09	0.06	0.02	-0.21	-0.11	-0.09	0.04	0.07	0.11	0.14
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Table 13:

ROE Analysis of Union Bank of India Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger												Base Year	Post Merger			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.53	0.52	0.53	0.68	0.72	0.74	0.72	0.73	0.71	0.63	0.44	0.51	0.50	0.56	0.60	0.61	0.77
Interest Burden	0.42	0.37	0.36	0.31	0.20	0.20	0.00	0.09	-0.23	-0.20	-0.28	-0.07	-0.10	0.10	0.21	0.20	0.28
Tax Burden	0.40	0.44	0.49	0.54	0.52	0.52	42.04	0.73	-0.23	-0.12	1.10	2.25	1.43	0.61	0.51	0.69	0.64
Total Assets Turnover	0.13	0.12	0.11	0.07	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07
Equity Multiplier	22.10	22.87	22.20	23.16	19.86	17.95	18.94	19.28	17.67	19.33	19.45	18.58	16.34	16.72	16.85	16.35	14.35
ROE	0.25	0.24	0.24	0.19	0.13	0.12	0.09	0.09	0.06	0.02	-0.21	-0.11	-0.09	0.04	0.07	0.11	0.14
ROA	1.12	1.07	1.06	0.84	0.67	0.68	0.47	0.46	0.33	0.12	-1.06	-0.59	-0.55	0.26	0.44	0.65	0.98
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Tables 12 and 13 show the Return on Equity (ROE) analysis of Union Bank of India with 3-step and 5-step DuPont models for the period of pre-merger, base year, and post-merger, 2008 to 2024. The 3-step DuPont model indicates that the net profit margin of the Union Bank of India was relatively constant in the pre-merger years but became negative in the year 2018 and 2019 before showing a slow rise during the post-merger years. The turnover of total assets decreased marginally yet remained rather steady. The financial leverage of the bank, as embodied by the equity multiplier, started declining gradually following the merger, implying a more conservative capital structure. All these contributed to the change in the ROE, and it reflected these changes by decreasing during the base year and increasing after the merger. The 5-step DuPont model is more detailed in that it decomposes ROE into operating margin, interest burden, tax burden, total asset turnover, and equity multiplier. This analysis identifies years where the bank incurred difficulties with regard to the interest and taxation costs, especially from 2016 to 2019, which had a negative impact on the profitability. Nevertheless, Union Bank has had a good operating margin and has, in the post-merger years, enhanced its ROA and ROE due to improved operational efficiency and financial leverage management. On the whole, the analysis demonstrates that Union Bank of India has tried to stabilize and strengthen its financial performance by going through the merger process.

Overall, Union Bank of India faced significant challenges in profitability and leverage post-merger but showed notable recovery by 2024. Improvements in Operating Margin and ROA suggest better efficiency and cost management, though continued focus on stabilizing profitability and reducing financial volatility will be critical.

Financial Performance of the Six Banks After Pre-Post-Merger Period

This section presents data and its analysis for all six banks studied as part of this research. The analysis is presented in tables 14 to 19. The analysis includes deposits and deposits in Current Account and Saving Account (CASA), Advances & Credit, NPAs, Profitability, Capital Adequacy, and Operational Metrics. The analysis for different banks is presented in the following sections.

State Bank of India (SBI) – Pre & Post-Merger (2017)

It can be seen from the data given in Table 14 that prior to the merger, SBI enjoyed an impressive deposit base of USD 319,441.59 million and a CASA ratio of 45.58%, which is a strong indicator of its dependence on low-cost deposits, which is vital to profits. After the merger, as associate banks were absorbed, there was a significant rise in the deposit base to USD 403,754.80 million. The CASA ratio, however,

decreased by a margin to 44.4%, indicative of the absorption of banks with a lower CASA ratio. In spite of this, SBI continued to have a solid base of cheap funding. There were also operational efficiencies as the merger created a rationalized network of branches and reduced the number of staff, which dropped from 2,79,803 in 2017 to 2,32,296 by 2024, resulting in a better allocation of resources and saving costs. The indicators of profitability were also better in the long run, with the net interest margin (NIM) rising from 2.93% in 2017 to 3.47% by 2024, and the cost-to-income ratio stabilized at 49.54 percent. This indicates effective cost control and better revenues through the lending activities. Altogether, the merger enabled SBI to secure its market share, optimize its operations, and increase profitability, even though the first integration proved to be difficult.

Table14:

Financial and Operational Performance of SBI: Pre- and Post-Merger Analysis

Category	Metric	March 2017 (SBI)	March 2017 (ABs)	April 2017 (Merged)	Mar-24
Deposits & CASA	Total Deposits (USD million)	3,19,441.59	84,313.21	4,03,754.80	9,16,167.74
	CASA Ratio (%)	45.58	40.1	44.4	41.11
	Market Share (Deposits %)	18.13	5.04	23.17	-
Advances & Credit	Gross Advances (USD million)	3,03,399.18	60,846.46	3,64,245.64	7,09,724.99
	Market Share (Advances %)	17.11	4.15	21.26	-
NPAs	Gross NPA Ratio (%)	6.9	20.15	9.11	2.24
	Net NPA Ratio (%)	3.71	12.99	5.19	0.57
	Provision Coverage Ratio (%)	65.95	52.18	61.53	91.89
	Slippage Ratio (%)	2.59	17.87	5.78	0.43
	Credit Cost (%)	2.14	5.77	2.9	0.37
Profitability	Cost-to-Income Ratio (%)	47.75	57.66	49.54	49.54
	Cost of Deposits (%)	5.79	6.31	5.84	4.81
	Yield on Advances (%)	9.42	8.98	9.32	11.61
	NIM (Domestic) (%)	3.11	2.35	2.93	3.47

Capital Adequacy	CET 1 (%)	9.82	-	9.41	10.36
	Tier 1 (%)	10.35	-	10.05	11.93
	CAR (%)	13.11	-	12.85	14.28
Operational Metrics	Number of Branches (Million)	17,170	6,847	24,017	22,542
	Total Staff (Million)	2,09,572	70,231	2,79,803	2,32,296
	Number of Customers (millions)	337.5	82.9	420.4	500
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)					

Bank of Baroda (BOB) – Pre & Post-Merger (2019)

It can be inferred from the analysis given in Table 15 that pre-merger, Bank of Baroda had deposits of USD 91,940.77 million and a CASA ratio of 40.24%, indicating a moderately strong low-cost deposit base. Post-merger, with the integration of Vijaya Bank and Dena Bank, deposits increased significantly to USD 131,747.05 million, though the CASA ratio declined slightly to 37.25% due to the inclusion of banks with weaker CASA contributions. By 2024, BOB managed to stabilize the CASA ratio at 38.76%, reducing funding costs. Operationally, the bank achieved significant efficiencies by rationalizing branches and reducing staff from 84,781 in 2019 to 81,369 in 2024. This helped bring down the cost-to-income ratio to 47.21%. Initially, the merged entity faced pressure from Dena Bank's high NPAs, pushing the gross NPA ratio to 10.02%, but effective provisioning and recovery efforts reduced it to 2.99% by 2024. Profitability improved as the NIM increased from 2.84% to 3.33%, reflecting better lending returns. The merger allowed BOB to expand its scale while achieving operational and financial stability.

Table 15:

Financial and Operational Performance of BOB: Pre- and Post-Merger Analysis

Category	Metric	March 2019 (BOB) (USD Million)	March 2019 (VB) (USD Million)	March 2019 (DB) (USD Million)	April 2019 (Merged) (USD Million)	Mar-24 (USD Million)
Deposits & CASA	Total Deposits (USD million)	91,940.77	25,316.71	14,491.10	1,31,747.05	1,91,016.62
	CASA Ratio (%)	40.24	25.19	42.96	37.25	38.76
Advances & Credit	Gross Advances (USD million)	67,520.34	18,798.78	7,480.02	93,757.68	1,53,386.22
NPAs	Gross NPA Ratio (%)	9.61	6.58	10.91	10.02	2.99
	Net NPA Ratio (%)	3.33	3.08	4.8	3.65	0.89
Profitability	Cost-to-Income Ratio (%)	45.56	61.32	94.26	53.19	47.21
	Cost of Deposits (%)	5.33	5.8	5.34	5.43	4.92
	Yield on Advances (%)	8.67	9.02	7.63	8.62	8.53
	NIM (Domestic) (%)	2.93	2.96	2.25	2.84	3.33
Operational Metrics	Number of Branches (Million)	5,553	2,119	1,775	9,447	8,179
	Total Staff (Million)	55,754	15,882	13,334	84,781	81,369
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)						

Canara Bank – Pre & Post-Merger (2020)

It can be seen from the analysis presented in Table 16 that before the merger, Canara Bank's deposits stood at USD 8,133.79 million, with a CASA ratio of 32.59%, indicating a reliance on higher-cost funding. Post-merger with Syndicate Bank, the deposit base increased to USD 11,791.81 million, while the CASA ratio marginally improved to 33.36%. By 2024, CASA reached 38.76%, reducing the cost of deposits

and ensuring a stronger funding base. Operational synergies were evident, as staff numbers reduced from 90,002 in 2020 to 82,638 by 2024, and the cost-to-income ratio decreased from 58.81% to 47.71%, reflecting improved operational efficiency. However, the gross NPA ratio, which was 8.21% pre-merger, initially spiked to 9.39% due to the weaker portfolios inherited from Syndicate Bank. Over time, effective provisioning and recovery efforts brought the gross NPA down to 4.23% by 2024. Profitability improved with NIM rising from 2.69% to 3.05%, indicating better returns from lending. The merger enabled Canara Bank to enhance its scale, improve asset quality, and achieve operational stability.

Table 16:

Financial and Operational Performance of Canara Bank: Pre- and Post-Merger Analysis

Category	Metric	March 2020 (Canara)	March 2020 (Syndicate)	April 2020 (Merged)	Canara (March 2024)
Deposits & CASA	Total Deposits (USD million)	8,133.79	3,658.02	11,791.81	17,066.11
	CASA Ratio (%)	32.59	35.09	33.36	38.76
Advances & Credit	Gross Advances (USD million)	5,870.88	2,601.55	8,472.43	12,494.73
NPAs	Gross NPA Ratio (%)	8.21	12.04	9.39	4.23
	Net NPA Ratio (%)	4.22	4.61	4.34	1.27
	Provision Coverage Ratio (w/TWO) (%)	75.86	79	76.95	93.3
	Provision Coverage Ratio (w/o TWO) (%)	50.73	64.69	56.23	89.1
	Slippage Ratio (%)	3.71	5.74	4.29	0.34
	Credit Cost (%)	2.46	3.26	2.8	0.96
Profitability	Cost-to-Income Ratio (%)	55.3	66.01	58.81	47.71
	Cost of Deposits (%)	5.57	5.09	5.42	5.5
	Yield on Advances (%)	8.18	8.33	8.22	8.71
	NIM (Domestic) (%)	2.5	3.13	2.69	3.05
Operational Metrics	Number of Branches (Million)	6,329	4,062	10,391	9,604
	Total Staff (Million)	57,918	32,084	90,002	82,638
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)					

Indian Bank – Pre & Post-Merger (2020)

It is evident from the analysis presented in Table 17 that Indian Bank had a CASA ratio of 41.20% pre-merger, reflecting a strong low-cost deposit base. Following its merger with Allahabad Bank, deposits grew to USD 4,893.98 million, but the CASA ratio slightly weakened to around 44% due to the integration of Allahabad Bank's portfolio. By 2024, the CASA ratio stabilized at 40.77%, maintaining affordable funding for lending activities. Operational efficiency improved gradually, with staff numbers decreasing from ~41,800 in 2020 to 40,251 by 2024, and branch rationalization contributing to better resource management. The gross NPA ratio, which was around 9.21% pre-merger, rose to approximately 12% post-merger due to Allahabad Bank's weaker portfolio but improved significantly to 3.95% by 2024 through aggressive provisioning and recovery efforts. Profitability also improved, with NIM rising from approximately 2.85% to 3.54%, reflecting better income from loans. The merger allowed Indian Bank to strengthen its financial stability and scale despite short-term integration challenges.

Table 17:

Financial and Operational Performance of Indian Bank: Pre- and Post-Merger Analysis

Category	Metric	March 2020 (Indian)	March 2020 (Allahabad)	April 2020 (Merged)	March 2024 (Indian Bank)
Deposits & CASA	Total Deposits (USD Million)	3,303.43	1,590.54	4,893.98	5,261.03
	CASA Ratio (%)	41.20%	47.10%	~44%	40.77%
Advances & Credit	Gross Advances (USD Million)	2,844.62	1,124.09	3,968.71	4,081.68
NPAs	Gross NPA Ratio (%)	9.21%	16.77%	~12%	3.95%
	Net NPA Ratio (%)	3.13%	5.52%	~4.2%	0.43%
	Provision Coverage Ratio (w/TWO) (%)	76%	64%	~70%	85.65%
	Slippage Ratio (%)	3.80%	4.10%	~3.9%	1.49%
Profitability	Cost of Deposits (%)	4.98%	5.37%	~5.1%	4.88%
	Yield on Advances (%)	8.90%	8.30%	~8.6%	8.72%
	NIM (Domestic) (%)	2.90%	2.80%	~2.85%	3.54%
Operational Metrics	Number of Branches (Million)	2,877	3,227	~6,104	5,851
	Total Staff(Million)	19,604	22,196	~41,800	40,251
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)					

Punjab National Bank (PNB) – Pre & Post-Merger (2020)

It is evident from the analysis given in Table 18 that pre-merger, PNB had deposits of USD 5,169.49 million and a CASA ratio of 44.30%, reflecting a moderate reliance on low-cost deposits. Post-merger with Oriental Bank of Commerce and United Bank of India, deposits increased significantly to USD 7,992.09 million, and the CASA ratio improved slightly to 40.50%. By 2024, the CASA ratio further strengthened to 42%, reducing the cost of funding. Operational efficiencies were achieved through branch rationalization and workforce optimization, reducing the cost-to-income ratio from 52% in 2020 to 48% in 2024. The merger initially increased the gross NPA ratio to 14.18%, but focused recovery efforts brought it down to 12.50% by 2024. Profitability improved, with the NIM rising from 2.60% to 2.90%, indicating enhanced lending efficiency. The merger enabled PNB to expand its market share and stabilize its financial metrics despite inheriting significant challenges related to NPAs.

Table 18:

Financial and Operational Performance of PNB: Pre- and Post-Merger Analysis

Category	Metric	March 2020 (PNB)	March 2020 (OBC)	March 2020 (UBI)	April 2020 (Merged)	March 2024 (PNB)
Deposits & CASA	Total Deposits (USD Million)	5,169.49	1,795.01	1,027.59	7,992.09	9,176.21
	CASA Ratio (%)	44.30%	30.50%	36.50%	40.50%	42%
	Market Share (Deposits %)	5.20%	1.80%	1%	8%	8.50%
Advances & Credit	Gross Advances (USD Million)	3,976.36	1,376.43	764.68	6,117.47	7,264.50
	Market Share (Advances %)	5%	1.70%	0.90%	7.60%	7.80%
NPAs	Gross NPA Ratio (%)	14.21%	12.66%	16.77%	14.18%	12.50%
	Net NPA Ratio (%)	5.78%	5.91%	8.67%	5.90%	4.50%
	Provision Coverage Ratio (w/TWO) (%)	74.50%	77%	65%	75%	78%
	Provision Coverage Ratio (w/o TWO) (%)	62%	60%	55%	61%	65%
	Slippage Ratio (%)	2.50%	3%	4%	2.80%	2.20%
	Credit Cost (%)	2%	2.50%	3%	2.30%	1.80%

Profitability	Cost-to-Income Ratio (%)	50%	55%	60%	52%	48%
	Cost of Deposits (%)	5%	5.50%	6%	5.30%	5.20%
	Yield on Advances (%)	8%	8.50%	9%	8.30%	8.50%
	NIM (Domestic) (%)	2.50%	2.70%	2.20%	2.60%	2.90%
Operational Metrics	Number of Branches (Million)	7.0	2.4	2.0	11.4	11.5
	Total Staff (Million)	70.0	21.0	13.0	104.0	100.0
	Number of Customers (Million)	18.0	5.0	4.0	27.0	28.0
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)						

Union Bank of India – Pre & Post-Merger (2020)

Table 19 analysis supports that Union Bank of India's deposits grew significantly from USD 54,220 million pre-merger to USD 108,230 million post-merger after integrating Andhra Bank and Corporation Bank. However, the CASA ratio remained relatively stable, slightly declining from 34.40% to 33.50%, which could increase funding costs. By 2024, the CASA ratio improved to 34.00%, stabilizing funding pressures. Operational efficiency improved as redundancies were addressed, with staff numbers reducing from 76,900 in 2020 to 75,900 in 2024. This led to a decline in the cost-to-income ratio to 47%, indicating better resource utilization. The gross NPA ratio spiked to 15.34% post-merger due to weaker portfolios, but was reduced to 7.50% by 2024 through provisioning and recovery efforts. Profitability also improved, with NIM increasing to 2.90%, reflecting better returns on lending. The merger allowed Union Bank of India to address significant challenges while leveraging its expanded scale for improved operational and financial performance.

Table 19:

Financial and Operational Performance of Union Bank of India: Pre- and Post-Merger Analysis

Category	Metric	March 2020 (Union Bank of India)	March 2020 (Andhra Bank)	March 2020 (Corporation Bank)	April 2020 (Merged)	March 2024 (Union Bank)
Deposits & CASA	Total Deposits (USD billion)	54,220	27,800	26,210	108,230	146,460
	CASA Ratio (%)	34.40%	34.55%	31.40%	33.50%	34.00%
	Market Share (Deposits %)	5.70%	2.90%	2.70%	11.30%	6.50%
Advances & Credit	Gross Advances (USD billion)	43,660	23,370	19,710	86,740	99,970
	Market Share (Advances %)	5.10%	2.70%	2.30%	10.10%	5.60%
NPAs	Gross NPA Ratio (%)	14.15%	16.77%	15.35%	15.34%	7.50%
	Net NPA Ratio (%)	5.49%	5.73%	5.25%	5.49%	2.10%
	Provision Coverage Ratio (w/TWO) (%)	67.21%	65.00%	70.00%	67.40%	88.00%
	Provision Coverage Ratio (w/o TWO) (%)	52.00%	50.00%	55.00%	52.30%	70.00%
	Slippage Ratio (%)	3.50%	4.00%	3.80%	3.70%	1.80%
	Credit Cost (%)	2.50%	2.80%	2.60%	2.63%	1.50%
Profitability	Cost-to-Income Ratio (%)	51.00%	53.00%	52.00%	52.00%	47.00%
	Cost of Deposits (%)	5.20%	5.50%	5.40%	5.37%	4.00%
	Yield on Advances (%)	8.50%	8.70%	8.60%	8.60%	7.40%
Operational Metrics	Number of Branches (million)	0.0043	0.0029	0.0024	0.0096	0.0085
	Total Staff (million)	0.0372	0.0207	0.0189	0.0769	0.0759
	Number of Customers (million)	0.09	0.05	0.045	0.185	0.153
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)						

Summary of Key Parameters of Six Banks

Table 20 (Descriptive Statistics) gives the detailed analysis of the 17-year history of the 6 major banks (SBI, BOB, Canara Bank, Indian Bank, PNB, and Union Bank), financial performance. In the case of SBI, the ROE average was 10.34 percent, and the standard deviation was 0.05872, which implies steady performance. The ROA average of 0.61%showed the steady use of assets and an enormous rise in profitability and financial soundness after the merger. The average ROE of BOB was 9.18 percent with a standard deviation of 0.09021, which demonstrates moderate variability, and the average ROA was 0.57 percent, which has significant changes (standard deviation: 0.55502). Canara Bank performed below benchmark, with an average ROE of 7.8% (standard deviation: 9.56%) and a mean ROA of 0.41% (standard deviation: 0.51%), though its performance improved over time after the merger, even though it was unstable in the beginning. The average ROE of Indian Bank was 11.51 percent (standard deviation: 6.71 percent), which is close to the industry averages, and the ROA that stands at 0.83 percent (standard deviation: 0.47 percent) indicates moderate asset utilization and stable recovery by 2024. Conversely, PNB showed great fluctuation, whereby its average ROE and ROA stood at 5.6% (standard deviation: 14.89%) and 0.35% (standard deviation: 0.84698), respectively, underscoring volatility following the merger. Finally, Union Bank had a mean ROE of 8.21 percent (standard deviation: 12.58 percent) and a mean ROA of 0.41 percent (standard deviation: 0.62), which depicts a moderate level of deviation in profitability and more variation in asset utilization.

Table 20:

Descriptive Statistics of Banks

Bank	Variables	N	Mean	SE (Mean)	Std. Deviation
SBI	ROA	17	0.609	0.084	0.35
	ROE (3 step)		0.103	0.014	0.058
	ROE (5 step)		0.103	0.014	0.058
BOB	ROA		0.567	0.135	0.555
	ROE (3 step)		0.092	0.022	0.09
	ROE (5 step)		0.092	0.022	0.09
Canara Bank	ROA		0.411	0.123	0.507
	ROE (3 step)		0.078	0.023	0.096

Bank	Variables	N	Mean	SE (Mean)	Std. Deviation
	ROE (5 step)		0.078	0.023	0.096
Indian Bank	ROA		0.826	0.114	0.47
	ROE (3 step)		0.115	0.0162	0.067
	ROE (5 step)		0.115	0.0162	0.067
PNB	ROA		0.352	0.205	0.846
	ROE (3 step)		0.056	0.036	0.148
	ROE (5 step)		0.056	0.036	0.148
Union Bank	ROA		0.409	0.151	0.626
	ROE (3 step)		0.082	0.03	0.125
	ROE (5 step)		0.082	0.03	0.125

Wilcoxon Test Results for PSBs

This section presents the outcome of testing of hypotheses based on the Wilcoxon Test, z-values, and p-values of ROA and ROE for all six banks. The results are shown in Tables 21 and 22 and Figures 3 and 4.

Table 21:

Wilcoxon Test Analysis of PSBs for Return on Assets (ROA)

Name of Banks	Z-value (Pre-merger & Post merger)	P-value
State Bank of India (SBI)	-1.4	0.161
BOB (Bank of Baroda)	-0.734	0.463
Canara Bank (CNBK)	-2.023	0.043
Indian Bank	-0.674	0.500
Punjab National Bank (PNB)	-1.483	0.138
Union Bank	-0.944	0.345

Figure 3:

Z-value (Pre-merger & Post-merger)

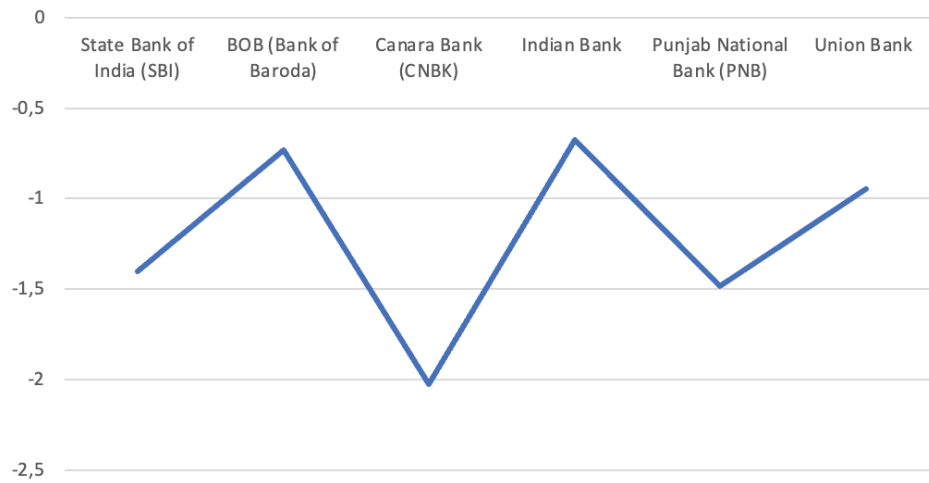


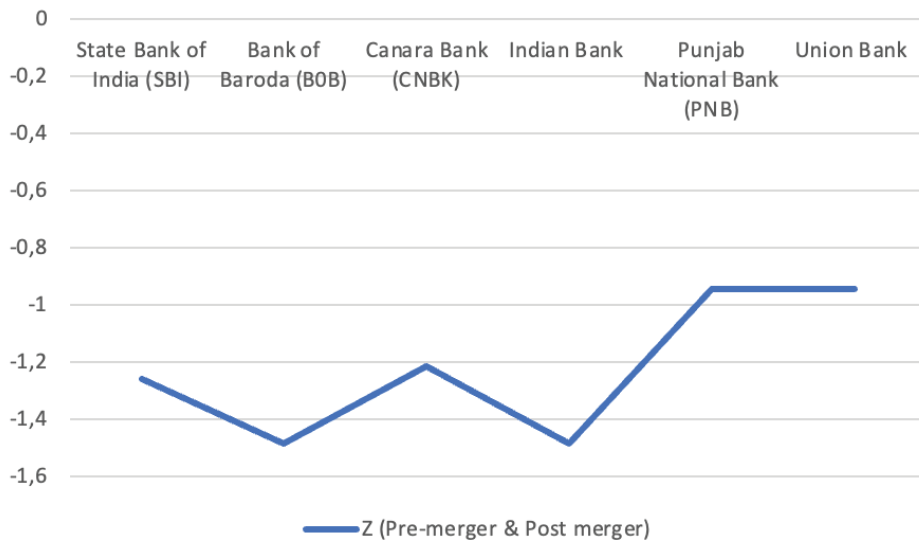
Table 22:

Wilcoxon Analysis of PSBs for Return on Equity (RoE)

Name of Banks	**Z (Pre-merger & Post merger)**	**P- value**
State Bank of India (SBI)	-1.26	0.208
Bank of Baroda (B0B)	-1.483	0.138
Canara Bank (CNBK)	-1.214	0.225
Indian Bank	-1.483	0.138
Punjab National Bank (PNB)	-0.944	0.345
Union Bank	-0.944	0.345

Figure 4:

Z-value (Pre-merger & Post-merger)



It is evident from the Z-values and corresponding p-values of the Wilcoxon Signed Rank Test stated in Table 21 that, except for Canara Bank, there is no statistically significant difference in banking performance before and after the merger in terms of Return on Assets (ROA). For State Bank of India, Bank of Baroda, Indian Bank, Punjab National Bank, and Union Bank of India, the p-values range between 0.138 and 0.500, all of which exceed the 5% level of significance, indicating that the observed changes in ROA during the post-merger period are statistically insignificant.

However, Canara Bank records a Z-value of –2.023 with a p-value of 0.043, which is statistically significant at the 5% level. This result indicates a significant change in ROA in the post-merger period, suggesting that the merger had a meaningful impact on the operational performance of Canara Bank. The lack of significant improvement in ROA for the remaining banks may be attributed to factors such as delayed realization of merger synergies, challenges associated with post-merger integration, or the influence of external market and macroeconomic conditions. In contrast, the significant improvement observed in Canara Bank reflects a more effective and timely integration process, highlighting the heterogeneous and bank-specific nature of merger outcomes.

Table 22 presents the Wilcoxon Signed Rank Test results for Return on Equity (ROE) of the selected banks in the pre- and post-merger periods. Although an improvement in ROE is observed across all banks following the mergers, the statistical results indicate that these changes are not significant, as all p-values exceed the 0.05 threshold. This suggests that the observed post-merger improvements in ROE cannot be conclusively attributed to the merger activity.

In particular, State Bank of India exhibits a marginal improvement in ROE, with a Z-value of –1.26 and a p-value of 0.208, implying that the change may be due to random variation rather than merger-related effects. Similar positive trends are observed for Bank of Baroda, Canara Bank, Indian Bank, Punjab National Bank, and Union Bank of India; however, the corresponding p-values, ranging from 0.138 to 0.345, indicate that these improvements are statistically insignificant. Overall, while ROE shows a positive movement in the post-merger period, the absence of statistically significant results suggests that the mergers did not exert a meaningful impact on the profitability of the banks, and the observed changes may be coincidental rather than merger-induced.

Hypothesis Test According to Wilcoxon Analysis

State Bank of India (SBI)

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in SBI's Return on Assets (ROA) before and after the merger.
2. Alternative Hypothesis (H_1): There is a significant difference in SBI's ROA before and after the merger.

The p-value of 0.161 is greater than 0.05, leading to the rejection of the null hypothesis. This indicates that there is no statistically significant change in SBI's ROA post-merger, implying the merger did not have a noticeable impact on the bank's operational performance.

Bank of Baroda (BOB)

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in BOB's ROA before and after the merger.

2. Alternative Hypothesis (H_1): There is a significant difference in BOB's ROA before and after the merger.

With a p-value of 0.463, which is considerably greater than 0.05, we fail to reject the null hypothesis. This suggests that there was no significant change in Bank of Baroda's ROA post-merger, meaning the merger did not result in a significant improvement or decline in performance.

Canara Bank (CNBK)

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in Canara Bank's ROA before and after the merger.
2. Alternative Hypothesis (H_1): There is a significant difference in Canara Bank's ROA before and after the merger.

The p-value of 0.043 is less than 0.05, leading us to reject the null hypothesis. This indicates that there was a statistically significant change in Canara Bank's ROA following the merger, suggesting the merger had a measurable impact on the bank's operational performance.

Indian Bank

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in Indian Bank's ROA before and after the merger.
2. Alternative Hypothesis (H_1): There is a significant difference in Indian Bank's ROA before and after the merger.

The p-value of 0.5, which is much greater than 0.05, we fail to reject the null hypothesis. This indicates that there was no significant change in Indian Bank's ROA post-merger, implying the merger did not affect the bank's performance.

Punjab National Bank (PNB)

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in PNB's ROA before and after the merger.

2. Alternative Hypothesis (H_1): There is a significant difference in PNB's ROA before and after the merger.

The p-value of 0.138 is greater than 0.05, so we fail to reject the null hypothesis. This suggests that there was no significant change in PNB's ROA post-merger, and the merger did not have a meaningful impact on the bank's operational performance.

Union Bank of India

Hypotheses:

1. Null Hypothesis (H_0): There is no significant difference in Union Bank's ROA before and after the merger.
2. Alternative Hypothesis (H_1): There is a significant difference in Union Bank's ROA before and after the merger.

With a p-value of 0.345, which is greater than 0.05, we fail to reject the null hypothesis. This indicates that there was no significant change in Union Bank's ROA post-merger, meaning the merger did not significantly alter the bank's performance.

Overall, Canara Bank is the only bank that indicates a statistically significant change in ROA with a p-value of 0.043 after the merger. But in all other banks (SBI, BOB, Indian Bank, PNB, and Union Bank of India), p-values are above 0.05, which means that there was no significant difference in ROA of these banks' pre-merger and post-merger. This implies that in the case of these banks, the mergers did not affect their performance in operations.

Differences Between ROA & ROE

Overall, as illustrated in Table 21, Canara Bank experienced a statistically significant improvement in Return on Assets (ROA) in the post-merger period, indicating that the bank's operational performance benefited from the merger. However, as reported in Table 22, although all the banks exhibited an increase in Return on Equity (ROE) after the merger, these changes were not statistically significant. This suggests that while mergers may have resulted in certain favourable changes in the profitability of some banks, such improvements were not strong enough to be considered statistically significant and may be attributable to external factors rather than the merger itself.

Conclusion

The case study of Indian Public Sector Banks (PSBs) in the pre- and post-merger periods is important for understanding the effectiveness of consolidation policies in the context of the hypotheses tested for Return on Assets (ROA) and Return on Equity (ROE). Mergers, which are envisaged as a mechanism to enhance financial stability, operational performance, and address systemic weaknesses, have produced mixed outcomes, as reflected in the hypothesis testing results.

Banks such as the State Bank of India (SBI) and Bank of Baroda (BOB) illustrate that mergers can lead to operational and financial improvements when post-merger integration is effectively managed. SBI recorded an improvement in profitability, with Return on Equity (ROE) increasing to approximately 16% by 2024, reflecting better operational efficiency. However, consistent with the hypothesis testing results, the change in Return on Assets (ROA) for SBI was not statistically significant, leading to the acceptance of the null hypothesis. Similarly, Bank of Baroda experienced a substantial improvement in asset quality, with gross Non-Performing Assets (NPAs) declining to 2.99% by 2024 from 10.02% in 2019; however, the hypothesis results indicate that the changes in ROA were not statistically significant.

SBI was able to leverage the merger to expand its scale of operations, rationalize processes, and stabilize key financial indicators such as Net Interest Margin (NIM) and ROE. Nevertheless, in line with the ROE hypothesis results, the observed improvement in ROE was not statistically significant. Similarly, although Bank of Baroda achieved notable reductions in NPAs and improvements in operational efficiency, these gains did not translate into statistically significant changes in either ROA or ROE.

In contrast, banks such as Punjab National Bank (PNB) and Union Bank of India faced considerable challenges in the post-merger period. Consistent with the hypothesis testing results, these banks did not exhibit statistically significant improvements in ROA or ROE, largely due to difficulties related to operational inefficiencies, absorption of weaker institutions, and post-merger integration challenges. Issues associated with cultural and procedural integration further constrained performance, highlighting the complexity of merging heterogeneous organizational structures.

Overall, the findings derived from hypothesis testing indicate that mergers are not a universal solution to the challenges faced by PSBs. While selective improvements in operational and financial indicators are observed, statistically significant chang-

es in ROA and ROE are limited and bank-specific. The effectiveness of mergers, therefore, depends on governance quality, integration strategies, and sustained efforts to enhance asset quality and profitability rather than the merger event itself.

In conclusion, although mergers may contribute to scale expansion and financial resilience, the hypothesis-based evidence suggests that their impact on ROA and ROE remains limited and uneven across banks. Long-term strategic execution, continuous monitoring, and adaptive management are essential for ensuring sustainable growth and financial stability in Indian PSBs.

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