

Journal of Economic Cooperation & Development

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Victor Chukwunweike Nwokocha**

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The Future of Islamic Finance Education

ISSN 1308 – 7800

Volume 46, No. 1 March 2025

J o u r n a l o f E c o n o m i c C o o p e r a t i o n & D e v e l o p m e n t



**Statistical Economic and Social Research
and Training Centre for Islamic Countries
(SESRIC)**

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Editorial

The current special issue provides a sparse array of implications for academic research and institutional application that examine welfare improvement in Muslim nations, and the globalized economy, as well as for the expanding Islamic institutions, and their conventional competitive market. This issue highlights innovation in Islamic finance and conventionally embedded windows. The issue delves significantly into global trade policy, econometric validation, and novel application to OIC nations, Nigeria's labor market and fiscal development, Bangladesh's Rohingya crisis, and the latest CEPA agreements. Lastly, this issue includes contemporary findings on banking risk and hedging policy across developed and transitioning economies. The conclusionary findings in the following ten papers highlight expansionary policies that are needed in investment diversification, banking regulation, macro-model validation, and Islamic Finance capital.

Hudaib's paper, "Are Islamic Windows of Conventional Banks Still Relevant in the Landscape of Islamic Banking?" identifies four factors — legal, economic, strategic, and organizational capability — that motivate conventional banks to operate Islamic windows. The growth of Islamic windows has driven competition and fostered innovation among Islamic and relevant conventional banks. Tangentially, these windows are improving education surrounding Islamic Finance.

Hasan et al.'s paper, "Structural Model of Effective Factors on Risk Appetite: A Grounded Theory Paradigm," creates a novel structural model using four new factors that influence risk appetite in publicly-traded banks: (1) causal conditions (organizational maturity), (2) intervening conditions (communications expansion), (3) intervening strategies (risk management), and (4) outcomes (organizational growth). Model validation was performed using confirmatory and discriminant analysis methods; and reliability was assessed through repeatability and generalizability. The model determines investors' risk profiles.

Okonta et al.'s paper, "Women's Socio-economic Status in Employment Opportunities in Nigeria: Implication for Gender Disparity in Labor/Industrial Market," investigates women's socio-economic status in

employment opportunities in Nigeria, controlling for the selection bias in the presence of sample truncation. The results show significant gender earnings gap to the disadvantage of Nigerian women, and the decline in sample bias and the gap as education increases. The study supports furthering female education initiatives in Nigeria.

Saeel's paper, "Trade Potential of India-UAE Comprehensive Economic Partnership Agreement (CEPA)," reveals that India has had a more stable comparative advantage compared to the UAE over the duration of their bilateral trading schemes. Ultimately, both nations see positive overall impacts and future trade projections of US\$113 billion within five years of the new CEPA agreement's signing. The study concludes that the specific, yet promising Free Trade Agreement (FTA) can be a notable pattern in contemporary geo-politics.

Hassan and Thowfeek's paper, "The Future of Islamic Finance Education," reinforces support and adherence to Shariah objectives in modern Islamic Finance Institutions. The ongoing research, innovation, and investments should maintain the fundamental ethics and cater to the newest generation (Generation Alpha). With notable investment in education and industry exposure, future business leaders can provide robust and transparent pricing models, digitalization tools, and universal capital and literacy accessibility. Such initiatives will naturally align with the plan and shape the future of Islamic finance.

Hassan et al.'s paper, "Nexus between Financial Hedging, Performance and Firm Value: Evidence from a Sample of non-Financial Asian Firms," investigates risk mitigation in non-financial Asian firms to find that hedging is value-enhancing across three types of risk: foreign currency, interest rate, and commodity price risk. The nexus is strongest with foreign currency risk, and weaker with commodity price risk. Lastly, the results show how profitable, highly levered, and high-growth companies prioritize derivatives for hedging strategy.

Bagirov et al.'s paper, "Research on the Impact of Bank Activities on Economic Dynamics: International Experience," examined banking regulation across multiple countries. Key findings show, in contrasting developed economies (USA, Switzerland, Germany, Turkey) and transition economies (Azerbaijan, Uzbekistan), that levels of globalized assets, financial technology, and macroeconomic indicators determine the impact of

regulatory affairs on the banking industry. The obtained results confirmed that efficient banking activity is a crucial factor in economic dynamics.

Poly et al.'s paper, "Beyond the Immediate Crisis: The Economic Costs of Hosting Rohingya Refugees in Bangladesh," examines the short- and long-term effects of the Rohingya refugee crisis on Bangladesh's economic growth. The findings display short-term benefits due to temporary employment creation, growing consumption, and government investments. The findings also highlight long-term obstacles due to the increasing burden on public services, infrastructure, and resources have added onto ongoing inequality and employment issues. As such, while the economy showed some resilience, with a 61% rate of adjustment to shocks, long-term negative impacts are expected to outweigh any temporary gains.

Akcan et al.'s paper, "Testing the Validity of Okun's Law in Islamic Cooperation Organization Countries: Panel Data Analysis," proves the validity of the Okun law in Organization of Islamic Cooperation countries between 1991 and 2023. They examine the relationship between economic growth and unemployment variables. The study's novel contribution is applying Okun's Law into the selection of the Organization of Islamic Cooperation as the primary sample.

Nwodo and Madueme's paper, "Fiscal Discipline, Size of Government, and Economic Growth in a Small Macro-Model of the Nigerian Economy," addresses the rising fiscal deficits and escalating public debt prevalent in Sub-Saharan Africa, driven by high-interest borrowing, limited revenue collection, and dependence on commodity exports. The findings reveal that fiscal indiscipline, measured as deficits exceeding 5% of GDP, increases government size, reduces output growth, and exacerbates unemployment. Furthermore, a 5% fiscal deficit stimulus raises government size by 0.5%-2%, decreases output growth by 4.5%-7.5%, and elevates unemployment by 0.8%-5.5%. This research contributes to understanding fiscal dynamics in resource-dependent economies.

H.E. Zehra Zümrüt Selçuk
Editor-in-Chief

Women's Socio-economic Status in Employment Opportunities in Nigeria: Implication for Gender Disparity in Labour/ Industrial Market

Patrick Onochie Okonta¹, Mercy Ijeoma Odo² and Victor Chukwunweike Nwokocha³

ABSTRACT

In recent times, little is known about the level of gender inequality in the Nigerian labour /industrial market and how such inequality is explained by the characteristics of men and women in the labour market. Consequently, this study investigates women's socio-economic status in employment opportunities in Nigeria. They study adopted a secondary data method. It used the 2008/2009 harmonised survey data especially the labour and employment component. Within the framework of Mincer type specification of wage equation, this study estimates ordinary least squares (OLS) at different levels of education. Heckman's two-step sample selection model was used to control for possible selection bias in the wage equation since this is always present in sample truncation. To explain gender gaps in earnings at different levels of education, Oaxaca type decomposition technique was employed in the analysis. The results show that there is a huge gender earnings gap to the disadvantage of women in the Nigerian labour market and that the level of this gap declines as the level of education increases. The study also finds that endowments which are the observed characteristics of men and women work to reduce the level of gender earnings gap significantly. This study recommends among other things, that government should ensure girls obtain higher educational qualifications by providing them support beyond primary and secondary education. Also, women should be encouraged to participate in the nonwage labour market activities since most of these activities have higher earnings potential.

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ملخص

لم يعد معلوما بما يكفي في الآونة الأخيرة مدى مستوى عدم المساواة بين الجنسين في سوق العمل والأوساط الصناعية في نيجيريا، وكيف تفسر حالة عدم المساواة هذه بخصائص الرجال والنساء في سوق العمل. لذلك تستعرض هذه الدراسة الوضع الاجتماعي والاقتصادي للمرأة من حيث فرص العمل في نيجيريا. وتعتمد الدراسة منهجية البيانات الثانوية. وتستخدم بيانات الدراسة الاستقصائية المنسقة لفترة 2009/2008، لا سيما عنصر العمل والتوظيف منها. في إطار مواصفات معادلة مينسر للأجور، على مستويات مختلفة من التعليم. واستخدم (OLS) تقدر هذه الدراسة المربعات الصغرى العادية نموذج هيكرمان ذو الخطوتين لاختيار العينة لرصد أي تحيز محتمل في الاختيار في معادلة الأجور، لأن هذا الأمر موجود دائما في تجزئة العينة. ولتفسير الفوارق بين الجنسين في الأجور في مختلف المستويات للتحليل. وتبرز النتائج أن هناك فجوة كبيرة في الأجور (Oaxaca) التعليمية، تم استخدام تقنية أوكاكا بين الجنسين في غير مصلحة المرأة في سوق العمل النيجيرية وأن مستوى هذه الفجوة في تراجع مستمر مع ارتفاع مستوى التعليم. وتوصلت الدراسة أيضا على أن الهبات التي تمثل خصائص ملحوظة في صفوف الرجال والنساء تساهم بصورة كبيرة في التقليل من مستوى الفجوة في الدخل بين الجنسين. ومن بين ما توصي به هذه الدراسة ضرورة أن تضمن الحكومة حصول الفتيات على مؤهلات تعليمية أعلى من خلال توفير الدعم لهن بعد التعليم الابتدائي والإعدادي. كما ينبغي تشجيع النساء على المشاركة في أنشطة سوق العمل غير المتعلقة بالأجور، لأن في معظم هذه الأنشطة إمكانات أعلى للدخل.

Résumé

Ces derniers temps, on sait peu de choses sur le niveau d'inégalité entre les sexes sur le marché du travail/industriel nigérian et sur la manière dont cette inégalité s'explique par les caractéristiques des hommes et des femmes sur le marché du travail. Par conséquent, cette étude examine le statut socio-économique des femmes en matière d'opportunités d'emploi au Nigeria. L'étude a adopté une méthode de données secondaires. Elle a utilisé les données de l'enquête harmonisée 2008/2009, en particulier la composante relative au travail et à l'emploi. Dans le cadre de la spécification de type Mincer de l'équation salariale, cette étude estime les moindres carrés ordinaires (MCO) à différents niveaux d'éducation. Le modèle de sélection

de l'échantillon en deux étapes de Heckman a été utilisé pour contrôler l'éventuel biais de sélection dans l'équation salariale, étant donné qu'il est toujours présent lors de la troncature de l'échantillon. Pour expliquer les écarts de rémunération entre les hommes et les femmes à différents niveaux d'éducation, la technique de décomposition de type Oaxaca a été utilisée dans l'analyse. Les résultats montrent qu'il existe un énorme écart de rémunération entre les sexes au détriment des femmes sur le marché du travail nigérian et que le niveau de cet écart diminue au fur et à mesure que le niveau d'éducation augmente. L'étude montre également que les dotations, qui sont les caractéristiques observées des hommes et des femmes, contribuent à réduire de manière significative l'écart de rémunération entre les hommes et les femmes. Cette étude recommande, entre autres, que le gouvernement veille à ce que les filles obtiennent des qualifications éducatives supérieures en leur apportant un soutien au-delà de l'enseignement primaire et secondaire. En outre, les femmes devraient être encouragées à participer aux activités non salariées du marché du travail, car la plupart de ces activités ont un potentiel de revenus plus élevé.

Keywords: Socioeconomic, Gender disparity, Employment, Labour, industrial market, Nigeria

JEL Classification: J00, J01

4 Women's Socio-economic Status in Employment Opportunities in Nigeria: Implication for Gender Disparity in Labour/ Industrial Market

1. Introduction

In Nigeria, despite her rich resources, the United Nations Development Programme¹ found that income inequality in the country deteriorated from 0.43 to 0.49 per cent between 1985 and 2008, placing her among the world's most unequal countries. Similarly, the Nigerian labour market has a high rate of unemployment. According to a survey conducted by the National Bureau of Statistics (NBS) in 2010, the national unemployment rate is 21.1 per cent, up 1.2 per cent from 2009. The national unemployment rate increased from 11.9 per cent to 21.1 per cent between 2005 and 2010. Further examination of the data revealed that there were more unemployed females than males (24.9 per cent for females and 17.7 per cent for males) as was shown in table 1.

Table 1: The National Unemployment rates (2000 – 2021)

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
13.1	13.6	12.6	14.8	13.4	11.9	12.3	12.7	14.9	19.7	21.1
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
18.2	18.8	19.4	20.0	20.6	21.2	21.8	22.4	23.0	23.6	24.2

Source: NBS National Manpower Stock and Employment Generation Survey (2000-2021).

Table 2 below shows the distribution of unemployment rate by educational attainment both in the rural and urban areas. The table below shows that the female gender is more affected by unemployment regardless of their level of education.

Table 2: The Unemployment Rate by Gender and Educational Attainment.

Educational level	Urban			Rural			Total		
	M	F	Both	M	F	Both	M	F	Both
Below Primary	12.4	13.7	13.2	24.8	30.0	27.5	21.5	23.7	22.7
Primary	10.3	14.7	12.7	18.0	25.8	21.7	15.6	21.9	18.7
JSS	13.4	16.9	15.2	22.6	29.4	25.6	19.5	24.2	21.7
Vocational/commercial	10.7	18.5	14.4	21.6	27.5	24.5	15.2	22.4	18.7
SSS	14.2	17.3	15.6	27.2	30.3	28.4	21.2	23.4	22.1
NCE/OND/Nursing	18.3	19.5	18.9	25.3	28.0	26.2	21.9	22.7	22.2
BA/BSc/Bed/HND	19.1	26.7	21.7	29.5	34.0	30.8	22.6	28.8	24.6
MSC/MA/MAdm	10.1	14.3	11.1	19.4	27.0	20.9	12.6	17.5	13.7

Source: NBS National Manpower Stock and Employment Generation Survey (2019).

From Table 2, the distribution of unemployment rates by gender and educational attainment in rural and urban areas. The female gender is more affected by unemployment regardless of education level, however, there is a drop for females with higher levels of education. The existence of formal and informal economic sectors characterizes Nigeria's labour market, according to NBS ². The informal sector, which accounts for almost 65 per cent of the economy, dominates all economic activities and hence generates the majority of jobs. As a result, informal employment employs a larger percentage of the workforce. Agriculture and allied activities employ the most people, with 14,837,693 individuals employed in the sector, with males accounting for 10,261,705 (69.16 per cent) and females accounting for 4,575,988. (30.84 per cent). Women are the most involved in accommodation and food service activities, accounting for approximately 83.00 per cent of overall employment, while men account for approximately 17.00 per cent. Overall, data on the informal economy in Nigeria revealed that more females were working in the informal sector (27,483,577) than males (27,160,099) (NBS, 2019). Also from 2010-2022, the total population of Nigerians employed in both formal and informal sectors equally show that there is a gender imbalance in the employment trend with males having 27,401 millions and 24,138 in the year 2010 and 31,042 and 25,170 in the year 2020.

From the NBS Manpower Stock and Employment generation Survey ³ one can see how females are discriminated against when compared to their male counterparts in employment both in the formal and informal sectors of the Nigerian economy. As a result, the focus of this study is on education, earnings, and gender discrimination in the Nigerian labour market. More intriguing is the fact that in Nigeria, the debate over labour market outcomes such as wage differential and gender discrimination has been minimal and inconclusive ^{4 5 6 7 8 9}. Even though most studies have examined this research area, none have attempted to empirically determine, for example, whether there is significant discrimination in employment (for the public, private, and the informal sectors of the economy) To this end, this study tend to address the following objectives: ((1)To estimate the level of gender earnings gap in the Nigeria labour market, and (2) to ascertain if the level of inequality in the labour market can be explained by observed characteristics of men and women and finally to ascertain if gender earnings gap in the Nigerian Labour market depends on the level of education.⁴

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2 Literature Review

Many Economic scholars especially labour economics have tried to analyse the relationship between education, earning and gender discrimination in the labour market. The literature on the relationship between gender inequality and employment is fairly substantial. There is some agreement in the research that increases in per capita income have a favourable influence on gender equality and, more importantly for this study, that gender inequality hurts labour market growth. Some research suggests that gaps in labour force participation hurt a country's economic performance^{10 11}. Gender disparities in education and incomes have been highlighted as a growth impediment more frequently^{12 13 14 15 16 17 18 19}. Also, studies have shown how social status, religious/spiritual involvement, and secularization influence attitudes toward gender equality in the workplace, education, and politics²⁰. Gender played a moderating role in the associations between these three sets of factors and attitudes toward gender equality, according to the study. The study adopted feminist standpoint theory and Davis and Robinson's model of consciousness. Feminist standpoint theory refers to the collective consciousness of women as a subordinate group. Furthermore, according to Davis and Robinson's concept of consciousness, subordinate groups become aware of their disadvantages and gain consciousness as a result of gender inequality. The data was collected in Iran during Wave 7 of the World Values Survey, which ran from 2017 to 2021. The final sample included 1469 Iranians aged 18 and up (716 men and 688 women). To explain their attitudes regarding gender equality in employment, education, and politics, multiple regression and logistic regression models were created. Social status determinants, religious/spiritual activity, and secularization were all linked to attitudes toward gender equality in employment, education, and politics, according to the findings. Some of these connections were expected based on the literature, while others were unexpected. Gender equality in employment, education, and politics were viewed favourably by women, the educated, the younger, the unmarried, and the secular. The researcher also discovered evidence that gender played a role in explaining the connections between the outcome variables. Older respondents indicated less support for gender equality in the workplace, as expected, and this link was stronger among women.

In Kenya, scholars have investigated wage determinants as well as a decomposition of the gender gap across sectors²¹. One of the studies investigated whether women

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participate in the labour market less than men, partly due to personal characteristics and partly due to wage discrimination. To explain participation and earnings, multinomial logit methods and ordinary least squares (OLS) with and without sample selection are used. The findings show that education and other demographic characteristics are key drivers of career choice and earnings and that self-selectivity is not a serious issue. The results of the gender gap decomposition show that men are favoured in all areas, whereas there is no evidence of discrimination against women. Using Logit regression analysis on primary data sets to explore the impact of gender imbalance in education on rural poverty in Pakistan showed that gender inequalities in schooling hurt rural poverty²². Female-male enrolment ratios, female-male literacy ratios, female-male ratios of total years of schooling, female-male ratios of earners, and education of household heads all appear to have a major negative impact on rural poverty, according to the empirical data. The findings show that household size and the female-male ratio (members) have a strong positive relationship with poverty risk. In developing nations like Pakistan, the inverse relationship between gender inequality in education and rural poverty shows that education increases work opportunities and reduces poverty. It has also been established that female schooling matters in both urban and rural localities; both primary and post-primary schooling levels exert a significant positive impact on women's labour market participation and have an opposite effect on fertility²³. The findings show that, while the gender gap in education has narrowed over time, it is critical for government policies to maintain the long-term sustainability of female educational achievements. This is, arguably, the most important technique for increasing female human capital and productive work, with positive effects on ideal family size and fertility choices.

Using cross-country and panel regressions to investigate the role of gender gaps in education and employment (proxied by gender gaps in labour force participation) on economic growth, it was discovered that gender disparities in education and employment had a major impact on economic growth²⁴. In comparison to East Asia, the total 'costs' of education and employment inequalities in the Middle East and North Africa and South Asia amount to 0.9-1.7 and 0.1-1.6 percentage point variations in growth. Gender disparities in employment appear to be having an increasing impact on regional economic growth variations, with female employment growth in the Middle East and North Africa and South Asia being slower. In a study that looked at the influence of gender inequality in education on income in Africa and the Middle East, utilizing data from a set of sub-Saharan African, North African, and Middle Eastern nations. The gap in female to male primary education enrolment ratios and the disparity in female to male secondary education enrolment ratios are

employed as gender inequality indicators. Gender inequality in primary and secondary education has a statistically significant negative influence on earnings, according to estimates, particularly in North African and Middle Eastern countries. Gender inequality in schooling appears to have an additional influence in generally open countries, although this effect is consistently positive, implying that while trade contributes to better income, it may also be accompanied by increased inequality.

Adebayo (2004) investigated how women's labour market involvement is affected by their own and husband's education using the Nigerian Labor Force Survey. Additional years of postsecondary education raise pay market participation probability by as much as 15.2 per cent, according to the findings. A marginal increase in primary schooling has little influence on the likelihood of wage employment but could boost self-employment participation rates by roughly 5.40 per cent. When a woman marries a highly educated man, these impacts are likely to be stronger. According to the findings, primary education is more productive in non-wage labour than wage jobs, and postsecondary education is more productive in pay work. Non-market jobs may not be a normal good for married women in Nigeria, according to data.

Many countries' educational gender gaps have been resolved or reversed, according to Ganguli, Hausmann, and Viarengo (2014). But what about gender disparities in the labour market? The authors study the labour force participation gap between men and women, the "marriage gap" between married and single women's participation, and the "motherhood gap" between mothers and non-mothers participation using micro-level census data from 40 nations. They discover considerable differences in the extent of these gaps, the rate at which they are changing, and the links between them and the educational gap between countries. The labour force participation gap, however, remains substantially unexplained by the other disparities, according to counterfactual regression analysis. These studies have revealed several pieces of evidence in labour market results in many nations in terms of gender discrimination, according to the literature examined thus far. For example, no research has been done in Nigeria on the topic of gender discrimination in pay across different sectors of work in Nigeria, or on whether educational attainment equalizes female earnings in the Nigerian labour market. Hence, this present research addresses this lacuna found in the extant literature reviewed.

3. Method

The theoretical framework that underpins the definition of the earnings equation is based on Mincer's work (1974). Over the years, academics have expanded this paradigm to cover the relationship between growth and average schooling levels across countries (for example, Bils and Klenow, 2000), as well as how to accurately assess the returns to schooling (see, for example, Heckman, Lochner and Todd, 2003, among others). Individual education level and years of experience are very important explanatory factors in Mincer's equation for pay determination. Most academics have also looked into the nonlinearity of years of schooling as a manner of effectively reflecting the benefits of education, particularly in Sub-Saharan African countries (Nordman and Roubaud 2010). Researchers are increasingly introducing explanatory variables that capture productivity-related characteristics as well as labour market specifics, leaving wage determinants as an empirical question. This is understandable given that labour markets differ not only between nations but also within countries. While we are informed by early frameworks, in the case of Nigeria, the study's choice of explanatory factors was driven.

To address the objective of this research we specify a wage equation of the form:

$$\ln wage = \beta x + \mu_1 \quad (1)$$

Specifying equation 1 above, we have

$$\begin{aligned} \ln wage = & \beta_0 + \beta_1 age + \beta_2 location + \beta_3 educational\ level + \beta_4 female + \\ & \beta_5 marital\ status \\ & + \beta_6 religion + \beta_7 mothers\ type\ of\ work + \beta_8 fathers\ type\ of\ work + \beta_9 \\ & experiences + \mu_1 - 2 \end{aligned}$$

Where $\ln wage$ is the natural logarithm of monthly wages/earnings (in Nigeria, monthly wage or earnings are the most common, accounting for over 95 per cent of wage employment), and x is a vector of individual characteristics such as age, experience, location, region, education level, father and mother occupation, marital status, and religion. The variable of interest is female, which has a value of 1 if she is female and 0 if she is not.

3.1.1 Estimation Issues

The potential econometric issues that result from the specification of equations are addressed in this work. One of the biggest issues with the wage equation, as mentioned above, is sample selection bias, which has two sources in this situation, according to Nordman, Sibbertsen, & Lahiri (2007). One is because salaries are only recorded for those who are employed, and not everyone is employed. The second selection bias results from a decision to work for the government rather than for private wage employment, non-wage employment, or self-employment. As a result, the non-observable variables affecting wages and those that simultaneously determine the sector in which the persons are now working have a significant correlation when determining earnings. Thus, the OLS estimator is rendered ineffective (Huesca and Camberos 2010). The first difficulty was solved by calculating a Heckman two-step sample selection model. It fitted a binomial probit model to this framework, which predicts an individual's likelihood of participation.

We defined the models as follows, based on Baum (2006):

$$\ln wage_i = \beta x_i + \mu_i; S_i = I(z_i' \gamma + v_i \geq 0) \quad (3)$$

where the explanatory variables in x stated in (3.2) above fulfill the zero-conditional-mean assumption, i.e., $E(x\mu) = 0$. If the argument is true, the $I(\cdot)$ function returns 1; otherwise, it returns 0. The selection function is given by equation (3.3). If $s_i = 0$, it observes $\ln wage_i$.

For the model to be properly identified, the selection function contains a set of explanatory variables z , which must be a superset of x . This indicates that z must likewise contain additional components not found in x . The Heckman selection model is based on this logic. Probit estimates of the probability of involvement are computed separately for men and women in the first step. Then, for men and women, the relevant estimated adjustment term (Inverse Mills Ratios, (IMR)) is incorporated in the second-stage earnings formulae. Because the correction term is included, the OLS produces consistent estimates of the augmented earnings functions (Nordman, et al. 2007).

3.2 Disintegration of sexual category pay packet Gap

We used decomposition techniques to determine if there is a large gender disparity in earnings and, if so, what factors explain it. Decomposition of the wage gap by degrees of education was also measured to investigate if education equalizes the

wage gap between men and women. The decomposition of the wage gap between men and women, as done in Oaxaca (1973), is a typical method of measuring gender discrimination in the labour market, and it is frequently employed in empirical investigations. Oaxaca and Ransom (1988), Neumark (1988), and Oaxaca and Ransom (1988) established a more general strategy for deconstructing gender gaps in labour markets. The primary idea is to use a set of characteristics that fluctuate systematically with socioeconomic and occupational factors to explain the distribution of the outcome variable in the issue. The Oaxaca decomposition (Oaxaca 1973) explains the difference between two groups' means of an outcome variable (that is, between male and female). On the one hand, the gap is owing to group differences in the magnitudes of the determinants of the result in question, and on the other hand, it is due to group disparities in the impacts of these determinants.

Let y be the result of interest and male and female groups exist. According to the regression model below, this research assumed that y is explained by a vector of determinants, x .

$$y_i = \begin{cases} \beta_{male} x_1 + \varepsilon_1^{male} & \text{if male} \\ \beta_{female} x_1 + \varepsilon_1^{female} & \text{if female} \end{cases} \quad \text{-----3.4} \quad (3)$$

Where the vectors of β parameters include intercepts. The gap between the mean outcomes,

$$\gamma^{female} \text{ and } \gamma^{male}, \text{ is equal} \\ \gamma^{male} - \gamma^{female} = \beta^{male} \chi^{male} - \beta^{female} \chi^{female} \quad (4)$$

Where χ^{male} and χ^{female} are vectors of explanatory variables evaluated at the means for the male and female respectively? If we have only χ_1 and χ_2 the decomposition can be written as follows:

$$y^{male} - y^{female} = \{\beta_o^{male} - \beta_o^{female}\} + \{\beta_1^{male} x_1^{male} - \beta_1^{female} x_1^{female}\} \\ + \{\beta_2^{male} x_2^{male} - \beta_2^{female} x_2^{female}\} = G_0 + G_1 + G_2 \dots \dots \dots 3.6 \quad (5)$$

so that the gap in y between the male and the female can be thought of as being due in part to (i) differences in the endowments (G_0), (ii) differences in x_1 and β_1 (G_1), and (iii) differences in x_2 and β_2 (G_2). For example, G_1 might measure the part of the

gap in mean earnings (y) due to differences in educational attainment (x_1) and the effects of educational attainment (β_1), and G_2 might measure the part of the gap due to the gap in accessibility of labour market (x_2) and differences in the effects of accessibility (β_2). This is the same as Neumark (1988), who suggests a generic breakdown of the wage disparity between men and women. As a result, it is not affected by the index number problem, which determines whether men or women are paid more.

Data Source

This study employed the 2012/2016 Harmonised Survey and two labour market survey datasets to estimate the models. In comparison to the 2014 survey, the 2012 harmonised survey obtained data for more than 332,000 people, with over 192,000 of them working in diverse sectors. The datasets have the advantage of capturing the majority of the factors that can be utilized to undertake a detailed analysis of labour market outcomes. Because the survey was conducted in all 36 states of Nigeria, the results are also nationally representative. The data also includes enough observations to investigate the labour market in the numerous industries we have mentioned. Individual labour market features, such as household ownership of variables and other intra-household labour allocations, can be connected to household characteristics. It selected to combine the two datasets to conduct two static comparative evaluations of Nigerian labour market outcomes. The data has been appropriately weighted to allow for under or over-representation of particular population units.

4. Empirical Result

4.1. Descriptive Statistics

The descriptive statistics of the important variables considered in the analysis are shown in Table 4.1. Over the last month, the earnings log comprises several sorts of earnings in the labour market, such as wages, salaries, and profits. Men's incomes are on average higher than women's. Men have a mean log of wages of 9.169, while women have an average log of earnings of 8.824. The data also reveals that men work greater hours on average than women. The distribution of men and women in the sample is well balanced, with around 77 per cent of each subgroup coming from rural areas, according to the data. This shows that the disparities in incomes were not due to a concentration of one group in a certain location. In addition, the average age of the two groups is comparable. Men in the sample have an average age of 24.4

years, while women have an average age of 23.2 years, reflecting a relatively young working population. In addition, the population distribution in terms of the zone is likewise balanced. When it comes to labour engagement in trade union activities, the table indicates that 27.6% of males are members of trade unions, while 20.2 per cent of women are members of one or more unions.

Table 3: Descriptive Statistics of the Variable by Gender

Variables	Male	Female	Total
log of earnings	9.169	8.824	9.027
hours worked	173.7	169.4	171.9
Rural	0.771	0.772	0.771
Age	24.41	23.17	23.82
Ages	923.6	809.9	869
Zone	3.479	3.499	3.488
Union	0.276	0.202	0.245
Occup	5538.4	5441.3	5497.7
marital status	1.38	1.582	1.477
no education	0.352	0.457	0.402
Primary	0.287	0.276	0.282
Secondary	0.248	0.2	0.225
Ond or equivalent	0.0607	0.0432	0.0523
degree or equivalent	0.0409	0.0216	0.0316
postgraduate (higher) degree	0.0111	0.00229	0.00685

These numbers indicate that in the Nigerian labour market, there is a low level of engagement in union activities. The marital status variable is set to 0 for people who have never married and 1, 2, 3, and 4 for those who are in various forms of a marital union, such as separated, divorced, or widowed. The mean values of 1.38 for males and 1.58 for females indicate that women are more likely to be married than men in the sample. No education, elementary, secondary, national diploma or similar, degree or equivalent, and postgraduate or higher education were used to categorize the education variable. The bulk of people in one kind or another of employment in developing countries have either no education or low educational levels, as is always the case. The proportion of men with no education is 0.352 compared to 0.457 for females, the proportion of men with primary education is 0.287 compared to 0.276 for women, the proportion of men with secondary education is 0.248 compared to

0.20 for females, the proportion of men with a national diploma or equivalent is 0.0607 compared to 0.0432 for females, the proportion of males with degree and equivalent is 0.0409 compared to 0.0216 for women, and the proportion with postgraduate education. These figures suggest that men have an advantage in terms of higher education as was shown in table 3.

Authors computation.

The table also showed the factors that influence earnings in the Nigerian labour market, with gender as the most important component. The variable gender is coded as female, with a value of 1 in the case of females and 0 in the case of males. The regression findings are presented for a variety of educational levels, ranging from little schooling to advanced degrees. Women are discriminated against at lower levels of education, but not at higher levels of education, according to the findings. Women earn around 33.7 per cent less than men when they lack a basic education, which is statistically significant even at the 1% level of significance. In addition, when labour market participants have only an elementary education, females earn around 29.7% less than their male counterparts, a statistically significant difference. At the secondary level of education, the income disparity between men and women narrows to 20%, but with a national diploma or equivalent qualifications, the wage gap widens to 35.2 per cent in men's favour, which is statistically significant as was revealed in table 4.

Table 4: OLS Estimate of Gender Bias in Wages in the Nigeria Labour Market at Different Levels of Education.

Dependent Variables: log of variables						
	Non-education	Primary	Secondary	Onequiv.	Degree	Higher degree
Hours	0.00465*** (0.000)	0.00150*** (0.000)	0.00139*** (0.000)	0.00197*** (0.004)	0.00357*** (0.000)	0.00526*** (0.000)
Rural	-0.150*** (0.001)	-0.113* (0.041)	-0.147*** (0.000)	0.0118 (0.883)	-0.114 (0.132)	-0.132 (0.294)
Age	0.00128 (0.805)	0.0269*** (0.001)	0.0355*** (0.000)	0.0654** (0.003)	0.0299 (0.197)	-0.00768 (0.860)
Agesq	0.00000116 (0.983)	-0.000259** (0.004)	-0.000272** (0.008)	-0.000439 (0.090)	-0.000288 (0.277)	0.000492 (0.323)
Female	-0.337*** (0.000)	-0.297*** (0.000)	-0.200*** (0.000)	-0.352*** (0.000)	0.0262 (0.711)	0.511** (0.003)
Occup.	-0.0000233* (0.050)	-0.0000847*** (0.000)	-0.0000284*** (0.001)	-0.0000664*** (0.000)	-0.0000291 (0.071)	-0.0000473 (0.102)
Union	-0.213*** (0.000)	-0.253*** (0.000)	-0.0190 (0.601)	-0.267*** (0.000)	0.196** (0.002)	-0.181 (0.203)
Zones						
Northeast	-0.0614 (0.282)	-0.0706 (0.433)	-0.213** (0.004)	-0.296* (0.020)	-0.180 (0.262)	0.0545 (0.814)
Northwest	0.268*** (0.000)	0.143 (0.051)	0.135* (0.027)	-0.0404 (0.718)	0.0159 (0.891)	0.347* (0.039)
Southwest	0.288*** (0.000)	0.175* (0.012)	0.140* (0.016)	0.142 (0.212)	0.158 (0.131)	0.427* (0.015)
Southeast	0.105 (0.101)	0.328*** (0.000)	0.0977 (0.099)	-0.0341 (0.791)	-0.0383 (0.746)	0.406 (0.084)
Southsouth	0.0512 (0.431)	0.0574 (0.403)	0.119* (0.032)	-0.00942 (0.934)	0.137 (0.234)	0.0873 (0.610)

Marital								
Married	-0.0380 (0.643)	-0.00809 (0.908)	-0.101* (0.031)	0.0256 (0.814)	-0.108 (0.319)	-1.001*** (0.000)		
Separated	-0.539*** (0.000)	-0.0731 (0.718)	-0.242 (0.097)	0.354 (0.352)	-0.111 (0.786)	-0.454 (0.386)		
Divorced	-0.121 (0.428)	0.0511 (0.822)	-0.133 (0.591)	-0.772* (0.026)	-0.0441 (0.914)			
Widowed	-0.278*** (0.009)	-0.490*** (0.000)	-0.108 (0.581)	0.0259 (0.915)	-0.284 (0.547)			
_cons	8.417*** (0.000)	8.874*** (0.000)	8.577*** (0.000)	8.069*** (0.000)	9.031*** (0.000)	9.499*** (0.000)		
R ²	0.129	0.076	0.081	0.162	0.097	0.491		
adj. R ²	0.125	0.071	0.075	0.148	0.075	0.457		
N	3674	2804	2683	982	675	228		

p -values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, North central and never married are base category dummies.

Source: Authors' computation

Heckman selection was used to ensure that the computed coefficients did not suffer from a selection bias problem. The Heckman sample selection model with the test of the hypothesis of independent equations is shown in table A1 in the appendix. The identifying constraint enforced was to utilize married people in the selection model since marital status can influence whether or not to work, but not necessarily wages. Selection bias was not a concern in the majority of the estimated results because the null of equation independence could not be rejected.

4.2. The Factors that Influence the pay Disparity between Men and Women

Table 5 shows the wage discrepancy between men and women at various levels of schooling, as well as the overall gap, which is given in the last column. At low levels of education, up to those with a national diploma, the difference in earnings is positive and large. These findings imply that women are discriminated against in the labour market when they have a low degree of education, and even more so when they have none. When they have a degree or a high degree, however, they are not only not discriminated against, but also have an advantage in terms of pay. Again, the wage differential reveals that as education levels rise, the gap narrows, implying that education plays a key role in reducing inequality in society. A closer study of the sources of gender earnings differences reveals that endowments help to lower the gender earnings gap at low levels of education, save for those who have completed secondary school, whereas the coefficients effect helps to enhance inequality. This indicates that variations in male and female traits affect labour market access services to narrow the gender earnings gap, whereas the impacts of the same qualities work to widen the gap. To put it another way, even when women have attributes that would give them an edge in the Nigerian labour market, how they use these characteristics to boost their earnings is the source of a substantial earnings difference in favour of men. Finally, the interaction effects demonstrate that at low levels of education, disparities in labour market accessibility and differences in the consequences of accessibility all contribute to a significant increase in the wages gap, although this is not the case at higher levels of education as was shown in table 5.

Table 5: Oaxaca Decomposition of Mean of Log Earnings by Education Levels

No education Differential:	Primary	Secondary	Ond	Degree	Higher degree	All	
Mean_Males	8.904***	9.107***	9.291***	9.845***	10.20***	9.641***	9.260***
	(392.40)	(330.31)	(422.96)	(221.73)	(268.42)	(131.28)	(695.73)
Mean_Females	8.515***	8.821***	9.061***	9.537***	10.12***	10.56***	8.887***
	(320.27)	(292.28)	(348.62)	(159.08)	(173.76)	(80.54)	(547.47)
Difference	0.389***	0.286***	0.231***	0.308***	0.0774	-0.924***	0.373***
	(11.13)	(7.01)	(6.78)	(4.13)	(1.11)	(-6.15)	(17.75)
Decomposition:							
Endowment:	-0.00760	-0.146***	0.0527*	-0.119**	0.112*	0.344	0.118***
	(-3.81)	(2.44)	(-2.63)		(2.12)	(1.30)	(7.86)
(-0.34)							
N	3674	2804	2683	982	675	228	11046
t statistics in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$							

Authors computation

4.3. Policy Implications of the Results

To begin, educational policies that allow women to not only attend school but also pursue higher education are required to reduce gender discrimination in the Nigerian labour market. Second, women with a solid education should be encouraged to use their skills in the workplace. This would also have ramifications for reducing the level of prejudice they suffer in Nigeria's labour market.

4.4. Summary of Findings

The role of education in eliminating gender inequality in the Nigerian labour and industrial market was studied in this research. Rather than looking at education as a single variable, as most studies in Nigeria and other countries have done, the study looked at inequality or gender pay gaps at all levels of education, from no schooling to doctorate degrees. Using an Oaxaca (1973) type decomposition into contributing components, the study investigates the causes of gender earnings disparity at various levels of education, as well as the determinants of the overall wage difference. Women earn 33.7 per cent less than men without a basic education, 29.7% less with

primary education, and 20% less with secondary education. Although the gender difference appears to be greater with a diploma or equivalent, the gender gap decreases when workers have a university degree or equivalent. Women appear to be much more favoured in the job market than men with higher or postgraduate degrees. These data imply that education is the key to minimizing female labour market discrimination. The Oaxaca decomposition technique is used to decompose the extent of the earnings difference, which is a contributing factor to gender inequality in the labour market. The findings suggest that at low levels of education endowments, which are male and female traits such as demographic and socioeconomic variables, the gender wage difference can be reduced. The Oaxaca decomposition technique is used to decompose the extent of the earnings difference, which is a contributing factor to gender inequality in the labour market.

4.5. Policy Recommendations

The findings of this study compel the following policy recommendations for closing the gender gap in the Nigerian labour and industrial market. The majority of these suggestions are aimed at women themselves, advising them on how to make the best use of their skills in the workplace. First and foremost, providing women with education is critical in preparing them to enter the workforce. This can be accomplished by ensuring that girls enrol in various levels of education and receive all sorts of support to reduce the dropout rate. The government and non-governmental organizations have been fighting to provide basic education to girls as one of the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) that were pursued by all developing nations between 2000 and 2015, and 2015 to 2030, respectively. Despite the fact that many nations claim to have achieved great progress in closing the gender gap in school enrollment, the findings of this study demonstrate that providing simply a basic education to girls is insufficient to minimize labour market disparity. Giving the majority of their higher education, up to and including university degrees, would greatly reduce and maybe eliminate pay differences in the labour market, not only in Nigeria but also in many other developing nations. Higher education would provide individuals with more options to actively participate in the labour market while also increasing their earning potential. Second, instead of sitting at home or looking for low-profile, non-challenging positions with their educational qualifications, women should be encouraged to participate actively in the labour market to explore the opportunities open to them. The majority of women would prefer to work in the public sector, where job pressure is lower than in the private sector. However, this has an impact on pay levels. Also, even if they have the opportunity to participate in activities with

higher earnings potential, women who choose to engage in other economic activities in the labour market such as buying and selling, manufacturing, and so on always choose less hazardous endeavours with lower incomes. While women are still in school, this is where education councilors may help. They need to be properly educated on the benefits of higher education and how to put it to use in the workplace. On the other hand, policymakers should ensure that women are properly represented in well-paying occupations in the labour market, much as most funding organizations now require gender balance in research bids. This would be a difficult assignment because in the end, men are more likely to require those high-profile positions due to the level of risk or challenge associated with those activities. Finally, in addition to wage work, women should be encouraged to engage in nonwage labour market activities, as most of them have higher earning potential. Women, particularly those with higher levels of education, would excel in such self-employment activities in the labour market, and they should not limit their involvement to petty commerce.

5. Conclusion

This study looked into the extent of gender disparity in the Nigerian labour market, as well as the causes of such inequality, by examining how the earnings gap is explained by both endowments and gender-specific endowment utilization. According to the findings, there is a significant gender pay disparity in the Nigerian labour market, which narrows as education levels rise. The study also suggests that endowments, or observed male and female qualities, work to dramatically diminish the gender wage gap. This study suggests that there is still room for more research in this area, particularly if panel data emerge in Nigeria or any other country where individual earnings in two different states could be investigated given that the individual has moved from one world to another defined by their level of education. This would help throw more light on the situation in Nigeria, or any other country where such data is available, and the lessons may be shared with policymakers in other countries.

Statements and Declarations

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Trade Potential of India UAE Comprehensive Economic Partnership Agreement (CEPA)

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ABSTRACT

The paper examines the impact of the India-UAE Comprehensive Economic Partnership Agreement (IUCEPA) on the composition and the extent of bilateral trade between India and UAE. To understand the complementarity of trade structure and potential for trade cooperation, the paper employed indicators such as Revealed Comparative Advantage (RCA), Revealed Trade Advantage (RTA) and Revealed Competitiveness (RC), along with trade specialisation analysis. To understand the trade impact of the IUCEPA agreement on both nations, an augmented gravity model with the Fixed Effect Vector Decomposition (FEVD) and Poisson Pseudo-Maximum Likelihood (PPML) estimation techniques were used. The findings revealed that India has had a more stable comparative advantage compared to the UAE over the years. There exists complementary trade between the two countries. The overall impact of the CEPA is positive, with the trade projected to increase to US\$113 billion within five years of signing the agreement. The study concludes that the India-UAE CEPA is a promising FTA for India and provides important lessons for future trade agreements to maximise the trade potential existing with other major trade partners.

ملخص

(IUCEPA) تدرس هذه الورقة أثر اتفاقية الشراكة الاقتصادية الشاملة بين الإمارات والهند على تركيبة العلاقات التجارية الثنائية بين الهند والإمارات العربية المتحدة ومداها. ولفهم تكامل هيكل التجارة وإمكانات التعاون التجاري، اعتمدت هذه الورقة مؤشرات مثل الميزة ، والقدرة التنافسية الظاهرة (RTA) ، والميزة التجارية الظاهرة (RCA) النسبية الظاهرة ، إلى جانب تحليل التخصص التجاري. ولفهم الأثر التجاري لاتفاقية الشراكة على كلا (RC) البلدين، تم استخدام نموذج الجاذبية المعزز مع تقنيتي التقدير: تفكيك متجهات الأثر

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وكشفت النتائج أن (PPML) ومقاربة الاحتمالية القصوى الزائفة لبواسون (FEVD) الثابت الهند طالما تمتعت على مر السنين بميزة نسبية أكثر استقرارا مقارنة بالإمارات العربية المتحدة. وهناك تكامل تجاري بين البلدين. ووهذا يعني أن ثمة أثر إيجابي لاتفاقية الشراكة الاقتصادية الشاملة، إذ تشير التوقعات إلى أن حجم التجارة بين البلدين سيبلغ 113 مليار دولار أمريكي في غضون خمس سنوات من تاريخ توقيع الاتفاقية. وتخلص الدراسة إلى أن هذه الاتفاقية تجسد اتفاقية تجارة حرة واعدة بالنسبة للهند، ويمكنها استخلاص تجارب قيمة منها لاستخدامها في الاتفاقيات التجارية المستقبلية لتعزيز المزايا التجارية القائمة مع باقي الشركاء التجاريين الرئيسيين.

RESUME

Cet article examine l'impact de l'accord de partenariat économique global entre l'Inde et les Émirats arabes unis (IUCEPA) sur la composition et l'ampleur du commerce bilatéral entre l'Inde et les Émirats arabes unis. Pour comprendre la complémentarité de la structure des échanges et le potentiel de coopération commerciale, le document utilise des indicateurs tels que l'avantage comparatif révélé (ACR), l'avantage commercial révélé (ACR) et la compétitivité révélée (CR), ainsi qu'une analyse de la spécialisation commerciale. Pour comprendre l'impact commercial de l'accord IUCEPA sur les deux nations, un modèle de gravité augmenté avec la décomposition vectorielle à effet fixe (FEVD) et les techniques d'estimation du pseudo-maximum de vraisemblance de Poisson (PPML) ont été utilisés. Les résultats révèlent que l'Inde a bénéficié d'un avantage comparatif plus stable que les Émirats arabes unis au fil des ans. Il existe des échanges complémentaires entre les deux pays. L'impact global du CEPA est positif, le commerce devant augmenter pour atteindre 113 milliards de dollars américains dans les cinq ans suivant la signature de l'accord. L'étude conclut que le CEPA Inde-Émirats arabes unis est un accord de libre-échange prometteur pour l'Inde et qu'il permet de tirer des enseignements importants pour les futurs accords commerciaux afin de maximiser le potentiel commercial existant avec d'autres partenaires commerciaux majeurs.

Keywords: India-UAE CEPA, India-UAE Trade, Gravity Model, Poisson

Pseudo-Maximum Likelihood (PPML) Estimation

1. Introduction

A staunch multilateralist for a long time, India shifted towards regionalism and signed many Regional Trade Agreements (RTAs) due to changes in the global trade situations and to exploit trade gains existing with potential trade partners. Most of the early trade agreements India signed helped to improve trade and investment with the partners, but the gains from trade disproportionately went in favour of India's trade partners. After careful considerations, the India-UAE Comprehensive Economic Partnership Agreement (CEPA), which was signed in February 2022 and came into effect in May 2022, tried to address some of the previous concerns by offering comprehensive sectoral coverage, provisions for balanced outcomes, a structured mechanism to address Non-Tariff Barriers (NTBs), etc. UAE is India's third largest trade partner, and the agreement is expected to improve bilateral trade by US\$ 100 billion within five years. Assessing the potential gains from the India-CEPA agreement is extremely useful for India regarding the economic, strategic, and long-term trade policy formulation for sustained economic development through expanded trade engagements. A systematic study on the impact of the agreement can provide initial gains from increased trade flows and sectoral changes that provide useful insights for designing more productive trade agreements for India in the coming years.

UAE is an important trade destination for India as it acts as a gateway to Middle Eastern countries and Central Asian countries and acts as a hub for transporting goods to these regions. Some of India's traditional export items, such as agricultural products, pharmaceutical products, textiles and clothing, gems and jewellery, are exported to Middle Eastern countries, particularly the UAE and are expected to improve further with the CEPA agreement. India is looking for an alternative supply chain network after the COVID-19 pandemic. It is currently focused on developing the Middle East-Central Europe regions through the Middle East economic corridor, and the UAE plays an important facilitator in this effort.

Despite the region's significance, there are limited studies assessing the economic impact of the CEPA, particularly on expected trade creation, trade specialisation patterns, and competitiveness of sectors and products. Studies on the topic primarily looked at historical trade intensities and potential benefits, leaving scope for a comprehensive analysis of sectoral

complementarities, export competitiveness over time, and the extent of bilateral trade creation.

The study used comprehensive methodological approaches such as the construction of trade indicators, trade specialisation through convergence equations and a gravity model for calculating trade potential. Robust estimation techniques such as Fixed Effect Vector Decomposition (FEVD) and Poisson Pseudo-Maximum Likelihood (PPML) were used in the paper to address methodological issues related to the gravity model. By addressing these gaps identified from the literature, the paper provides a deeper understanding of the economic impact of the India-UAE CEPA. It offers valuable insights for formulating effective trade policy and RTA strategies.

2. Literature Review

Regional Trade Agreements (RTAs) have been studied over the years to understand their impact on bilateral trade. Studies by Vicard (2009) and Freund et al. (2009) suggest that RTAs increase bilateral trade, while Chen et al. (2004) counters this, stating that due to RTAs, developing countries lose their exports. Mandharachalam et al. (2022) estimated potential trade gains from India's RTA and showed that India's GDP could improve by 4.1 per cent and can add US\$109.096 billion in 2030. Studies related to India, such as those by Siddiqui (2019) and Ahmed (2010), highlight the negative impact of RTAs on trade, increasing India's deficit with Japan and ASEAN, respectively, while Krishna (2021) and Kaushal (2021) have negated the point, showing improved export efficiency for India.

Many studies have tried to explore India-UAE relations. Using indices like Trade Intensity and Revealed Comparative Advantage, Alam et al. (2017) suggest a significant trade potential in various sectors. Goyal and Vajid (2016, 2018) highlight India and UAE's commitment to strengthening economic and trade ties, while Krishnaswamy and Shaw (2014) warn that the trade figures might be inflated due to the round-tripping certain commodities. Ismail and Ahmed (2022, 2024) estimate a trade creation of 70% with CEPA and emphasise the untapped bilateral trade potential. Similarly, Kanojia et al. (2024), using comparative and econometric analyses, found that CEPA has improved the trade volumes and investment figures between India and UAE, while Górski and Bhukya

(2024) highlight that CEPA has the potential to open India's procurement market to international competition, enhancing efficiency.

This study builds on methodologies used by Balassa (1965) and Fertö et al. (2003), applying Revealed Comparative Advantage to assess export specialisation, and Dalum et al. (1998) to assess the specialisation pattern over the years. It also employs the Gravity model introduced by Tinbergen (1962). To address the heteroscedasticity and to handle time-invariant variables in panel data, the two augmented gravity models are structured using the Poisson Pseudo Maximum Likelihood Model by Silva and Tenrevro (2006) and the Fixed Effect Vector Decomposition (FEVD) model by Plümper and Troeger (2007).

While many researchers have tried studying the CEPA, a critical research gap is found in understanding the present India-UAE relations, especially in the specialisation pattern and gravity model-driven analysis. This study tries to fill that gap and assess the complementarities.

3. India's Trade Relations with UAE

India and UAE have a historical relationship dating back centuries. The bilateral trade between the two countries has steadily grown, making India UAE's top trading partner in 2008-09 and the UAE becoming India's top trading partner in 2012-13. India's top 5 imports from the UAE in the year 2021 based on 2-digit HS classifications were Mineral Fuels (27), Natural, cultured pearls (71), Plastics (39), Salt, Sulphur (25), and Iron and Steel (72) and the other imports included Jewellery, Minerals, Chemicals, and Wooden Products. India's top 5 exports to the UAE were in Natural, cultured pearls (71), Mineral Fuels (27), Electrical machinery and equipment (85), Iron and Steel (72), and Ships, boats, and floating structures (89), and the other important items include Food items, Textiles, Engineering Products, and Chemicals (UNComtrade).

The Comprehensive Economic Partnership Agreement (CEPA) between India and the UAE, which came into force in May 2022, had an ambitious target of taking the trade in goods to US\$ 100 billion and the trade in services to US\$ 15 billion in 5 years from agreement's signing, which had already reached around US\$ 85 billion even before completing one year of the agreement (UNComtrade). The CEPA agreement allows a significant tariff concession of duty-free access on 97% of tariff lines by

the UAE to India, covering 99% of India's exports to the UAE, while India provides duty-free access for 90% of tariff lines. The UAE and India have agreed to apply immediate tariff elimination to 80.3% of the product line and 64.6% of the product line, respectively. The remaining tariff is scheduled for phased elimination (India Ministry of Commerce and Industry, 2022). The agreement has kept a tight 40% Rules of Origin (RoO) for most products to prevent routing products from others. The agreement provides enhanced market access to Indian service providers in about 111 sub-sectors, which include professional services, R&D, telecommunication, and audio-visual services. India has included a chapter on Government Procurement for the first time, and provisions were made for paperless trading and electronic authentication. In addition, the agreement had provisions on Intellectual Property Rights, Investment Promotion, SME Cooperation, Dispute Settlement and Labor and Environment. The agreement also kept significant provisions such as a special focus on cooperation in strategic sectors like defence, space, and nuclear energy, a fast-track approval process for Indian pharmaceutical products already approved in developed countries, duty-free access for Indian jewellery exports to the UAE and significant tariff reductions on Indian textile exports to UAE. This reduction in trade barriers is expected to help both economies in economic growth and diversification, fostering more dynamic bilateral trade relations.

UAE is an important strategic partner to India as it provides energy security and renewable energy requirements to India. UAE is a gateway to the broader Middle East, Africa, and Europe with air and sea connectivity, benefiting trade and tourism and exporting manufactured goods and services to the region. The huge Indian diaspora in UAE (about 3.5 million) is a cementing force in this relationship. India presents a huge opportunity to the UAE in terms of its vast consumer market, investment opportunities in infrastructure, energy, and technology and provides food security through agricultural exports. The India-Middle East-Europe corridor will reduce shipping costs substantially, provide easy access to Europe via the Middle East, create a new supply chain and provide an alternative to China's Belt and Road Initiative (BRI).

4. Data and Methodology

The data for the study was collected from multiple sources, including UN Comtrade (classified under the harmonised system), World Integrated

Trade Solution (WITS), Centre d'Études Prospectives et d'Informations Internationales (CEPII), and the United States International Trade Commission. The bilateral trade between India, UAE, and the world was collected from the UN Comtrade using the WITS from 2000 to 2022 to calculate trade indices at HS 2 digits and 6 digits. The gravity model data were collected from 2000 to 2019 for 50 countries from the Centre d'Études Prospectives et d'Informations Internationales and WITS of the World Bank. The bilateral trade flows between the top 30 trading nations were used to create a panel dataset (unbalanced) with 46063 entries for FEVD and 45944 entries for PPML.

4.1. Tools of Analysis

The Balassa's Revealed Comparative Advantage (RCA) for India and UAE is used to measure the trade competitiveness using the following formula:

$$RCA_{ij} = \frac{\frac{X_{ij}}{X_{it}}}{\frac{X_{wj}}{X_{wt}}} \quad (1)$$

Where: X_{ij} = Exports of product j by country i ; X_{it} = Total exports by country i ; X_{wj} = world (/Country k , in case of bilateral) exports of product j ; X_{wt} = Total world (/Country k , in case of bilateral) exports. An RCA value greater than 1 indicates a country's comparative advantage in a product. The bilateral RCA is calculated to see which country has an advantage over the other in the given products. A value above four is considered strong, between 2-4 is considered medium, and between 1-2 is considered weak/low (Hinloopen, 2001).

4.2. Model Specifications

The study used Specialisation/Despecialisation analysis to explain how countries' export patterns and comparative advantages evolve over time. This helps identify whether countries are becoming more specialised in certain industries or sectors or diversifying their export base. As a first step towards specialisation and de-specialisation analysis for India and UAE, Revealed Symmetric Comparative Advantage (RSCA) was calculated using the following formula:

$$RSCA_{ij} = (RCA_{ij} - 1)/(RCA_{ij} + 1) \quad (2)$$

An autoregressive regression model is run to check for the stability of the patterns over time:

$$RSCA_{ij2} = \beta_0 - \beta_1 RSCA_{ij1} + \epsilon_i \quad (3)$$

Where β_1 close to 1 indicates stability, greater than 1 indicates specialisation, and less than 1 indicates de-specialisation. The β_1 value below 0 indicates that the specialisation pattern has reversed. The base year for the analysis was set to 2000, except for 2016, which was used to assess the COVID-19 effect. 2004, 2008, 2012, 2016, 2020, and 2022 were taken as the current years individually to know the change in export patterns for India and UAE. Further, sigma specialisation was analysed with the formula β_1/R .

The gravity model of international trade is used to analyse the effects of various independent variables on bilateral trade flows between India and UAE. The Fixed Effect Vector Decomposition (FEVD) model was used to correctly analyse the impact of time-invariant and rarely changing variables in the panel data of the gravity model. The paper first estimated the fixed effect model to extract the unit effects. Then, we regress the unit effects from the first model on the time-invariant and rarely changing variables using OLS. The last step is to estimate a Pooled OLS model on the baseline model, including all the explanatory time-variant, time-invariant, and rarely changing variables while accounting for the residuals from the OLS model.

The FEVD Model is given as:

$$\ln(BT_{ij}) = \beta_0 + \beta_1 \ln(GDP_i) + \beta_2 \ln(GDP_j) + \beta_3 \ln(Dist_{ij}) + \beta_4 FTA + \beta_5 Contiguity + \beta_6 Comofflang + \beta_7 Comethnolang + \beta_8 Comreligion + \beta_9 Comcol + \epsilon_{ij} \quad (4)$$

The PPML model is given as:

$$BT_{ij} = \exp(\beta_0 + \beta_1 \ln(GDP_i) + \beta_2 \ln(GDP_j) + \beta_3 \ln(Dist_{ij}) + \beta_4 FTA + \beta_5 Contiguity + \beta_6 Comofflang + \beta_7 Comethnolang + \beta_8 Comreligion + \beta_9 Comcol + \epsilon_{ij}) \quad (5)$$

Where BT_{ij} = bilateral trade flow between country i and j ; $\ln(BT_{ij})$ = natural log of bilateral trade flow; $\ln(GDP_i)$ = natural log of the GDP of country i capturing its economic size; $\ln(GDP_j)$ = natural log of the GDP of country j capturing its economic size; $\ln(Dist_{ij})$ = Distance between country i and j ; FTA = Dummy variable representing the free trade agreement between country i and j ; $Contiguity$ = Dummy representing the shared border between country i and j ; $Comofflang$ = Dummy representing whether country i and j share a common official language; $Comethnolang$ = Dummy representing whether country i and j share a common ethnic language; $Comcol$ = Dummy representing whether country i and j share a common colonial history.

Similar regressions are run with bilateral exports and imports as the dependent variables. The Poisson Pseudo Maximum Likelihood (PPML) method of gravity model was used to handle heteroskedasticity in trade flow without using a log to check for the impact of the RTA on India-UAE trade.

5. Empirical Results

The results of the RCA analysis, specialisation/despecialisation of trade patterns and the change in the trade flows between India and UAE based on the gravity model are provided below.

5.1. RCA Analysis

RCA was calculated for India and UAE from 2000 to 2022 to understand the comparative advantage and its emergence. Over this period, both countries have experienced gains and losses in comparative advantage in HS product categories. Table 1 shows the HS 2-digit commodities in which India and UAE have had a significant loss since the year 2000-2003. As shown in the table, India has completely lost its advantage in product codes 08 and 26. India has lost its strength significantly in other products mentioned in the table, but it still enjoys a comparative advantage in those commodities. On the other hand, the UAE experienced a significant loss in only one product, HS-11, which has completely lost its comparative advantage.

Table 1: Significant RCA loss for India and UAE since 2000

INDIA							
Prod Code	Product Name	2000-2003	2004-2007	2008-2011	2012-2015	2016-2019	2020-2022
08	Fruit and nuts, edible; peel of citrus fruit or melons	2.467	1.656	1.118	0.927	0.793	0.600
13	Lac; gums, resins and other vegetable saps and extracts	14.287	10.514	10.103	19.441	7.379	5.276
26	Ores, slag, and ash	3.599	5.571	2.751	0.503	0.570	0.665
42	Articles of leather; saddlery and harness; travel goods	5.832	3.834	2.457	2.030	1.827	1.495
50	Silk	16.862	12.766	6.937	2.915	2.283	3.617
62	Apparel and clothing accessories; not knitted or crocheted	4.488	3.396	2.682	2.479	2.432	1.950
63	Textiles, made up articles; sets; worn clothing and worn textile articles; rags	8.355	6.486	4.076	4.188	4.558	3.372
71	Natural, cultured pearls; precious, semi-precious stones;	8.827	7,382	5.803	3.811	3.977	2.484
UAE							
Prod Code	Product Name	2000-2003	2004-2007	2008-2011	2012-2015	2016-2019	2020-2022
11	Products of the milling industry; malt, starches, inulin, wheat gluten	1.457	0.738	0.291	0.166	0.282	0.284
Note: Products with minor losses for India are not reported in the table.							

Source: Authors' Calculations

Table 2 shows the HS 2-digit commodities in which India and UAE have gained comparative advantages since 2000-03. For India, except for product code 17, all the other products listed, product codes 69, 76, 78, and 79, have shown a rise from having no comparative advantage to

having a comparative advantage, especially in the 10 years from 2012-2022. India maintains a strong comparative advantage in Sugar and Sugar Confectionery (17). On the other hand, UAE has shown a comparative advantage gain in products coded 24, 71, 74, and 75, and it maintains a strong comparative advantage in Tobacco (24).

Table 2: Significant RCA gain for India and UAE since 2000

INDIA							
Prod Code	Product Name	2000-2003	2004-2007	2008-2011	2012-2015	2016-2019	2020-2022
17	Sugars and sugar confectionery	2.245	1.600	2.058	1.866	2.003	4.815
69	Ceramic products	0.517	0.409	0.454	0.705	1.460	1.812
76	Aluminium and articles thereof	0.680	0.574	0.587	0.782	1.365	1.947
78	Lead and articles thereof	0.114	0.461	1.033	1.367	2.457	3.057
79	Zinc and articles thereof	0.198	1.499	2.983	2.343	2.280	2.913
UAE							
Prod Code	Product Name	2000-2003	2004-2007	2008-2011	2012-2015	2016-2019	2020-2022
24	Tobacco and manufactured tobacco substitutes	0.063	0.136	0.240	0.793	3.991	6.664
71	Natural, cultured pearls; precious, semi-precious stones;	0.031	0.552	2.593	2.731	3.188	3.332
74	Copper and articles thereof	0.060	0.069	0.236	0.720	1.370	1.141
75	Nickel and articles thereof	0.002	0.002	0.007	0.027	0.266	2.543

Source: Authors' Calculations

Table 3 highlights the HS 2-digit commodities with a strong RCA (4+) and how it has changed over the past two decades. India has always had a comparative advantage in the products listed above; coded 10, 13, 17, 52, 53, and 57; and India still maintains its comparative advantage in the above commodities. UAE maintains a strong comparative advantage in only two commodities, coded 24 and 27. UAE has always had a comparative advantage in Mineral Fuels (27), which it still maintains.

Table 3: Current strong Comparative advantage for UAE

INDIA		RCA Values					
Prod Code	Product Name	2000-2003	2004-2007	2008-2011	2012-2015	2016-2019	2020-2022
10	Cereals	3.995	3.846	2.652	4.348	3.700	4.298
13	Lac; gums, resins and other vegetable saps and extracts	14.287	10.514	10.103	19.441	7.379	5.276
17	Sugars and sugar confectionery	2.245	1.600	2.058	1.866	2.003	4.815
52	Cotton	9.208	7.359	7.301	8.480	7.003	7.419
53	Vegetable textile fibres; paper yarn and woven fabrics of paper yarn	5.978	4.887	5.115	4.690	6.445	6.910
57	Carpets and other textile floor coverings	9.810	8.894	5.954	5.980	6.361	6.548
UAE		RCA Values					
HS Code	Product Name	2000-2003	2004-2007	2008-2011	2012-2015	2016-2019	2020-2022
24	Tobacco and manufactured tobacco substitutes	0.063	0.136	0.240	0.793	3.991	6.664
27	Mineral fuels, mineral oils and products of their distillation;	7.562	4.725	3.245	3.037	4.658	6.684

Source: Authors' Calculations

Table 4 shows us the Bilateral Revealed Comparative Advantage in HS 2-digit commodities that the UAE enjoys over India currently. Of all the products listed, UAE enjoys a significant comparative advantage (4+) in only products coded 01, 24, 27, 47, and 75. In Copper and articles (74), the UAE enjoys a comparative advantage over India, but in all the other products, the bilateral advantage that the UAE possesses is just over 1. In all the other products, except those listed in Table 4, India enjoys a bilateral revealed comparative advantage over the UAE.

Table 4: Current bilateral RCA for UAE over India, year group 2020-2022

HS Code	Product Name	RCA 2020-2022	HS Code	Product Name	RCA 2020-2022
01	Animals; live	6.269	47	Pulp of wood or other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard	37.091
04	Dairy produce; birds' eggs; natural honey	1.235	49	Printed books, newspapers, pictures and other products of the printing industry; etc.	1.650
18	Cocoa and cocoa preparations	1.730	71	Natural, cultured pearls; precious, semi-precious stones; etc.	1.345
19	Preparations of cereals, flour, starch or milk; pastrycooks' products	1.060	74	Copper and articles thereof	2.408
24	Tobacco and manufactured tobacco substitutes	5.043	75	Nickel and articles thereof	13.992
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	5.136	76	Aluminium and articles thereof	1.055
39	Plastics and articles thereof	1.057	80	Tin; articles thereof	1.763

Source: Authors' Calculations

Table 5 gives the complementary HS-2 products between India and UAE for 2016-2019 and 2020-2022. There are five products in which India had a strong comparative advantage, and UAE had none in the year group 2016-19, which became 6 in 2020-2022. There were 37 products in which both countries enjoyed complementarity in the 2016-19 group, which became 39 in the 2020-22 group. There are 5-6 products in which both countries have a comparative advantage, but the intensity of comparative advantage is different, showing a possibility of complementarity.

Table 5: Complementarity between India and UAE 2016-19 & 2020-22

Trade Complementarity		2016-2019	2020-2022
India 4+	UAE <1	13, 52, 53, 57, 63	10, 13, 17, 52, 53, 57
India 2-4	UAE <1	03, 09, 10, 14, 29, 32, 50, 54, 55, 61, 62, 78, 79, 89	03, 09, 29, 32, 50, 54, 55, 63, 78, 79, 89
India 1-2	UAE<1	02, 12, 23, 30, 36, 38, 41, 42, 58, 64, 67, 68, 69, 72, 73	02, 11, 14, 23, 30, 36, 38, 40, 41, 42, 46, 58, 61, 62, 67, 68, 69, 72, 73
India <1	UAE 4+	99	-
India <1	UAE 2-4	-	75
India <1	UAE 1-2	49, 74	49, 74
India 1+	UAE 1+	17‡, 24‡, 25, 27‡, 71, 76‡	24‡, 25, 27‡, 71, 76
‡ shows potential for complementarity			

Source: Authors' Calculations

5.2. Stability of Export Specialisation

Table 6 highlights whether India and UAE are continuing with the specialisation they had in the year 2000 in the HS 2-digit products. There is β -de-specialisation as the β values are less than 1. This is true for both India and the UAE. This suggests that the products in which India and UAE had low RSCA are now tending towards higher RSCA, and the products in which they had high RSCA are tending towards lower RSCA. That accounts for the regression effect, but the mobility effect should be checked as β values are less than 1.

Table 6: Stability of export specialisation pattern for India and UAE

INDIA					
Assessment Year	Base Year	α	β	R	$\beta/R(\sigma)$
2004	2000	-0.001	0.844***	0.902	0.935
2008	2000	-0.001	0.759***	0.851	0.892
2012	2000	-0.039	0.691 ***	0.824	0.839
2016	2000	-0.024	0.640***	0.801	0.799
2020	2000	-0.001	0.598***	0.725	0.824
2022	2000	-0.046	0.532***	0.681	0.782
2020	2016	0.024	0.959	0.930	1.031

UAE					
Assessment Year	Base Year	α	β	R	$\beta/R (\sigma)$
2004	2000	-0.177**	0.763***	0.694	1.099
2008	2000	-0.313***	0.569***	0.468	1.216
2012	2000	-0.240**	0.592***	0.476	1.243
2016	2000	-0.054	0.715**	0.490	1.459
2020	2000	-0.044	0.726**	0.522	1.391
2022	2000	-0.083	0.689***	0.507	1.360
2020	2016	-0.182***	0.733***	0.768	0.954
Note: Since $\beta < 1$, we must consider β/R , which shows convergence					
Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$					

Source: Authors' Calculations

The σ value for India is less than 1, suggesting a relatively lower mobility effect wherein the relative positions of products in India's export specialisation have not changed much, whereas the same is not true for the UAE. The σ value is greater than 1, suggesting that the products' positions in export specialisation have changed considerably for UAE. Table 7 shows the descending order of RCA strength for the HS 2-digit commodities for both India and UAE. For India, out of the products listed in the year group 2000-03, 7 are repeated in the year 2020-22. This number is restricted to only 3 for UAE. This further supports our analysis of specialisation patterns.

Table 7: Ranking of products with the highest comparative advantages for India and UAE

INDIA			
2000-03		2020-22	
HS Code	Product Name	HS Code	Product Name
50	Silk	52	Cotton
13	Lac; gums, resins and other vegetable saps and extracts	53	Vegetable textile fibres; paper yarn and woven fabrics of paper yarn
57	Carpets and other textile floor coverings	57	Carpets and other textile floor coverings
52	Cotton	13	Lac; gums, resins and other vegetable saps and extracts
71	Natural, cultured pearls; precious, semi-precious stones; precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coin	17	Sugars and sugar confectionery
63	Textiles, made up articles; sets; worn clothing and worn textile articles; rags	10	Cereals
09	Coffee, tea, mate and spices	09	Coffee, tea, mate and spices
53	Vegetable textile fibres; paper yarn and woven fabrics of paper yarn	50	Silk
42	Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silk-worm gut)	63	Textiles, made up articles; sets; worn clothing and worn textile articles; rags
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	78	Lead and articles thereof

UAE			
2000-03		2020-22	
HS Code	Product Name	HS Code	Product Name
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes
99	Commodities not specified according to kind	24	Tobacco and manufactured tobacco substitutes
76	Aluminium and articles thereof	71	Natural, cultured pearls; precious, semi-precious stones; precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coin
11	Products of the milling industry; malt, starches, inulin, wheat gluten	75	Nickel and articles thereof
25	Salt; sulphur; earths, stone; plastering materials, lime and cement	76	Aluminium and articles thereof
69	Ceramic products	25	Salt; sulphur; earths, stone; plastering materials, lime and cement
17	Sugars and sugar confectionery	74	Copper and articles thereof
15	Animal or vegetable fats and oils and their cleavage products; prepared animal fats; animal or vegetable waxes	17	Sugars and sugar confectionery
62	Apparel and clothing accessories; not knitted or crocheted	49	Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans
89	Ships, boats and floating structures	39	Plastics and articles thereof

Source: Authors' Calculations

5.3. Gravity Analysis

The results of the two efficient estimation methods, namely the Fixed Effect Vector Decomposition Model (FEVD) and the Poisson Pseudo Maximum Likelihood Model (PPML) of the gravity model, are presented in Table 8.

Table 8: FEVD and PPML Gravity Models

Independent Variables	Dependent Variables					
	ln (Bilateral Trade)	Bilateral Trade	ln (Exports)	Exports	ln (Imports)	Imports
	FEVD	PPML	FEVD	PPML	FEVD	PPML
$\ln(GDP_i)$	0.662***	0.747***	0.674***	0.725***	0.693***	0.766***
$\ln(GDP_j)$	0.573***	0.732***	0.629***	0.748***	0.594***	0.717***
$\ln(Dist_{ij})$	-1.254***	-0.553***	-0.374***	-0.583***	-1.621***	-0.525***
FTA	0.094***	0.247***	0.099***	0.302***	0.056***	0.200***
Contiguity	-0.288***	0.551***	1.580***	0.554***	-1.068***	0.546***
Comofflang	0.017	-0.354***	0.267***	-0.389***	0.004	-0.326***
Comethnolang	0.547***	0.437***	0.537***	0.488***	0.622***	0.392***
Comreligion	-0.693***	-0.549***	0.181***	-0.488***	-0.721***	-0.609***
Comcol	0.466***	0.212***	-0.084***	0.184***	0.508***	0.239***
Intercept	0.228***	-10.00***	-9.864***	-10.43***	1.487***	-10.96***
Observations	46063	45944	46063	45944	46063	45944
R ²	0.960		0.934		0.932	
Deviance based pseudo R ²		0.823		0.780		0.787

Note: Significance levels: * p<0.1, ** p<0.05, *** p<0.01

Source: Authors' Calculation

Bilateral trade, bilateral exports, and bilateral imports are the independent variables for running FEVD and PPML models, which gives six gravity equation results. All the variables in both models are highly significant, except for the Dummy representing a common official language, which does not show significance under FEVD with the dependent variables as bilateral trade and bilateral imports. Regarding trade elasticities with the GDPs of both nations, the PPML model shows higher elasticity for all three equations than the FEVD model by around 0.005-0.012% (FEVD $se \approx 0.002$). About Distance, the PPML model maintains stability in its coefficient at around -0.55, with a slight variation for the models with Exports and Imports. On the other hand, the FEVD has a larger range ($se \approx 0.003, 0.004, \text{ and } 0.005$), respectively. Under both models, FTA positively impacts bilateral trade, exports, and imports. FTA positively and significantly increased bilateral trade by 9.8% [= $(e^{0.094} - 1) \times 100$] under FEVD and 28% under PPML. CEPA will increase the exports for a country by 10.4% under FEVD and 35.3% under PPML. FTA will increase the imports by 5.7% based on the FEVD model and 22.1% under the PPML model. The R^2 suggests that the independent variables explain 96%, 93%, and 93% of the variations in dependent variables, namely bilateral trade, exports, and imports. The goodness fit for the PPML is measured with deviance-based Pseudo R^2 , which suggests that 82%, 78%, and 79% of the variations are explained by the independent variables for their respective dependent variables.

Since the implementation of CEPA, the only variables that have changed are the countries' GDPs and the FTA dummy. India and UAE are among the nations with top trade, thus naturally having a representation in the regression model. The trade was approximately US\$ 72.9 billion in FY2021-22, which rose to US\$ 84.5 billion in FY2022-23.

Table 9: 'Change in trade' predictions based on FEVD model 2022-23

Variables	2022-23 Growth	FEVD Coefficients	FEVD Change in Percentage (US\$) (72.9 base)	FEVD Change in value (in US\$ billion)
$\ln(GDP_{ind})$	7.2%	0.662	4.77%	3.48
$\ln(GDP_{UAE})$	7.9%	0.573	4.53%	3.30
FTA	Yes	0.094	9.8%	7.14
Total			19.1%	13.92
Source: World Bank (growth rates)				

Source: Authors' Calculations

Table 9 shows the absolute change in trade based on the estimated model, which shows that trade has increased by US\$ 13.9 billion. Thus, the predicted trade becomes US\$ 86.8 billion, which is very close to the actual figures of US\$ 84.5 billion. Let us try to predict the flow further based on the 2 GDP variables. Table 10 shows that by the end of the year, the trade is expected to grow to US\$ 91 billion. If the growth rates remain unchanged, the bilateral trade is projected to reach US\$97.9 billion in FY2024-25, US\$105.3 billion in FY2025-26, and US\$113.3 in FY2026-27.

Table 20: Change in trade predictions based on FEVD model 2023-24

Variables	2023-24 Growth	FEVD Coefficients	FEVD Change in Percentage (US\$) (72.9 base)	FEVD Change in value (in US\$ billion)
$\ln(GDP_{ind})$	8.2%	0.662	5.4%	4.56
$\ln(GDP_{UAE})$	3.6%	0.573	2.2%	1.86
Total			7.6%	6.422
Source: pib.gov.in (Growth rate India) wam.ae (Growth rate UAE)				

Source: Authors' Calculations

6. Discussion

The paper examined how the sectoral trade pattern between India and UAE changed and how the CEPA will likely influence bilateral trade. A close examination showed that products HS-10, 13, 17, and 24 were placed on the exclusion list due to strong comparative advantage for either India or the UAE, which could lead to dumping, revenue loss, and harm to the local industries. RCA analysis showed a significant RCA loss for India, but India did not let the RCA for most of the products fall below 1. On the other hand, the UAE experienced a significant loss of only one product. Both countries exhibit trade complementarity in around 39 products, with five products showing strong potential for mutual benefit.

Specialisation trends suggest that both countries are experiencing sectoral convergence. India still maintains most of its top RCA products (HS-50, 13, 57, 52, 63, 09, and 53) in the top 10 list even after a couple of decades. In contrast, many of their top 10 RCA products have been replaced by

some other products for the UAE. Three products (HS-27, 25, and 17) still need to be added to the list. This might be due to the rapid development and change that the UAE has gone through in the past three decades. The gravity model analysis showed that by the end of the 5th year after signing the agreement, the trade will reach US\$ 113 billion, a robust trade expansion. However, India should keep a close eye on its trade deficit with the UAE, which depends on oil imports, as there is a high possibility that it might widen in the future. However, the enhanced trade will generate jobs, increased consumer welfare, and other economic benefits for both nations.

Recently, the concessional duty rates under CEPA on gold and silver have led to a significant surge in imports from the UAE. Analysts argue for the withdrawal of these duty cuts under CEPA; otherwise, this can create a greater trade deficit, increased domestic competition, and a loss of revenue to the Indian Government (GTRI).

UAE has a small number of products with a competitive edge over India. Trade complementarity allows both nations to create trade and economic advancements when tariffs are phased out. Unlike the previous RTAs of India, this agreement is promising as it is carefully crafted with an important trade partner. This finding aligns with Ismail and Ahmed (2022), who indicated that CEPA resulted in 70% trade creation and 30% trade divergence, ultimately leading to a positive consumer surplus (Ismail & Ahmed, 2022).

7. Conclusion

In conclusion, the India-UAE CEPA has shown significant trade potential between India and the UAE due to the level of complementarity. The trade is expanding at the expected rate, with projected bilateral trade reaching US\$ 113 within the next five years. Both nations have effectively leveraged their comparative advantages, demonstrating strong trade complementarity. Challenges like the tariff concessions on gold and silver remains, which could disrupt CEPA's effectiveness. However, they could be avoided by renegotiating the key terms. The success of this agreement will help India reevaluate its approach towards negotiating future agreements and revisit existing RTAs to maximise their potential.

8. Limitations and Future Research

For the gravity model, bilateral trade flows of the top 30 trading nations were used to create the panel dataset, covering most of the global trade, to analyse the trade effect. The study focused on 2-digit HS products for constructing trade indices and specialisation, leaving scope for further research on 8-digit HS products open. Granular level analysis might be needed to check for the impact of CEPA at the intra-industry level.

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Nexus Between Financial Hedging, Performance and Firm Value: Evidence from A Sample of Non-Financial Asian Firms

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ABSTRACT

Use of hedging and firm value (performance) nexus has received mixed attention due to conflicting results that broadly consider firms from the U.S. and European contexts. This study investigates data from Asia-Pacific region to observe the interaction between use of hedging, value, and performance of non-financial firms. Results indicate hedging to be value enhancing irrespective of the three types of risks hedged: foreign currency, interest rate, and commodity price risk with foreign currency risk is the strongest driver. This nexus, however, is weaker for commodity price risk. Several moderation and robustness tests also confirm that profitable, highly levered, and high growth companies use derivatives for hedging to a higher extent. We forward that both reactive and proactive reasons behind hedging might be connected to corporate intention to reduce ‘reputation risk’.

ملخص

تحظى العلاقة بين استخدام التحوط وقيمة الشركة (الأداء) باهتمام متباين بسبب النتائج المتضاربة التي تغطي بشكل عام الشركات من السياقين الأمريكي والأوروبي. وهذه الدراسة تستعرض بيانات من منطقة آسيا والمحيط الهادئ لدراسة التفاعل بين استخدام التحوط وقيمة وأداء الشركات غير المالية. وتشير النتائج إلى أن التحوط يعزز القيمة بغض النظر عن أنواع المخاطر الثلاثة موضوع التحوط: العملات الأجنبية، وأسعار الفائدة، ومخاطر أسعار السلع الأساسية، حيث إن مخاطر العملات الأجنبية هي المحرك الأقوى. غير أن هذه العلاقة أضعف على مستوى مخاطر أسعار السلع الأساسية. وتؤكد كذلك العديد من اختبارات الاعتدال والمتانة أن الشركات المربحة

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وحدات المديونية العالية والنمو المرتفع تستخدم بدرجة كبيرة المشتقات للتحوط. ونرى أن الأسباب التفاعلية والاستباقية وراء التحوط مع قد تكون مرتبطة بنية الشركات للحد من "مخاطر السمعة".

RESUME

Le lien entre l'utilisation de la couverture et la valeur de l'entreprise (performance) a fait l'objet d'une attention mitigée en raison de résultats contradictoires concernant les entreprises des contextes américain et européen. Cette étude examine les données de la région Asie-Pacifique afin d'observer l'interaction entre l'utilisation de la couverture, la valeur et la performance des entreprises non financières. Les résultats indiquent que les opérations de couverture augmentent la valeur de l'entreprise, quels que soient les trois types de risques couverts : le risque de change, le risque de taux d'intérêt et le risque de prix des matières premières, le risque de change étant le facteur le plus important. Ce lien est toutefois plus faible pour le risque de prix des matières premières. Plusieurs tests de modération et de robustesse confirment également que les entreprises rentables, fortement endettées et à forte croissance utilisent davantage les produits dérivés à des fins de couverture. Nous pensons que les raisons réactives et proactives qui sous-tendent les opérations de couverture pourraient être liées à l'intention des entreprises de réduire le 'risque de réputation'.

Keywords: Hedging, Financial risk, Derivative, Firm value, Performance, Asia-Pacific.

JEL Classification: G32, F3

1. Introduction

In a perfect capital market, use of hedging does not ameliorate firm value (Modigliani & Miller, 1958). As shareholders can design their own protection plan at an equal cost, use of hedging techniques leads to negligible value enhancement for an individual firm (Jin & Jorion, 2006). In reality, with the relaxation of the assumptions of the perfect capital market, in terms of financial distress, taxes, and agency costs, there exists an optimal hedging policy that positively influences firm value and performance (Leland, 1998; Stulz, 1996; Gay & Nam, 1998; Geczy, Minton & Schrand, 1999).

Empirical literature offers three conflicting hypotheses on hedging-value-performance (HVP) nexus (Campbell, Mauler, & Pierce, 2019). First, hedging increases firm value (Allayannis & Weston, 2001; Chen & King, 2014; Clark & Judge, 2008). Second, use of hedging tools, such as derivatives, may add cost exceeding the benefits of risk management, leading to a negative connection with value (Nguyen & Faff, 2010; Nelson, Moffitt, & Affleck-Graves, 2005). Third, there is no definite conclusion that can establish a clear connection between use of hedging technique, value, and the performance of firms (Belghitar, Clark & Mefteh, 2013; Guay & Kothari, 2003). Motivated by these gaps, this study investigates whether use of hedging enhances value (and performance) of non-financial firms from the Asia Pacific region.

Asian hedging market has been growing since the Asian financial crisis. Asian markets are generally growing, with more emphasis given on interest rate and foreign exchange derivatives. Hong Kong SAR and Singapore are the most sophisticated, while the China offers the highest level of restriction (Hohensee & Lee, 2006). While most Asia-Pacific markets are still developing their derivative arsenal, global investors⁵ plan to move away from ‘overvalued’ U.S. markets to tap on the post-pandemic Asian markets with billions of dollar. This is generally portrays the need for more investigations into demand for hedging in the Asia-Pacific markets.

Our results extends on the contributions of recent studies. Bachiller, Boubaker and Mefteh-Wali (2021) conduct a meta-analysis on hedging instruments and firm value. They find foreign currency derivative to be specially value-adding, while country-specific attributes, such as the practice of common law and developed economy, influenced the use of derivative. We conduct our study to observe the connection between HVP in a set of mixed income countries from the Asia-Pacific region. Geyer-Klingenberg, Hang, and Rathgeber (2020) also conduct a meta-analysis and present that the connection between hedging and value is inconsistent when considered different types of risk hedged. For instance, foreign currency derivative is found to be positively connects to value, which is in line with Bachiller et al. (2021), while the interest rate hedging exhibits a negative effect on firm value. Therefore, this study extends its

⁵ <https://www.bloomberg.com/news/articles/2021-03-21/hedge-fund-investors-with-812-billion-see-asia-as-preferred-bet>

contribution to investigate the influence of types of risks hedged on the value and performance of firms.

Empirical evidence of the relationship between HVP in the Asia-Pacific context is rare and recent. Zamzamir et al. (2021) investigate Malaysian Islamic firms and report significant influence of hedging on firm value. Kim, Papanastassiou & Nguyen (2017) consider country specific attribute, such as the corruption in East Asian countries, that reports attractiveness of hedging in low corruption countries. Lee (2019) considers corporate governance of selected firms and report intention to use hedging among firms with high governance standards. Ameer (2009) has reported a minimum value creation by hedging activities among selected Malaysian firms. Lau (2016) also examines Malaysian firms and reports that firm market value is negatively connected to use of derivative, while the connection is positive with financial performance. Chowdhury et al. (2023) examine how CEO risk preferences shape hedging decisions and find that regardless of whether a CEO is risk-seeking or risk-averse, hedging does not significantly enhance firm value. Instead, it functions more as an insurance mechanism, offering protection without necessarily creating value—especially during extreme market fluctuations. Similarly, Chu et al. (2025) investigate commodity futures hedging and report that it negatively impacts firm value by increasing capital expenditures and reducing free cash flow, raising concerns about whether hedging benefits firms in commodity-dependent industries.

Other studies present a more favorable view. Das and Kumar (2023) find that Indian multinational corporations (MNCs) using foreign currency derivatives and foreign-denominated debt see their firm value rise by 16.91% and 10.21%, respectively. Their findings suggest that hedging is particularly beneficial for firms exposed to currency risk. Similarly, Ji and Wei (2023) confirm that hedging with derivatives enhances firm value, with their results holding up even after alternative testing and propensity score matching (PSM).

Beyond financial performance, recent studies also examine hedging's role in corporate governance and reputation management. Deng and Yang (2023) find that high-reputation firms hedge more aggressively to maintain stability, yet their research suggests that interest rate hedging can sometimes reduce firm value, challenging the belief that well-managed firms always hedge optimally. Meanwhile, Mefteh-Wali and Hussain (2024) highlight that family-owned businesses often adopt

suboptimal hedging strategies due to agency conflicts between family owners and minority shareholders, limiting its effectiveness.

The recent studies covering the Asian context present support for a mixed bag of hypotheses, which demands deeper investigation. While there is less support for cost-value hypothesis of hedging, there is significant support for reputation as use of hedging may positively influence the perception of the shareholders and debtholders (Lau, 2016).

This study investigates the interaction between hedging, performance, and value of non-financial firms considering sample from Asia-Pacific countries. Our paper offers unique contributions from two quarters. First, we considered data from 123 non-financial firms that were registered across twelve Asia-Pacific countries. These countries as sample were least covered by the past studies. Second, while most extant studies considered effect of hedging on either value or financial performance, we considered both value (Tobin's Q) and financial performance (ROIC) alongside a healthy mix of company- and country-specific determinants of value (and performance). Hedging activities signal good management quality through which the relationship with performance and value may occur. Therefore, firm characteristics may moderate the relationship between HVP. Exploring these firm characteristics also increases our understanding of the underlying reasons leading to positive or negative relationship between hedging and performance, thus is expected to contribute to resolving the contradictions presented in extant studies.

This study develops as follows. Section 2 reviews the literature. We divide the literature into three major sections. Two sub-sections discuss the two competing hypotheses: positive and negative connection between hedging, firm value, and performance, while the third sub-section reviews empirical literature relevant to the emerging markets. Section 3 discusses the data and methodology used in this study. We have employed OLS for main investigations since the results are more consistent to theory while two-stage least square and dynamic panel models using System-GMM are employed for robustness. Data includes 123 companies across 12 Asia Pacific countries for the period 2011-2015 for a total of 615 year-firm observations. Section 4 discusses the results from regular models and robustness tests. In general, our results indicate that the hedging activities add value to the company irrespective of the type of risk hedged. Companies with higher leverage, better profitability and better growth prospect will generally be benefitted more by hedging. Hence, we support

the first group of hypotheses specifying a value-enhancing attributes of hedging using derivatives. Section 5 concludes the study. We forward two channels of hedging by non-financial firms: proactive and reactive channels. Intention to hedge by both the channels connect strongly to reputation risk. Our results support the view that the non-financial firms in Asia-Pacific context engage in hedging to reduce reputation risk.

2. Literature review

Three major theories are discussed while explaining the hedging-value-performance (HVP) nexus. The first is the irrelevance theory assuming perfect markets by Modigliani and Miller (1958). Under this view, risk management is irrelevant since shareholders can create the hedging policy they desire at no cost (benefit) compared to the firm (Jin & Jorion, 2006; Ayturk, Gurbuz, & Yanik, 2016). The second stance argues that the cost of hedging outweighs the benefits. This leads to a negative relationship with firm value (Nelson et al. 2005). This negative relationship can occur if risk management programs are designed to satisfy managerial interests rather than shareholders' interests (Hagelin, Holmén, Knopf, & Pramborg, 2007; Knopf, Nam, & Thornton Jr, 2002), if derivatives are used for speculation rather than hedging hence increasing risk exposure (Adam, Fernando, & Salas, 2017), and when hedging is less effective in risk mitigation (Hagelin & Pramborg, 2004). Empirically, the prodigious losses associated with derivative usage add doubt to its capability to aggrandize value. Recent research supports these concerns. Chu et al. (2025) found that firms using commodity futures experienced a decline in firm value, largely because hedging lowered operational free cash flow while raising capital expenditures. Similarly, Ullah et al. (2023) showed that hedging strategies, when combined with high capital expenditures, led to a drop in firm value, especially for firms with significant foreign operations. Even companies with strong reputations are not immune to these risks—Deng and Yang (2023) found that while high-reputation firms hedge more aggressively, their interest rate hedging strategies often harm firm value rather than enhance it.

The third stance expects a direct relationship with firm value and establishes the base for risk management literature and practices. The channel for this positive relationship, in this view, can be through reducing income volatility, therefore, expected tax liability (Smith & Stulz, 1985), reducing financial distress costs resulting in higher debt level (Myers, 1977; Leland, 1998; Stulz, 1996), alleviating

underinvestment costs causing lower agency costs of leverage (Gay & Nam, 1998; Bessembinder, 1991; Froot et al., 1993), and attenuating information asymmetry (DeMarzo & Duffie, 1991). Recent empirical evidence strongly supports these arguments. Das and Kumar (2023) found that firms using foreign currency derivatives and foreign-denominated debt saw their value increase by 16.91% and 10.21%, respectively. Likewise, Ji and Wei (2023) reported that hedging positively impacted firm value, with results remaining robust even after extensive testing. HongXing et al. (2023) further reinforced these findings by using deep neural network models to demonstrate that currency risk hedging significantly boosts firm value, particularly in emerging markets. However, not all firms benefit equally. Mefteh-Wali and Hussain (2024) highlight how family-owned businesses sometimes engage in suboptimal hedging, limiting the potential value they could gain. At the same time, Gupta et al. (2024) show that in emerging markets, derivatives are particularly beneficial because they help stabilize earnings volatility and create tax advantages. Other evidence indicated that lower cost of equity is associated with smooth earnings (Francis, LaFond, Olsson, & Schipper, 2004). Finally, managerial attitude towards risk also channels corporate incentive for hedging. Managers emphasize on potential diminishing of corporate reputation due to volatility of income and market value. Since compensation is also tied to corporate income and market value, managers have the tendency to use the safest route to achieve less volatility by using hedging (Smith & Stulz, 1985).

Empirical results of hedging on firm value are mixed. Various papers demonstrate a positive effect on firm value (Allayannis and Weston, 2001; Kim, Mathur & Nam, 2006; Carter, Rogers, & Simkins, 2006; Pérez-González & Yun, 2013; Laing, Lucey & Lütkemeyer, 2020; Bartram, Brown & Conrad, 2011; Chen & King, 2014; Clark & Judge, 2008). Opposing quarters are strong too (Fauver & Naranjo, 2010; Hagelin *et al.*, 2007; Adam *et al.*, 2017; Nguyen & Faff, 2010; Nelson *et al.*, 2005). Considerable number of studies also do not find any overriding association between hedging practices and firm value (Bartram *et al.*, 2011; Belghitar *et al.*, 2013; Tufano, 1996; Jin & Jorion, 2006; Ayturk *et al.*, 2016).

Bartram *et al.* (2011) use a sample of non-financial firms from forty-seven countries and report a significant positive relationship between use of derivative and firm value. As lower cost of debt is connected to less

volatile operation, Beatty, Petacchi, and Zhang (2012) show that use of derivative results in low earning volatility and lower cost of borrowing. Graham and Rogers (2002) and Donohoe (2015) report that firms can benefit from reduced cash effective tax rates by using derivatives. Allayannis and Weston (2001) find at least 5% higher value for the firms using foreign currency derivative when compared to the non-users. Even though Panaretou, Shackleton and Taylor (2013) did not find interest and commodity price hedging to be value-enhancing, any value relevant to the interest rate and commodity price hedging for a sample of U.K. non-financial firms, they reported 6% hedging premium for the foreign currency hedging.

Campello, Lin, Ma, and Zou (2011) present that hedge benefits the companies by reduction of cost of debt and less restrictive covenants used in debt agreements. Tufano (1996) finds that financial hedging instruments are effective in reducing the commodity price exposure of firms. Nevertheless, hedging instruments are not connected to any enhancement in shareholder value. Kim et al. (2006), however, supports the shareholder value maximization hypothesis as their study provides evidence that financial hedging reduces short-term foreign exchange transaction risk exposure. Boubaker, Manita, and Mefteh-Wali (2020) also find a positive connection between foreign currency hedging and firm value. Overall, Ahmed, Azevedo, and Guney (2014) and Ahmed, Fairchild, and Guney (2020) conclude that risk mitigating practices using hedging was greatly influenced by type of risks and hedging tools used. Dhanani, Fifield, Helliar, Stevenson (2007) find strong country-specific influence on the HVP nexus.

Consistent with hedging and low information asymmetry nexus, Qiao, Xia and Zhang (2020) find fewer underwriting fees and price revisions for IPO firms with hedging. Pérez-González and Yun (2013) show a positive connection between the use of weather derivatives and firm value among the electric and gas utility companies registered in the U.S. Focusing on other relevant industries and sectors, Mackay and Moeller (2007) investigate a set of oil refiners based in the U.S. during 1985-2004 and find that using derivative for risk management had positive effect on firm value. On similar industry for almost the same duration, Phan, Nguyen, and Faff (2014) distinguish the value response between the case of downside risk and upside risk of the underlying asset. They argue that

use of hedging to be more relevant to the cases with downside risk, rather than the one with upside risk.

Findings by Jin and Jorion (2006) on oil and gas sector do not exhibit any discernable connection between value and hedging. However, evidence on the positive connection between value and financial hedging in oil and gas sector is evident in Haushalter (2000). The connection is established through reduction of financing cost. Gilje and Taillard (2017) find that the positive effect comes from reducing the probability of distress and underinvestment. While establishing the case of the large non-financial firms, Carter et al. (2006) and Merkert and Swidan (2019) have reached a broader agreement on the positive influence of hedging on performance. While Carter et al. (2006) reports a 5-10% hedging premium, Merkert and Swidan (2019) conclude that hedging is effective in alleviating financial risks but ineffective as a speculative tool.

Studies also relate hedging with corporate governance, payout policy, stock value, and agency problem. Foreign currency hedging positively influences abnormal stock return (Nelson et al., 2005). Hedging against interest rate and commodity price risks do not carry any trace of connection with stock price. Hedging brings no good to firms with weak governance practices (Fauver & Naranjo, 2010). Firms with higher dividend payout can avoid engaging into hedging contracts (Bonaime, Hankins & Harford, 2014). With a huge contrast, firms with higher growth options find hedging beneficial (Choi, Mao, & Upadhyay, 2013).

Previous studies considered companies from the U.S. or European contexts primarily for two reasons. Firstly, major market listed companies in oil and gas sector were in these two regions. Secondly, financial markets with cost efficient hedging contracts were limited to these large markets. Studies on emerging market started appearing in mainstream literature only recently. Nguyen and Faff (2010) investigated non-financial firms in Australia and concluded insignificant connection between hedging and firm value. While investigating 107 non-financial firms from Pakistan, Bashir, Sultan and Jghef (2013) also reported insignificant relationship between hedging and firm value. A series of other studies on emerging market that include a study on 134 non-financial firms from New Zealand (Li, Visaltanachoti & Luo, 2014), ninety Swedish firms (Nguyen, 2015), and a set of Turkish non-financial firms (Ayturk et al., 2016) also exhibited no significant connection between the use of derivative and firm value. This is rather surprising that

a good number of emerging market studies have reported robust insignificant connection between hedging and value.

Results supporting the nexus are also reported in several studies. Alam and Gupta (2018) took non-financial firms from India as sample and found lesser value volatility among hedgers and hedging to be value-enhancing around the financial crisis. Luo and Wang (2018) found positive connection between hedging and firm value among Chinese firms, particularly among the ones with higher profitability and better investment opportunities. While their study found an industry-varying value-enhancing effect, the nexus is weaker around financial crisis. Gómez-González, León Rincón, and Leiton (2012) found positive connection between hedging and value growth among Colombian non-financial firms. Like Júnior and Laham (2008), Berrospide, Purnanandam, and Rajan (2010) found positive connection for firms from Brazil.

Kim et al. (2017) controlled for corruption while studying HVP nexus among East Asian firms. They reported possible connection between low corruption and value among domestic firms. Lee (2019) found stronger positive connection among firms with effective corporate governance. Ameer (2009) studied Malaysian firms, but reported minimal relationship. Lau (2016) also took Malaysian firms into consideration but reported a negative (positive) relationship between value (financial performance – ROA and ROE) and hedging.

Several recent studies provide strong evidence that hedging can boost firm value. Das and Kumar (2023) find that firms using foreign currency derivatives and foreign-denominated debt experience notable gains, with firm value increasing by 16.91% and 10.21%, respectively. These results suggest that currency risk management is a critical tool for firms operating in volatile international markets, helping them reduce exposure to exchange rate fluctuations. Their findings hold across different industries and company sizes, reinforcing the idea that well-executed hedging strategies can improve financial stability.

Supporting this view, Ji and Wei (2023) demonstrate that firms using derivative instruments tend to achieve higher valuations, thanks to their ability to smooth earnings and provide financial predictability. Their study employs propensity score matching (PSM) and extensive robustness tests, ensuring that the observed benefits of hedging are not

influenced by external biases. By incorporating alternative financial performance measures, they conclude that hedging remains an effective tool for firms navigating uncertain economic environments.

Building on these insights, HongXing et al. (2023) take a technological approach, using deep learning models to assess hedging strategies in emerging markets. Their study reveals that firms employing structured and data-driven hedging policies see significant improvements in firm value. This research highlights the growing role of artificial intelligence and big data in financial risk management, emphasizing that firms that integrate technology into their hedging decisions can optimize strategies and achieve better financial outcomes. Moreover, their findings suggest that the success of hedging depends not only on the decision to hedge but also on how effectively firms implement and monitor their risk management practices.

Despite this strong evidence supporting hedging, several studies caution that hedging does not always lead to positive outcomes and, in some cases, can even hurt firm value. Chu et al. (2025) challenge the assumption that all hedging strategies are beneficial by focusing on commodity futures hedging, which is widely used by firms exposed to volatile raw material prices. Their findings indicate that instead of stabilizing cash flows, commodity futures hedging can drain resources, increase capital expenditures, and reduce free cash flow, ultimately leading to a decline in firm value. They argue that when hedging is not aligned with operational needs or is used excessively, it may create financial burdens that outweigh its intended benefits.

Similarly, Ullah et al. (2023) warn that hedging combined with high capital expenditures can erode firm value, particularly for firms with extensive foreign operations. Their study suggests that when firms engage in both aggressive investment strategies and risk management, the costs associated with hedging may become too high, resulting in weaker financial performance. The key takeaway from their findings is that firms must strike a balance between investment and risk management, ensuring that hedging does not restrict financial flexibility or lead to liquidity challenges.

Adding to the complexity, Deng and Yang (2023) examine corporate reputation and hedging effectiveness, uncovering that interest rate hedging in high-reputation firms can actually reduce firm value. Their

findings challenge the assumption that well-managed firms automatically benefit from hedging. Instead, they suggest that excessive hedging may signal excessive risk aversion, limiting firms' ability to pursue profitable growth opportunities. Their research also highlights the pressures that firms with strong reputations face to appear financially conservative, even when hedging does not necessarily improve performance. In some cases, they find that interest rate hedging is not only ineffective but may even contribute to firm underperformance.

Given the widely mixed results both in developed as well as developing country contexts, this study aims to investigate the HVP nexus. We differentiate our study based on the sample and robustness tests undertaken for analysis. In the next section, we discuss the empirical setting and data.

3. Empirical Design

3.1 Data

Our data comes from 123 non-financial firms listed across twelve Asia-Pacific countries, namely Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, and Thailand. Five of the twelve selected countries are from Association of Southeast Asian Nation (ASEAN) countries. Data period ranged from 2011 until 2015 with a total of 615 firm-year observations. Since derivatives may be used for speculative purposes not for hedging especially in financial firms, this paper focused on the nonfinancial firms. We offer much longer dataset when compared to existing studies by Bartram et al. (2011), Belghitar et al. (2013), and Khediri and folus (2010). The data came from three sources: 1) DataStream was used for company-specific data, 2) the World Bank datasets were used for country-specific macroeconomic factors, and 3) company annual reports were used for hedging-specific information.

On the hedging part, two kinds of data are hand-picked: first whether the companies use hedging, and second, if they do, type of risk they hedge against. We have used computer native search functions to find this information from the annual reports of the firms that are downloaded from the company website. Based on the methodologies suggested in a lion share of the relevant studies (e.g., Nelson et al., 2005; Bartram et al., 2011; Ahmed et al., 2014; Ahmed et al., 2020), we have separated the hedgers

from the non-hedgers based on a rigorous keyword search for the hedging activities using the annual reports. Keywords used are “derivative”, “hedge”, “financial instruments”, and “risk management”. Consequently, firms that have not disclosed any of these keywords in their annual reports are thereby identified as the non-hedgers. To reduce the survivorship bias, we have only used the firms that consistently used hedging throughout the sample year. To extend the selection further, we have categorized the firms based on their type of risk hedged into three types of risks. These are commodity price risk, foreign exchange risk, and interest rate risk. These are most widely cited risks that are found to be considered into the broader spectrum of financial hedge in relevant studies.

Table 1: Description of variables

Variables	Notation	Definition/ measurement	Data Source
Dependent variables			
Tobin's Q	Tobin's Q	Measures the firm value: Natural log of the [(Total assets – book value of equity + market value of equity) / Total assets].	DataStream
Return on Invested Capital	ROIC	Measure financial performance: Earnings before interest and tax / (Total capital + Short Term Debt and Current Portion of Long-Term Debt).	DataStream
Derivative use			
Hedge Dummy	Hedge	'1' = if firm uses financial derivative '0' = if the firm does not use derivative	Firm annual report
Foreign exchange hedge dummy	FCR	'1' = derivative is used for foreign currency risk '0' = derivative is not used for foreign currency risk	Firm annual report
Interest rate hedge dummy	IRR	'1' = derivative is used for hedging interest rate risk '0' = derivative is not used for interest rate risk	Firm annual report
Commodity hedge dummy	CPR	'1' = derivative is used for hedging commodity price risk '0' = derivative is not used for commodity price risk	Firm annual report
Firm characteristics and moderators			

Variables	Notation	Definition/ measurement	Data Source
Dependent variables			
Leverage	Leverage	Book value of total debt / Book value of total assets	DataStream
Firm size	Firm Size	Natural log of the book value of assets	DataStream
Growth	MB	Market value of equity / Book value of equity	DataStream
Dividend	DD	'1' = if dividend per share is positive, and '0' for otherwise	DataStream
Return on Asset	ROA	EBIT / book value of total assets.	DataStream
Macro variables			
Ln (GDP per capita)		Measures the size of the country's output: Natural log of the PPP-adjusted gross domestic product (GDP) expressed in current market price in USD.	World Bank: World Development Indicators
Bank deposits per GDP		Deposit in banks as a percentage of GDP	World Bank: Global Financial Development
Market capitalization per GDP		Total market capitalization as a percentage of GDP	World Bank: World Development Indicators

Note: Sample includes 123 non-financial firms from 12 Asia-Pacific countries.

3.2 Descriptions of the variables

Table 1 provides the definition of the variables. We have considered two alternative proxies for value and performance based on the suggestions of the extant studies. Value is represented by Tobin's Q and the return on invested capital (ROIC) is used to proxy the financial performance (Allayannis, Lel, & Miller, 2012; Bartram et al., 2011; Chen & King, 2014). These are the two dependent variables in the model. Q ratio is calculated by dividing the market value with its replacement value (Jin & Jorion, 2006; Panaretou et al., 2013). Following Hirsch and Seaks (1993), log transformation of the Q ratio is used for better statistical distribution.

Studies on hedging and value (and performance) have suffered from the choice of the right proxies as determining the use of hedging and the data on the same are difficult to get. Considering the difficulty of size, positions and hedging activities, following similar studies, we have coded

the hedging activity with binary expression (See Allayannis et al., 2012; Ayturk et al., 2016; Ahmed et al., 2014; Ahmed et al., 2020 for reference). General hedging activity is coded with '1' if there is any hedging activity, or as '0' for the absence of such activity. The dummy variables for the use of derivatives are denoted with 'Hedge', 'CPR' for the Commodity Price Risk hedge, 'FCR' for the Foreign Exchange Risk hedge, and 'IRR' for the Interest Rate Risk hedge.

3.3 Control variables

a. Firm size

Firm size is determined based on a natural log of the total asset. Firm size is reported having mixed relationship with the firm value. While there exists strong negative relationship (Ahmed et al., 2014; Ahmed et al., 2020; Belghitar et al., 2013; Chen & King, 2014), yet there are evidences of strong positive connection between the two (Magee, 2013; Kim et al., 2017). Size is analogous to economies of scale and scope, higher efficiency, higher returns on equity, greater market power, and lower insolvency risk (Liebenberg & Sommer, 2008). We expect a positive relationship of firm size with firm value and performance.

b. Leverage

Higher leverage indicates high financial risk, which is often connected to lower firm value (Magee, 2013; Belghitar et al., 2013; Abdeljawad & Mat Nor, 2017). Contrary to the financial risk perspective, Zou (2010) argues that leverage offers tax benefits on debt, and reduce agency problem by engaging outside debtholders into firms' controlling functions. These activities are connected to higher value. To capture the convexity of the relationship, the square of the total debts to total assets ratio is considered in this study to proxy (squared) leverage. Adding this squared term indicate that the effect of the leverage variable on firm performance and value depends on the level of leverage. A negative sign is expected for the squared leverage variable, indicating the effect of leverage of an inverted U-shape.

c. Dividends

We use a dummy variable to identify any firm that pays out dividend with a value of "1" and "0" otherwise. Based on several theories, dividend payout is strongly connected to firm value. Higher dividend is connected

to higher earnings (Jin & Jorion, 2006), which indicates less capital constraints for dividend issuing firms (Allayannis et al., 2012; Ayturk et al., 2016; Rashid, Mat Nor, & Ibrahim, 2013). Possibility of higher earnings and less capital constraints contribute to higher corporate value. We expect that dividend has a positive influence on firm value.

d. Growth opportunities

Higher growth firms indicate better investment opportunities. Higher growth opportunity generally finds a positive connection with value (Myers, 1977; Froot et al., 1993; Marami & Dubois, 2013). To be more specific, growth opportunity is found to increase Tobin's Q (Khediri & Folus, 2010). Their study indicates that higher investment opportunity is reflected through growth in market value of the company. To proxy growth opportunity, this study considers a ratio of market to book equity value.

e. Profitability

Profitability, measured by the return on asset (ROA), is used as a control variable in the Tobin's Q model. In general, profitable firms should see a growth in value, thus the Tobin's Q (Allayannis et al., 2012). We also expect that profitability finds a positive connection with firm value.

f. Country-specific variables

Following Kim et al. (2017), natural log of the GDP per capita is taken as a measure of relative performance of the country. GDP per capita also represent the size of an economy, in nominal term. Bank sector deposit to GDP ratio is taken as a proxy for bank market development. Bank deposit includes demand, time, and savings deposits of banks in the selected countries. We have also considered equity market capitalization to GDP ratio to measure the broader financial market development of a country.

$$Y_{i,t} = \alpha + \beta_1 Hedge_{it} + \theta X_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Y_{i,t} = \alpha + \beta_1 Hedge_{it} + \beta_2 moderator_{it} + \beta_3 Hedge.moderator_{it} + \theta X_{i,t} + \varepsilon_{i,t} \quad (2)$$

3.4 Empirical specifications

We have used equation (1) and (2) to present general empirical specifications in this study. $Y_{i,t}$ represents the dependent variables: ROIC and Tobin's Q. $Hedge_n$ is a series of dummy variables used including "Hedge" that are coded with "1" if any firms use derivative to hedge $CPR_{i,t}$, $FCR_{i,t}$, $IRR_{i,t}$. CPR is used for commodity price risk, FCR is for foreign exchange risk, and IRR is used for the interest rate risk, respectively. $X_{i,t}$ is a vector to represent a set of control variables, including size, leverage, squared leverage, dividend, investment growth, profitability, GDP per capita, bank deposits per GDP, and market capitalization per GDP. *Moderator* is one of the moderating variables (size, dividends, leverage, growth options, profitability) with "Hedge". β_1 , β_2 , β_3 , θ are the regression coefficients to be estimated, 't' and 'i' present time and cross-sections respectively, and $\varepsilon_{i,t}$ is the regression error term.

Table 2: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
TobinsQ	615	-0.8367	0.5791	-3.3144	1.7529
ROIC	615	0.1195	0.4078	-6.7547	1.5483
Hedge	615	0.5561	0.4972	0.0000	1.0000
CPR	615	0.1154	0.3198	0.0000	1.0000
FCR	615	0.5008	0.5004	0.0000	1.0000
IRR	615	0.3593	0.4802	0.0000	1.0000
Firm Size	615	14.5027	1.9029	8.8061	19.1877
MB	615	0.2454	0.2698	0.0001	5.4578
DD	615	0.8000	0.4003	0.0000	1.0000
Leverage	615	0.2425	0.2694	0.0000	5.4533
Squared Leverage	615	0.1313	1.2015	0.0000	29.7385
ROA	615	0.0841	0.2678	-4.6341	1.0542
Ln GDP per capita	615	10.0146	0.7232	8.4104	11.3734
Bank deposits to GDP	615	98.5751	54.8133	30.3128	334.5510
Market capitalization to GDP	615	124.1525	157.5298	26.1846	1124.7050

Notes: Refer to Table 1 for the notations used. The log value of Q ratio is negative, but very close to zero. Average ROIC is 11.95%. Around 55.61% of the firm used derivatives for hedging. Proportion of the companies using commodity, foreign currency and interest rate hedging have been 11.54%, 50.08%, and 35.93% respectively. Natural log of firm size is 14.50. Market value is 24.5% of the total book value of equity. Average dividend is 0.80, which indicates that average firms are dividend paying. Average debt has been 24%, which means that most firms are financed with equity. ROA is 8.41%, which is slight larger because of using EBIT instead of net income in denominator.

4. Results and Discussion

Descriptive statistics appear in Table 2. More than half of the companies in the sample (55.6%) are found to use derivative for hedging. On further classification of the risk types, Table 2 reports that 11.5%, 50% and 35.9% of the sample companies use derivative to hedge commodity price, foreign currency, and interest rate risks, respectively. In line with several past studies, a large proportion of the firms use derivatives for foreign currency hedging (Boubaker et al., 2020).

Table 3 presents pair-wise correlation coefficients for the variables tested in this study. While most of the coefficients are relatively negligible from the multi-collinearity standpoint, MB and leverage ratio (and Sqr. leverage) are found to be moderately correlated. Considering the variables used for regression analysis, the potential multicollinearity problem between MB and leverage ratio obliges us to use these two variables alternatively. The VIF⁶ is also checked with all estimated models to confirm the absence of multicollinearity problem in the final models.

⁶ Results are not provided here but are available at reasonable request.

Table 3: Pairwise correlation matrix between related variables

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
[1]. TobinsQ	1.00														
[2]. ROIC	-0.10	1.00													
[3]. Hedge	0.24	0.17	1.00												
[4]. CPR	0.03	0.00	0.32	1.00											
[5]. FCR	0.23	0.17	0.90	0.29	1.00										
[6]. IRR	0.26	0.04	0.67	0.22	0.56	1.00									
[7]. Firm Size	0.33	0.11	0.32	0.07	0.32	0.26	1.00								
[8]. MB	0.54	-0.64	0.09	0.06	0.07	0.12	0.08	1.00							
[9]. DD	0.01	0.31	0.22	-0.01	0.22	0.16	0.41	-0.14	1.00						
[10]. Leverage	0.55	-0.65	0.08	0.05	0.07	0.13	0.09	1.00	-0.13	1.00					
[11]. Sqr Leverage	0.23	-0.70	-0.04	-0.01	-0.04	-0.02	-0.10	0.83	-0.10	0.83	1.00				
[12]. ROA	-0.14	0.97	0.14	-0.01	0.15	0.04	0.14	-0.66	0.31	-0.66	-0.73	1.00			
[13]. LnGDP per capita	0.00	-0.14	0.24	0.18	0.24	0.27	-0.09	0.01	0.00	0.00	0.03	-0.15	1.00		
[14]. Bank deposits to GDP	0.09	0.00	0.41	0.09	0.40	0.39	0.19	-0.05	0.18	-0.05	-0.01	-0.01	0.60	1.00	
[15]. Market capitalization to GDP	0.11	0.02	0.20	0.03	0.22	0.26	0.18	-0.07	0.12	-0.07	-0.02	0.00	0.42	0.75	1.00

Note: Table 3 shows pairwise correlation coefficients. Highest correlation has been 0.998, which is recorded between MB and leverage. These two variables are considered as alternative in models. The second highest is 0.968 recorded between ROA and ROIC. ROA is not used while having ROIC as the dependent variable. FCR and Hedge ratios are also highly correlated and are tested independently. This also indicates that foreign currency risk hedging comprises most of the hedging activities. High correlation between IRR and FCR also indicates that most firms want to hedge against these two risks more often.

Table 4: OLS regression on Derivative Use and Firm Performance

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ROIC	ROIC	ROIC	ROIC	ROIC	ROIC	ROIC	ROIC
Hedge	0.154*** (0.0173)				0.200*** (0.0184)			
FCR		0.157*** (0.0150)				0.193*** (0.0164)		
IRR			0.0434** (0.0117)				0.102*** (0.0146)	
CPR				0.0433** (0.00999)				0.0745** (0.0233)
Firm Size	-0.0214** (0.00502)	-0.0215** (0.00501)	-0.0156** (0.00529)	-0.0150** (0.00533)	0.00158 (0.00860)	0.00256 (0.00841)	0.00889 (0.00897)	0.0127 (0.00878)
Leverage	-0.282** (0.0791)	-0.268** (0.0844)	-0.225* (0.0845)	-0.197* (0.0851)				
Sqr Leverage	-0.177*** (0.0141)	-0.180*** (0.0150)	-0.188*** (0.0148)	-0.194*** (0.0154)				

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ROIC	ROIC	ROIC	ROIC	ROIC	ROIC	ROIC	ROIC
DD	0.236*** (0.0380)	0.235*** (0.0409)	0.253*** (0.0396)	0.258*** (0.0387)	0.172*** (0.0223)	0.170*** (0.0242)	0.186*** (0.0209)	0.194*** (0.0198)
lnGDP per capita	-0.0901*** (0.0189)	-0.0904*** (0.0176)	-0.0868*** (0.0176)	-0.0883*** (0.0189)	-0.0814** (0.0188)	-0.0814*** (0.0172)	-0.0797*** (0.0167)	-0.0799** (0.0196)
Bank deposits to GDP	-0.000350** (0.000115)	-0.000314* (0.000134)	0.000207 (0.000214)	0.000327 (0.000199)	-0.000644*** (6.28e-05)	-0.000561*** (9.42e-05)	-5.40e-05 (0.000170)	0.000222 (0.000172)
Market capitalization to GDP	0.000111* (4.05e-05)	9.44e-05 (4.75e-05)	1.52e-05 (5.54e-05)	1.98e-05 (5.76e-05)	4.94e-05 (5.85e-05)	2.07e-05 (6.85e-05)	-7.67e-05 (7.58e-05)	-7.68e-05 (7.96e-05)
MB					-0.973*** (0.163)	-0.967*** (0.166)	-0.965*** (0.170)	-0.946*** (0.187)
Constant	1.170*** (0.104)	1.179*** (0.0962)	1.055*** (0.0912)	1.048*** (0.103)	0.961*** (0.128)	0.955*** (0.125)	0.856*** (0.104)	0.791*** (0.132)
Observations	605	605	605	605	605	605	605	605
R-squared	0.602	0.604	0.579	0.578	0.528	0.527	0.496	0.488

Notes: Refer to Table 1 for definitions. This table reports the linear regression results. The dependent variable is ROIC. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

Table 5: OLS regression on Derivative Use and Firm Value

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hedge	0.0527** (0.0119)				0.0723*** (0.0106)			
FCR		0.0551 *** (0.00762)				0.0651*** (0.0116)		
IRR			0.0407** (0.0120)				0.108*** (0.0134)	
CPR				-0.0730 (0.0427)				-0.0621 (0.0439)
Firm Size	0.0346** (0.00803)	0.0345** (0.00847)	0.0359** (0.00809)	0.0384*** (0.00784)	0.0728*** (0.00224)	0.0734*** (0.00265)	0.0716*** (0.00179)	0.0780*** (0.00241)
Leverage	2.445*** (0.0691)	2.448*** (0.0670)	2.445*** (0.0696)	2.491*** (0.0628)				
Sqr Leverage	-0.287*** (0.00933)	-0.288*** (0.00819)	-0.284*** (0.00991)	-0.291 *** (0.00960)				
DD	-0.0346** (0.00954)	-0.0347** (0.00863)	-0.0350** (0.0103)	-0.0333** (0.0108)	-0.172** (0.0615)	-0.173** (0.0606)	-0.172** (0.0607)	-0.172* (0.0628)
ROA	0.320** (0.0924)	0.317** (0.0950)	0.340** (0.0935)	0.351** (0.0927)	0.717** (0.180)	0.722** (0.190)	0.722** (0.179)	0.767** (0.185)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln GDP per capita	-0.0273** (0.00953)	-0.0277** (0.00951)	-0.0266** (0.00940)	-0.0165 (0.0139)	0.00575 (0.0145)	0.00621 (0.0148)	0.00167 (0.0143)	0.0174 (0.0177)
Bank deposits to GDP	7.71e-05 (0.000233)	8.29e-05 (0.000228)	0.000190 (0.000232)	0.000304 (0.000258)	-0.000221 (0.000214)	-0.000173 (0.000260)	-0.000203 (0.000214)	8.60e-05 (0.000230)
Market capitalization to GDP	0.000580*** (5.25e-05)	0.000575*** (5.14e-05)	0.000548*** (5.22e-05)	0.000536*** (6.04e-05)	0.000479*** (7.11e-05)	0.000466*** (7.38e-05)	0.000442*** (6.73e-05)	0.000423*** (7.69e-05)
MB					1.568*** (0.219)	1.574*** (0.222)	1.559*** (0.213)	1.614*** (0.223)
Constant	-1.729*** (0.130)	-1.721*** (0.129)	-1.749*** (0.122)	-1.885*** (0.138)	-2.336*** (0.0885)	-2.346*** (0.0914)	-2.272*** (0.0762)	-2.520*** (0.103)
Observations	605	605	605	605	605	605	605	605
R-squared	0.529	0.530	0.529	0.529	0.450	0.449	0.453	0.448

Notes: Refer to Table 1 for definitions. This table reports the linear regression results. The dependent variable is Tobin's Q. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

4.1 Main results: Hedge, type of risk, value, and performance

We start with OLS results for main and moderation models, then move to robustness check with dynamic panel model using system-GMM, Two-stage least square, and using lagged explanatory variables. Equation (1) and (2) are used as the broader test models. Heteroskedasticity consistent clustered robust standard errors are presented following Allayannis et al. (2012) and Petersen (2009). Table 4 presents the relationship between use of hedging and financial performance having ROIC as the dependent variable. Table 5 shows the same for firm value using Tobin's Q as the dependent variable. Each of these tables includes dummies for use of hedging (*Hedge*), and three proxy dummies for each of the risk hedged (*FCR*, *IRR*, *CPR*). The R-squared values for the models in Table 4 ranges between 48% and 60% and in Table 5 between 44% and 53%, indicating good model fit.

Panel 1 in Table 4 shows the results for hedging in general, while panels 2 through 4 display the same for three types of risks - FCR, IRR, and CPR. Panel 5 through 8 replace leverage ratio by MB ratio due their potential multicollinearity effect. MB is the proxy used for growth, while leverage indicate percentage of debt. Regular country- and company-specific control variables are used in all panels. Despite using several proxies and control variable, we find strong support for the first major of extant studies – hedging strongly positively increases ROIC. These results have two takeaway messages. First, there exists significant hedging premium. Hence, firms in the Asia-Pacific region will find it 'profitable' to add hedging to their decision list. Second, the connection between financial performance and hedging is not sensitive to type of risks, meaning that whatever the type of risk hedged, hedgers will reach their incentives. Our results strongly support hedge premium reported by extant studies (Ahmed et al., 2014; Panaretou et al., 2013; Carter et al., 2006). These results carry two key implications.

First, the evidence confirms that firms in the Asia-Pacific region stand to gain substantial financial benefits from hedging activities, making it a strategically sound decision for firms navigating economic uncertainty. This aligns with recent findings by Ji and Wei (2023), who report that hedging significantly improves firm value across various industries, particularly in markets characterized by financial volatility. Similarly, Gupta et al. (2024) highlight that derivative usage in emerging markets enhances firm value by reducing earnings volatility and tax liabilities,

which is consistent with our findings. These studies suggest that hedging is more than just a risk-reduction tool—it is also a value-enhancing financial strategy.

Second, our findings indicate that the link between financial performance and hedging remains strong regardless of the type of risk being managed. This finding is particularly relevant in the context of prior research showing that foreign exchange, interest rate, and commodity hedging can all contribute to financial stability. In line with our results, Das and Kumar (2023) demonstrate that foreign currency derivatives and foreign-denominated debt enhance firm value by 16.91% and 10.21%, respectively, further confirming that currency risk hedging remains a crucial component of corporate financial strategy. Similarly, HongXing et al. (2023) use deep learning models to analyze currency risk hedging in emerging markets, showing that firms with well-structured hedging strategies experience significant improvements in financial performance, further reinforcing our findings.

Table 5 presents results for similar models used in Table 4, but for firm value. Tobin's Q is the proxy for firm value. Usual three risk proxies, control variables for country- and company-variable control variables are considered. ROA is taken as additional proxy for the value model. Due to mechanical relationship issue, ROA was not considered in ROIC models. First four panels in Table 5 present results for leverage models and the last four for MB models. In general, results of Table 5 indicate a strong positive influence of hedging on firm value. While taking a deeper look into the type of risks, both leverage and MB models show that foreign currency and interest rate hedging strongly positively influence value. However, the influence of commodity price hedging has been consistently insignificant. Not many studies are found on commodity hedging on Asia-Pacific. Recently Kumar, Badhani, Bouri and Saeed (2020) find that commodity market in the Asia-Pacific exhibits strong herding behavior. Hence, there exists a possibility of spillover of risks to other countries, which makes hedging difficult. Also, as Asia-Pacific interest rate and foreign currency hedging markets are relatively more developed than the commodity market, differences in the level of sophistication and the restriction, and the country-specific heterogeneity may help explain the insignificant results of the commodity price hedging in the Asia-Pacific (Ahmed et al., 2020). Other results in Table 5 are qualitatively identical to those of the Table 4.

Our findings strongly support the argument that hedging enhances firm value. In particular, both foreign currency and interest rate hedging have a strong and positive influence on firm value. These results align with Mefteh-Wali and Hussain (2024), who find that foreign currency risk management strategies increase firm value in family businesses, suggesting that firms with structured risk management policies benefit from reduced uncertainty and financial distress. Likewise, Deng and Yang (2023) demonstrate that high-reputation firms are more likely to hedge to maintain financial stability, further supporting our conclusion that hedging remains an effective tool for enhancing firm value, particularly in firms with high market exposure.

However, our findings reveal a notable contrast in the impact of commodity price hedging, which consistently fails to show a significant effect on firm value. This result is particularly striking given the importance of commodity markets in the Asia-Pacific region. One possible explanation is that the Asia-Pacific commodity market exhibits strong herding behavior, as reported by Kumar, Badhani, Bouri, and Saeed (2020). They argue that investor sentiment and market spillover effects create challenges for effective hedging, making it difficult for firms to achieve meaningful risk reduction. This is further supported by Chu et al. (2025), who find that commodity futures hedging can reduce firm value due to its impact on free cash flow and capital expenditures. These results suggest that commodity hedging in the Asia-Pacific region may be subject to greater market inefficiencies than foreign currency and interest rate hedging, potentially limiting its effectiveness.

Additionally, Ullah et al. (2023) provide further insights into why commodity hedging may not significantly impact firm value, showing that when hedging is combined with high capital expenditures, it can erode financial performance rather than enhance it. Their findings highlight that the cost of hedging may outweigh its protective benefits in certain circumstances, particularly when firms face significant external financial pressures. This may help explain the insignificant results for commodity hedging in our study, as firms operating in commodity markets may be subject to structural constraints that limit hedging effectiveness.

Among other control variables, firm size increases firm value but decreases performance. Leverage also reduces performance but pushes

the firm value up. However, the squared leverage reduces both firm value and performance, indicating the hypothesized inverted U-shape for the effect of leverage. Dividend payout leads to reduction in value, indicating that the investors have penalized the financially constrained companies if they are paying out dividend. Market to book ratio connects negatively to performance but positively to firm value. GDP per capita and bank deposits to GDP ratio exhibit negative effects on firm performance and value, while market capitalization reports the expected positive effect.

Table 6: Derivative Use and Firm Performance with interaction models

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	ROIC	ROIC	ROIC	ROIC	ROIC	ROIC
Hedge	0.964*** (0.157)	0.208** (0.0585)	0.0918** (0.0250)	1.251*** (0.136)	0.273** (0.0737)	-0.0201 (0.0351)
Firm Size	0.000729 (0.00807)	-0.0225** (0.00508)	-0.0205** (0.00482)	0.0290* (0.0114)	2.62e-05 (0.00759)	-0.00536 (0.00457)
Leverage	-0.308** (0.0753)	-0.282** (0.0765)	-0.415** (0.124)			
Sqr Leverage	-0.169*** (0.0138)	-0.177*** (0.0138)	-0.153*** (0.0225)			
DD	0.215*** (0.0372)	0.263** (0.0640)	0.236*** (0.0382)	0.147*** (0.0226)	0.208** (0.0456)	0.198*** (0.0303)
MB				-0.970*** (0.150)	-0.971*** (0.161)	-1.097*** (0.103)
lnGDP per capita	-0.0909** (0.0210)	-0.0908*** (0.0196)	-0.0973*** (0.0208)	-0.0830** (0.0215)	-0.0824** (0.0196)	-0.108*** (0.0211)
Bank deposits to GDP	-0.000233 (0.000173)	-0.000296 (0.000170)	-0.000285* (0.000121)	-0.000476** (0.000133)	-0.000570*** (0.000117)	-0.000307** (9.84e-05)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
ROIC	ROIC	ROIC	ROIC	ROIC	ROIC	ROIC
Market capitalization to GDP	0.000165** (4.29e-05)	0.000110* (4.13e-05)	0.000120** (3.62e-05)	0.000123 (5.88e-05)	4.79e-05 (5.91e-05)	0.000104** (3.51e-05)
DD*Hedge		-0.0672 (0.0670)			-0.0908 (0.0785)	
Leverage*hedge			0.262* (0.110)			
Size*hedge	-0.0557*** (0.00977)			-0.0724*** (0.00840)		
MB*Hedge						0.827*** (0.131)
Constant	0.878*** (0.0768)	1.169*** (0.109)	1.249*** (0.131)	0.593*** (0.120)	0.961*** (0.130)	1.297*** (0.147)
Observations	605	605	605	605	605	605
R-squared	0.614	0.603	0.605	0.549	0.530	0.567

Notes: Refer to Table 1 for definitions. The dependent variable is ROIC. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

Table 7: Derivative Use and Firm value with interactions model

VARIABLES	(1) TobinsQ	(2) TobinsQ	(3) TobinsQ	(4) TobinsQ	(5) TobinsQ	(6) TobinsQ	(7) TobinsQ	(8) TobinsQ
Hedge	0.157 (0.138)	0.0875 (0.0560)	0.229*** (0.0272)	-0.0258** (0.00634)	0.184 (0.147)	0.0961 (0.0718)	0.0572 (0.0327)	-0.000136 (0.0562)
Firm Size	0.0374** (0.00844)	0.0339** (0.00761)	0.0325*** (0.00660)	0.0442*** (0.00783)	0.0758*** (0.00341)	0.0723*** (0.00343)	0.0757*** (0.00504)	0.0708*** (0.00183)
Leverage	2.440*** (0.0668)	2.445*** (0.0703)	2.833*** (0.148)	2.428*** (0.0652)				
Sqr Leverage	-0.286*** (0.00922)	-0.287*** (0.00977)	-0.350*** (0.0135)	-0.326*** (0.0154)				
DD	-0.0364** (0.00850)	-0.0171 (0.0403)	-0.0389** (0.0120)	-0.0478** (0.0148)	-0.174** (0.0604)	-0.160 (0.0921)	-0.179** (0.0554)	-0.157** (0.0460)
ROA	0.314** (0.0935)	0.318** (0.0930)	0.362** (0.0962)	0.0517 (0.152)	0.710** (0.184)	0.716** (0.181)	0.676* (0.246)	0.665** (0.161)
MB					1.564*** (0.217)	1.568*** (0.219)	1.543*** (0.219)	1.490*** (0.257)
lnGDP per capita	-0.0278** (0.00879)	-0.0279** (0.00899)	-0.00396 (0.0106)	-0.0209 (0.0120)	0.00521 (0.0146)	0.00535 (0.0153)	0.00805 (0.0152)	-0.00664 (0.00830)
Bank deposits to GDP	9.14e-05 (0.000233)	0.000112 (0.000190)	-0.000103 (0.000288)	4.73e-05 (0.000240)	-0.000206 (0.000198)	-0.000198 (0.000154)	-0.000236 (0.000234)	-0.000120 (0.000261)
Market capitalization to GDP	0.000587*** (5.46e-05)	0.000579*** (5.18e-05)	0.000552*** (5.89e-05)	0.000560*** (5.39e-05)	0.000486*** (7.84e-05)	0.000478*** (6.98e-05)	0.000472*** (6.89e-05)	0.000497*** (5.35e-05)
DD*Hedge		-0.0434 (0.0763)				-0.0296 (0.0869)		
Leverage*hedge			-0.750*** (0.138)					

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROA *Hedge								
Size*hedge	-0.00715 (0.0101)				-0.00762 (0.0102)			
MB*Hedge								0.295 (0.212)
Constant	-1.762*** (0.151) 605	-1.728*** (0.131) 605	-1.985*** (0.164) 605	-1.889*** (0.168) 605	-2.371*** (0.0612) 605	-2.336*** (0.0880) 605	-2.384*** (0.124) 605	-2.186*** (0.105) 605
Observations								
R-squared	0.529	0.530	0.540	0.541	0.450	0.450	0.450	0.452

Notes: Refer to Table 1 for definitions. The dependent variable is Tobin's Q. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

4.2 Robustness test: effect of moderation

Table 6 and 7 tabulate regression results for equation 2 with interaction terms. In this section, our objective is to check for the robustness of the main results, given the moderation of the “*Hedge*” variable with other selected firm-specific variables. Table 6 considers ROIC as the dependent variable, while Table 7 takes Tobin’s Q as the dependent variable. Firm specific variables considered for the moderation are dividends, leverage, size, and MB (proxy for growth) for both value and performance models, and ROA as an additional moderator for value models (Table 7). Heteroskedasticity consistent clustered robust standard errors are presented following Allayannis et al. (2012) and Petersen (2009).

The results in Table 6 and 7 add some new corners to the original results. From the performance-hedging nexus (Table 6), while hedging consistently positively influences performance (ROIC), contrary to Bonaimé, Hankins and Harford (2014), we find that dividend-hedge interaction term does not have a significant influence on the value. While considering the growth options, our findings support the existing works by Choi, Mao and Upadhyay, (2013) that use of hedging by high growth firms earns high. Even though leverage had a negative relationship with performance, hedging-leverage is found to increase performance. Interaction with size exhibits that smaller firms take performance arbitrage using hedging.

Table 7 shows the results for value-hedging nexus for the moderation terms. Hedging results are inconsistent due to moderation terms. Even though hedging positively influences value, most of the coefficients are insignificant. Interaction terms involving dividend, size and growth opportunities are all insignificant. Companies with low leverage will see increase in value if hedging is used. Companies with higher ROA will see higher value if hedging is used. Even though results are not entirely homologous between the value and the performance models, the interaction terms find leverage, size, profitability, dividend and growth opportunities to be influential while making hedging decision.

4.3 Robustness test: Dynamic panel analysis using System-GMM

As suggested by Magee (2013), if firm performance is correlated with its lagged values in an autoregressive process, a lagged dependent variable as an independent variable should be included to capture this dynamism.

In order to account for endogeneity in this case, the effect of hedging on firm performance is estimated in a dynamic panel framework using System-GMM estimators. The system GMM estimator uses a first-difference transformation to control for unobserved firm heterogeneity, and uses lagged values of firm performance as instrumental variables to control for failure of the strict exogeneity assumption (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998). System GMM is suitable for small ‘*t*’ and large ‘*n*’ panels (Roodman, 2006). We replicate Table 4 by adding the lagged dependent variable and estimate the dynamic models with system-GMM estimators. We accept first lag of dependent variable (ROIC) as endogenous, while all other variables are considered as exogenous. The results of this estimation indicate that the lagged dependent variable is insignificant in all specifications, meaning that the phenomenon is not autoregressive and dynamic modeling is not suitable⁷

4.4 Robustness test: lagged independent variables and two-stage least squares

Another possibility is that the influence goes from performance to hedging not vice versa or both variables are determined simultaneously. To overcome these possibilities, we repeat all regressions with lagged independent variables to ensure that the relationship goes from hedging to performance. Part of these results are presented in Table 8 (a). The last possibility is that the hedging variable is endogenous. We used the two-stage OLS with lagged values of the “*Hedge*” variable as instrument and part of the results are presented in Table 8(b). In both cases, the results are qualitatively like the results presented in this paper.

⁷ Results are available upon reasonable request.

Table 8: Robustness Tests for Derivative Use

(a) Lagged independent variables					(b) Two-Stage least square				
VARIABLES	(1) TobinsQ	(2) TobinsQ	(3) ROIC	(4) ROIC	VARIABLES	(1) TobinsQ	(2) TobinsQ	(3) ROIC	(4) ROIC
L.Hedge	0.0424** (0.0131)	0.0489*** (0.00679)	0.185*** (0.0157)	0.237** (0.0676)	Hedge	0.0713*** (0.0146)	0.0974*** (0.0276)	0.201*** (0.00824)	0.251*** (0.0168)
L.Firm Size	0.0198 (0.0108)	0.0314* (0.0133)	-0.0254** (0.00446)	-0.00606 (0.0213)	Firm Size	0.0291*** (0.00613)	0.0704*** (0.00150)	-0.0226*** (0.00532)	0.000816 (0.00739)
L.Leverage	3.243*** (0.506)		1.912 (1.424)		Leverage	2.448*** (0.0639)		-0.310*** (0.0794)	
L.Sqr Leverage	-1.742 (1.018)		-4.537 (2.951)		Sqr Leverage	-0.291*** (0.00475)		-0.171*** (0.0138)	
L.DD	-0.0746* (0.0304)	-0.0782* (0.0276)	0.251*** (0.0191)	0.274*** (0.0378)	DD	-0.0403*** (0.0104)	-0.200*** (0.0534)	0.257*** (0.0305)	0.183*** (0.0221)
L.ROA	0.00615 (0.260)	0.130 (0.277)			ROA	0.299*** (0.0815)	0.685*** (0.181)		
L.MB		2.241*** (0.0480)		-0.721 (0.459)	MB		1.492*** (0.180)		-1.013*** (0.117)

(a) Lagged independent variables					(b) Two-Stage least square				
VARIABLES	(1)	(2)	(3)	(4)	VARIABLES	(1)	(2)	(3)	(4)
lnGDP per capita	-0.0593* (0.0190)	-0.0464* (0.0178)	-0.129** (0.0301)	-0.110** (0.0289)	ln GDP per capita	-0.0229*** (0.00824)	0.00951 (0.0134)	-0.101*** (0.0184)	-0.0944*** (0.0178)
Bank deposits to GDP	0.000167 (0.000599)	0.000225 (0.000546)	-0.000543 (0.000255)	-0.000489 (0.000364)	Bank deposits to GDP	1.73e-05 (0.000333)	-0.000378 (0.000371)	- (7.45e-05)	- (1.40e-05)
Market cap to GDP	0.000581*** (9.54e-05)	0.000523*** (6.78e-05)	0.000207** (5.54e-05)	8.01e-05* (2.77e-05)	Market cap to GDP	0.000572*** (6.30e-05)	0.000478*** (8.35e-05)	0.000108*** (2.34e-05)	5.28e-05 (3.91e-05)
Constant	-1.170** (0.291)	-1.393** (0.323)	1.409*** (0.163)	1.145** (0.235)	Constant	-1.690*** (0.119)	-2.288*** (0.102)	1.270*** (0.104)	1.085*** (0.112)
Observations	483	483	483	483	Observations	483	483	483	483
R-squared	0.487	0.473	0.341	0.210	R-squared	0.548	0.454	0.634	0.567

Notes: Refer to Table 1 for definitions. This table reports the regression results in (a) independent variables are lagged by one period except for macroeconomic variables, and in (b) a two-stage OLS is used. “Hedge” is considered endogenous and instrumented by the lagged values of “Hedge”. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

5. Conclusion

The relationship between hedging and firm value has been widely debated, with research offering mixed results on whether risk management strategies help or hinder financial performance. Some argue that hedging stabilizes cash flows, reduces financial uncertainty, and enhances firm value, while others suggest that its benefits are limited or even costly. Much of the existing research has focused on firms in developed markets, where financial instruments and regulatory frameworks are well-established. In contrast, the experience of firms in emerging economies, where market conditions differ significantly, remains relatively underexplored.

This study helps bridge that gap by examining the impact of hedging on firm performance and value in Asia-Pacific economies. By analyzing data from 123 firms across 12 countries between 2011 and 2015, and using multiple statistical techniques to ensure robustness, we provide new insights into how hedging functions in diverse economic and financial environments. Our findings strongly suggest that hedging is a value-enhancing strategy, particularly when firms hedge foreign exchange and interest rate risks. Firms that actively manage these risks experience greater financial stability, improved profitability, and stronger long-term performance. However, when it comes to commodity price hedging, we find no clear link to firm value. This suggests that firms in the region face challenges in effectively hedging commodity risks, possibly due to market inefficiencies, speculative activity, or regulatory constraints.

5.1 Implications

One of the key takeaways from this study is that hedging should not be seen simply as a defensive measure against risk but as a proactive financial strategy. When implemented effectively, hedging allows firms to smooth earnings, minimize uncertainty, and improve financial flexibility, all of which contribute to stronger business performance. For firms operating in highly volatile markets, especially those exposed to foreign exchange and interest rate fluctuations, structured hedging strategies can provide a competitive advantage, allowing them to navigate financial uncertainty with greater confidence.

Not all firms benefit equally from hedging. Our findings suggest that companies with higher leverage, strong profitability, and significant

growth potential are in the best position to leverage derivative instruments effectively. These firms are typically more financially secure and able to balance the costs of hedging with the benefits of risk reduction. This means that financial managers need to carefully evaluate their firm's financial structure and risk exposure before deciding whether and how to implement hedging strategies. well-thought-out hedging approach, tailored to a company's specific financial situation and market environment, is far more effective than a one-size-fits-all approach.

Hedging is not just about managing financial risk—it is also about managing corporate reputation and investor perceptions. Firms that hedge strategically often do so to signal stability and financial prudence to investors, lenders, and other stakeholders. Highly leveraged firms, for instance, may engage in hedging reactively, using it as a tool to reassure investors and creditors that they are taking steps to manage potential financial distress. On the other hand, highly profitable and high-growth firms may hedge proactively, aiming to create a predictable financial environment that supports long-term expansion and attracts investors seeking stability. This suggests that firms do not hedge only for risk mitigation but also to strengthen their position in financial markets and enhance investor confidence.

Our results forward that there is a lack of a clear relationship between commodity price hedging and firm value. While hedging foreign exchange and interest rate risks clearly delivers financial benefits, commodity hedging does not appear to be as effective in the Asia-Pacific region. This could be due to inefficiencies in commodity derivative markets, speculative behavior, or limited access to well-structured hedging instruments.

From a policy and regulatory standpoint, our findings highlight the need for stronger financial market infrastructure in emerging economies to support hedging activities. Policymakers should focus on improving transparency in derivative markets, reducing barriers to entry, and ensuring that firms have access to well-regulated hedging instruments. Strengthening these markets would allow firms to hedge more effectively, leading to greater financial stability at both the firm and national levels.

5.2 Limitations and future research

Despite its contributions, this study has limitations. The dataset covers only five years, meaning that longer-term trends could not be fully examined. Additionally, while the study controls for firm- and country-specific factors, other elements—such as corporate governance, managerial risk preferences, and industry-specific regulations—may influence hedging outcomes. Future research could explore how these factors interact with hedging strategies to provide a more nuanced understanding of risk management.

Looking forward, there are several promising directions for future research. One important area would be to examine how hedging strategies evolve over time and whether they help firms remain resilient during financial crises or economic downturns. Another interesting question is how corporate governance influences hedging decisions, as well-managed firms may be better equipped to implement risk management strategies effectively. Additionally, industry-specific studies could provide deeper insights into how hedging effectiveness differs across sectors, particularly in industries with high exposure to market volatility, such as manufacturing, energy, and financial services.

Is hedging in its current form providing real financial protection, or are there structural barriers preventing firms from fully benefiting from these instruments? Future research could explore this issue further by examining how commodity hedging effectiveness varies across industries and different regulatory environments.

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Structural Model of Effective Factors on Risk Appetite: A Grounded Theory Paradigm

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ABSTRACT

Adhering to risk appetites through their formulation guarantees that risk management stays in line with predefined levels of risk, even though accepted banks can frequently tolerate higher levels of risk. In light of the aforementioned, the primary goal of the current study is to examine, create, and validate a structural model of the variables affecting the risk appetites of recognised banks on the stock exchange using the grounded theory paradigm. Data was collected through semi-structured interviews with 15 accounting experts using snowball sampling and theoretical sampling. After using Grounded Theory paradigm suggested by Strauss and Corbin (1990) to design and validate structural model factors that have influence on risk appetite in banks listed on stock exchange, based on our qualitative analysis we design a new structural model using four new factors that have influence on risk appetite in banks listed on stock exchange, which are: (1) causal conditions (organizational factors, organizational maturity); (2) intervening conditions (communication expansion); (3) intervening strategies (risk management methods), and (4) outcomes (organizational growth, continuity of activities). We validated our new structural model using confirmatory and discriminant analysis methods, while reliability was assessed through repeatability and generalizability. This finding will help banks to determine what kind of risk appetites investors have.

ملخص

الالتزام بالرغبة في المخاطرة من خلال صياغتها يضمن تماشي عملية إدارة المخاطر مع مستويات المخاطر المحددة مسبقاً، على الرغم من أن البنوك المعترف بها يمكنها في كثير من الأحيان تحمل

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مستويات أعلى من المخاطر. وفي ظل ما سبق، يتمثل الهدف الأساسي من هذه الدراسة في تفحص وإنشاء واختبار صحة نموذج هيكلي للمتغيرات التي تؤثر على إقبال البنوك المعترف بها على المخاطرة في البورصة باستخدام نموذج نظرية التفاعل الحقلي. وجمعت البيانات من خلال مقابلات شبه منظمة مع 15 خبيراً في المحاسبة عن طريق جمع العينات بأسلوب كرة الثلج والعينات النظرية. بعد استخدام نموذج نظرية التفاعل الحقلي، الذي اقترحه ستراوس وكوربين (Strauss and Corbin, 1990) لتصميم نموذج هيكلي للعوامل المؤثرة على الرغبة في المخاطرة في البنوك المدرجة في البورصة والتحقق منه، واستناداً إلى تحليلنا النوعي، صممنا نموذجاً هيكلياً جديداً باعتماد أربعة عوامل جديدة لها تأثير على الرغبة في المخاطرة في البنوك المدرجة في البورصة، وهي: (1) الظروف السببية (العوامل التنظيمية، النضج التنظيمي)، و(2) الظروف المتداخلة (التوسع في التواصل)، و(3) الاستراتيجيات المتداخلة (أساليب إدارة المخاطر)، و(4) النتائج (النمو التنظيمي، استمرارية الأنشطة). وتحققنا من صحة نموذجنا الهيكلي الجديد باستخدام أساليب التحليل التأكيدي والتمييزي، في حين تم تقييم الموثوقية من خلال قابلية التكرار والتعميم. من شأن النتيجة المتوصل إليها أن تساعد البنوك في تحديد نوع الإقبال على المخاطرة في صفوف المستثمرين.

RESUME

Le respect de l'appétit pour le risque par sa formulation garantit que la gestion du risque reste conforme aux niveaux de risque prédéfinis, même si les banques reconnues peuvent fréquemment tolérer des niveaux de risque plus élevés. À la lumière de ce qui précède, l'objectif principal de la présente étude est d'examiner, de créer et de valider un modèle structurel des variables affectant l'appétit pour le risque des banques reconnues en bourse en utilisant le paradigme de la théorie ancrée. Les données ont été collectées au moyen d'entretiens semi-structurés avec 15 experts comptables en utilisant un échantillonnage en boule de neige et un échantillonnage théorique. Après avoir utilisé le paradigme de la théorie ancrée suggéré par Strauss et Corbin (1990) pour concevoir et valider les facteurs du modèle structurel qui ont une influence sur l'appétit pour le risque dans les banques cotées en bourse, nous avons conçu, sur la base de notre analyse qualitative, un nouveau modèle structurel utilisant quatre nouveaux facteurs qui ont une influence sur l'appétit pour le risque dans les banques cotées en bourse, qui sont : (1) conditions causales (facteurs organisationnels, maturité organisationnelle) ; (2) conditions d'intervention (expansion de la communication) ; (3) stratégies d'intervention (méthodes de gestion des risques), et (4) résultats (croissance organisationnelle, continuité des activités). Nous avons validé notre nouveau modèle structurel à l'aide de méthodes d'analyse confirmatoire et discriminante, tandis que la fiabilité a été évaluée par la

répétabilité et la généralisabilité. Ces résultats aideront les banques à déterminer le type d'appétit pour le risque des investisseurs.

Keywords: Risk Management; Risk Appetite; Structural model; Grounded Theory Paradigm.

JEL Classification: E12; E43; E52

1. Introduction

Risk appetite reflects the level of risk that a bank is willing to accept to achieve its business objectives. Fundamental risks include credit risk, liquidity risk, operational risks, market risks (including interest rate and currency exchange rate risks), and reputation risk. The risk appetite framework imposes constraints based on capital adequacy, liquidity adequacy, and concentration risks, with the ultimate goal of reducing income volatility, ensuring a strong capital and liquidity structure in economic cycles, and maintaining the bank's reputation (Kayani & Hasan, 2024; Yari et al., 2021).

Risk appetite is annually reviewed by the board of directors with the assistance of the risk management unit, and its implementation is the responsibility of the board. Since the risk phenomenon is inherent, businesses strive to create processes, methods, and tools for logical risk management, maintaining it at acceptable levels in line with organizational goals. Despite the not being a new concept in financial literature, recent financial crises and their profound effects on the bankruptcy of companies and financial institutions, particularly banks, underscore its increasing importance (Soleimani et al., 2020). The accepted amount of risk must be determined by the organization based on market conditions, and most importantly, the tolerable level of risk (Yari et al., 2021).

Risk appetite forms the core of a comprehensive risk management solution and serves as a metric for comparing the overall risk status within the organization. The primary goal of risk management is to maximize shareholder value. Internal controls are weaker for more complex companies; therefore, unified risk management for a business unit should theoretically offer more benefits (Hosseini et al., 2022). Studies indicate

that, to the extent that management is more capable in expanding and implementing risk appetite documents in various areas of the company, more activities are covered by the risk management process. Processes and more sections of the company are involved in prevention and coping with risks (Yari et al., 2021). In companies where management has the necessary ability regarding the design and use of processes and risk appetite documents in various activities, the level of company risk has significantly decreased. In contrast, in companies where necessary actions have not been taken regarding the design of risk appetite processes and the use of risk appetite documents in various areas of company activities, they face more challenges in managing risks related to the continuity of operations.

Companies develop their strategies based on risks and business environment opportunities. They periodically revise their strategies in line with environmental changes to reduce risks as much as possible and utilize opportunities to create value in the company (Ullah et al., 2022). To achieve this, management must have the ability to use appropriate frameworks to optimize company strategies and performance. In this regard, companies whose managers could establish an integrated risk management framework or key areas such as risk appetite documents are more successful in achieving company goals (Hasan et al., 2022). Risk appetite at the board level is the amount of risk the organization is willing to accept to create value. The organization's risk appetite, aligned with strategy and budget documents, contributes to the coherence of organizational activities to achieve the goals set in these documents (De Zwart., 2022).

One of the fundamental problems faced by accepted banks in the stock market is the inconsistency between the risks banks encounter and the risks that the board of directors is aware of. This issue is crucial, requiring the board of directors and the CEO to have a precise understanding of risk appetites and to be well-acquainted with the risks they are willing to tolerate for profitability. In other words, management and the board of directors must proactively understand the capacity of accepted banks in the stock market to tolerate risks and accurately assess the level of tolerable risk in current and future conditions to reach the desired capacity effectively (Hasan and Al-Najjar, 2024a, 20024b).

This matter is essentially addressed by the risk appetite framework for banks, providing information to the board of directors so that they can make informative and effective decisions. Establishing risk appetites significantly aids in the continuity of managing the activities of accepted banks in the stock market at a predetermined level of activities. What is crucial is recognizing, in accepted banks in the stock market, that the selection of strategies and objectives is contingent upon understanding risk appetites. While accepted banks can often tolerate more risk, adhering to risk appetites through the formulation of risk appetites ensures that risk management remains aligned with predetermined levels of risks. Therefore, considering the above, the main objective of the current research is to investigate, develop, and validate the structural model of factors influencing the risk appetites of accepted banks in the stock exchange based on the paradigm of the grand theory. So, the fundamental question of this research is how is the structural model of factors influencing the risk appetites of accepted banks in the stock exchange? To answer this question, we conducted our research using quantitative research methods and collected our data through semi-structured interviews with 15 accounting experts using snowball sampling (first step) and theoretical sampling (second step).

After using Grounded Theory paradigm suggested by Strauss and Corbin (1990) to design and validate structural model factors that have influence on risk appetite in banks listed on stock exchange, based on our qualitative analysis we design a new structural model using four new factors that have influence on risk appetite in banks listed on stock exchange, which are: (1) causal conditions (organizational factors, organizational maturity); (2) intervening conditions (communication expansion); (3) intervening strategies (risk management methods), and (4) outcomes (organizational growth, continuity of activities). We validated our new structural model using confirmatory and discriminant analysis methods, while reliability was assessed through repeatability and generalizability.

Our findings are contributing to current literature in two different ways: firstly, we design a completely new structural model using four new factors that have influence on risk appetite in banks listed on stock exchange. Secondly, our new structural model is validated using two different (confirmatory and discriminant) analysis methods.

The rest of the paper is organised as follows. In section 2 we have provided our literature review. Methodology is provided in section 3. In section 4 we provided our findings and in section 5 model validation. In Section 6 we discussed our findings and model validation. We conclude our paper in section 7.

2. Literature Review

In this research paper we investigated, created, and validated a structural model of the variables affecting the risk appetites of recognised banks on the stock exchange using the grounded theory paradigm. To conduct this research, we first reviewed our research theoretical background, to that we explained how grounded theory works and how this is related with our research. After that we tried to establish a relationship between grounded theory and risk appetite model. In the following section we analysis previous relevant literature. In the final two sections we created a risk appetite model framework and discussed the risk appetite process.

2.1 Review of Theoretical Background

Expansion of the conceptual space of risk and risk management: Although there are differences in how risk is defined, the following brief definition illustrates its essence: risk means the probability of incurring a loss. This definition encompasses two main aspects of risk: The amount of loss must be possible and Uncertainty about that loss must also exist (Dorofee, 2018). Therefore, risk is applied to situations where the returns can be associated with imagined probability distributions. In other words, risk is the probability of the actual return rate being different from the expected return rate for an investor (Kavyani, 2017). According to the definition of risk, risk management is a process in which an individual tries to ensure that the risk they face is the same risk they think or want to deal with in guiding affairs in their preferred direction (Zarrin, 2016). Risk management, as one of the solutions for companies to deal with uncertainty in the business environment, plays an effective role in preserving and improving efficiency and effectiveness, and consequently, improving the performance of the company (Arefmanesh, 2022). The goal of risk management is to control the adverse consequences of risk tolerance and ensure the achievement of the benefits of accepting risk. This requires identifying risk and making intelligent decisions to manage it (Demirchi, 2017). Risk management enables a company to better

manage its common risks, thereby increasing the likelihood of success and reducing the likelihood of failure and uncertainty in achieving organizational goals (Li et al., 2022).

Concept and Role of Risk Appetite Terms such as risk appetite, risk fluctuation, risk management philosophy, and risk culture are important and innovative topics that have been examined in the Enterprise Risk Management (ERM) model by Kuzu (Posch, 2020).

In comparison to traditional risk management, which attempts to manage each risk on its own path and separately from the process of managing other risks, Enterprise Risk Management (ERM) examines the set of a company's risks together in a comprehensive and integrated manner (Lawson et al., 2017). This risk management approach is considered part of the overall business strategy, and one of its main goals is to increase shareholder value (Posch, 2020).

Kuzu's main philosophy, in formulating the ERM framework, is based on the idea that the value derived from a company's activities is maximized when a set of strategies is employed to achieve a desirable balance between returns and associated risks. It aims to efficiently and effectively use organizational resources to achieve goals (Posch, 2020). Risk appetite and risk tolerance levels are vital components for the effective implementation of an organization's risk management plan (Posch, 2020). Kuzu has recently provided new guidelines on how companies can improve their decision-making by specifying and formulating risk appetites (Gong, 2021), which is especially crucial in today's uncertain and complex markets.

2.2 How to use Grounded theory for Risk appetite Model

In the last two decades, different styles of grounded theory have been introduced, to the extent that they are referred to as the family of grounded theory. As a result of the development of the foundational theory, it can be considered more than a research method, a kind of perspective for researchers.

It is worth mentioning that in the process of foundation theory, data collection and their analysis, two processes are connected. Often, in this

way, data is collected through interviews and coded and analyzed through operational guidelines to produce the final theory. In this approach, primary data is provided through interviews, and data is selected and collected in different ways using theoretical sampling to complete the emerging theory. During the research process, data collection continues until theoretical saturation is reached. This means when the circular process of collecting, sorting and analyzing data and improving the theory by using them reached the point that the new data did not change the generated theory, theoretical saturation was achieved and thus, from the collection of samples New will be withheld.

2.3 Review of Empirical Background

Yari et al. (2021) investigated risk appetites, continuity risk, and the management's ability and responsiveness. The results showed that as management becomes more adept at expanding and deploying risk appetite documents in various areas of the company, more activities are covered by the risk management process. Processes and more sections of the company are involved in preventing and dealing with continuity risks.

Soleimani (2020) conducted a comparative study of the risk appetite framework in the banking industry and Iranian banks. The results indicated that risk appetites form the core of a comprehensive risk management solution and serve as a criterion for comparing the overall risk situation in the organization.

Gharahkhani (2017) examined the presentation of a risk appetite framework as a tool for determining tolerance limits for risk in insurance institutions. The results emphasized the importance of accurately determining risk appetites or risk tolerance levels, as failure to do so may lead to significant losses and, ultimately, bankruptcy.

Rezaei et al. (2020) explored the relationship between management capability and the components of integrated risk management. The results showed a positive and significant impact of management capability on integrated risk management, particularly on operational risk management.

Khosraviani and Heidarpour (2022) examined the efficiency of artificial neural networks in predicting liquidity risk for all government banks. The

study demonstrated that using accounting information and a designed neural network, it is possible to predict liquidity risk in government banks.

Rahman et al. (2020) showed that intelligence and educational background are key indicators in determining the level of management capability. Competent managers demonstrated better performance in defining risk appetites and managing higher level risks compared to other managers.

Baker and Wurgler (2002) indicated that management capability in determining appropriate levels of risk appetites corresponding to environmental conditions leads to a reduction in continuity risk. Competent managers, by understanding environmental conditions, reduced the continuity risk of company operations.

Mio et al. (2022) investigated the relationships between bank risk appetites and risk-taking, emphasizing the key role of integrated reports. The study showed that banks demonstrating higher risk-taking also provide more disclosure. Risk-taking, regardless of the area in which banks operate, acts as a mediator between adopting a specific type of report—integrated reports—and disclosing risk appetites.

Fatou et al. (2022) evaluated the relationship between risk appetites, competition, and uncertainty. The results indicated that competition and uncertainty have a strong positive effect on risk behavior, and higher economic fluctuations strengthen the potential impact of convertible bond issues on risk appetites.

Taki et al. (2021) examined the effects of risk appetites and social pressure on aggressive financial reporting behavior. The results demonstrated that the interaction between organizational risk-taking and social pressure did not affect the tendency of financial managers to engage in aggressive financial reporting.

Akdag et al. (2020) investigated the effects of fluctuations among risk appetite indicators. The results of this study revealed a unidirectional relationship, indicating that fluctuations are moving towards risk appetite indicators. This causation is observed separately in the short, medium, and long term.

Mare (2019) explored the principles of an operational risk appetite framework for a bank in South Africa. The results showed that most identified principles for an operational risk appetite framework for a South African bank are considered important and vital, although some have not been fully implemented.

Fettahoğlu (2019) examined the relationship between credit default swap premiums, credit risk appetites, and risk appetites. The study revealed that there is a significant and negative correlation between the risk appetite index and credit default swap premiums for both foreign and domestic investors.

2.4 Risk Appetite Framework

The risk appetite framework is an approach that includes policies, processes, controls, systems, and procedures, statements, risk appetites, risk limits, and roles and responsibilities statements for individuals overseeing the implementation and monitoring of the risk appetite framework. The development and formulation of the risk appetite framework are iterative and evolutionary processes. The risk appetite framework includes processes for formulating strategies, developing business plans, and models and systems for measuring and aggregating risks, which should be able to consider risk capacity, risk appetites, risk limits, and risk profiles for business units and relevant legal entities, as well as interactions with legal entities (Gharekhani, 2016). There are three key elements in a framework for setting risk appetite statements:

1. Expressing risks that are acceptable or based on strategy and that the organization intends to accept, as accepted risks are appropriately compensated. Risk tolerance levels and boundary structures, i.e., exposure limits and concentration limits, are determined for these risks.
2. Starting risks that are unacceptable or outside the strategy should be avoided, and a zero/minimal tolerance level should be set for them. These are risks that the board of directors and senior management have no appetite to accept (e.g., minimum standards for employing external employees and agents, no appetite for investing in specific high-risk countries).
3. Defining strategic, financial, and operational parameters to enable the development of a framework within which the company's business model is implemented. Parameters may be

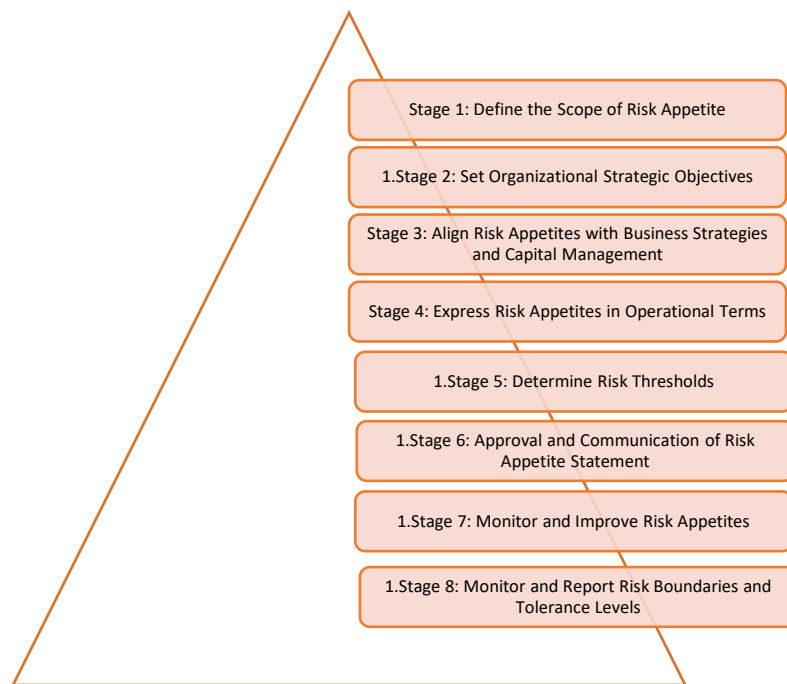
expressed as objectives, scopes, minimums, and maximums and provide a basis for formulating risk tolerance levels and boundary structures. These parameters include strategic risk parameters (e.g., pursuing new products, leasing programs, and merger and acquisition activities), financial risk parameters (e.g., maximum acceptable loss level or performance change, including profit volatility per share, asset returns, or return on investment), and operational risk parameters.

In addition, ISO 73 Guide 2009 notes that stakeholders also have a "willingness to tolerate risk" (Gong et al., 2021). Usually, strategies and objectives derived from the risk management attitude of the organization and its board of directors, other internal and external stakeholders have different attitudes toward the level or amount of risk that the organization should accept. Recognizing the different risk attitudes of internal and external stakeholders can affect how the organization balances its risk appetite statements with the expectations of these stakeholders. When setting risk appetites, the interests of other relevant parties in achieving the company's goals should also be considered, as the goals of a company are directly related to meeting the needs and expectations of various stakeholders (such as shareholders, insurers) (Gharekhani, 2017).

2.5 Risk Appetite Process

One of the main stages of implementing organizational risk management is determining risk appetite. A company must define its position regarding risk in a risk appetite statement. An organization with aggressive risk appetites can set aggressive goals, while an organization with risk-averse appetites may set conservative goals with minimal appetite for risk. Additionally, different appetites should exist for each area of the business (Bekaert et al., 2022).

The resources used in determining risk appetites include financial capability criteria, business strategic plans, profitability, stress scenarios, risk monitoring reports, liquidity profiles, multi-year budgets, events, risk appetite strategies for other companies, damages, credit rating assessments, customer types, market growth and trends, market share objectives, and competitive outlooks. The stages of determining the risk appetite framework are in Figure 1 (Gharekhani, 2015):

Figure 1: Risk Appetite Process (Gharekhani, 2016)

3. Methodology

The current research is exploratory in nature, applied in terms of research type, and qualitative in terms of research strategy, following a foundational data theory paradigm based on the Strauss and Corbin (1990) paradigmatic model. This method employs a systematic series of procedures to generate a theory based on an understanding of the phenomenon under investigation. The research findings encompass theoretical adjustment and the reality under examination, rather than a set of interconnected figures or information. The primary goal of foundational data theory is to construct and present a theory that is truthful and enlightening in the field studied. This research strategy is anchored on three elements: concepts, categories, and propositions. The main objective is to move from the particular to the whole without losing focus on the central axis of investigation (Corbin & Strauss, 1990).

Moreover, the Strauss and Corbin (1990) paradigmatic model is based on the identification of six elements: causal conditions, context, intervening

conditions, action/interaction strategies, consequences, the core phenomenon, and the relationships between them. According to Strauss and Corbin (1990), the application of this model enables researchers to systematically think about the data and organize them coherently.

In this research, semi-structured interviews were conducted to collect data from 15 accounting experts in both academic and executive sectors. The participants were selected through snowball sampling (in the first step) and purposive sampling (in the second step) until theoretical saturation was achieved. The obtained data were then coded based on the theoretical coding process, which includes open, axial, and selective coding, following the foundational data theory paradigm of Strauss and Corbin (1990). This process aimed to discover subcategories and main concepts and, ultimately, to develop a structural model of the factors influencing risk appetite in the banks listed on the stock exchange.

The qualitative findings and the constructed model will be validated using credibility methods, including repeatability through a high coefficient of 0.8 and transferability through a systematic and comprehensive theoretical sampling method. The list of interviewees for the qualitative research is presented in Table 1.

In the second part we used the distribution of questionnaires and asked the opinions of about 385 experts in the field of bank risk management to validate the model obtained based on the grounded theory paradigm. For this purpose, after collecting opinions, we validated the model using structural equation model and SmartPLS statistical software. If the path coefficient for each component is greater than 0.3 and the t-statistic is significant, then the component is retained, otherwise it is removed from the model.

Table 1: List of Interviewees for Qualitative Research in the Foundational Data Theory Model

Row	Gender	Education	Experience	Occupation	Field of Study
1	Male	PhD	Over 30 years	University Professor and Faculty Member - Certified Accountant - Member of the Technical and Legal Committee of the Audit Institution Mofid Rahbar	Accounting
2	Male	PhD	Over 20 years	University Professor and Director and Partner of the Audit and Certified Accountant Institution	Accounting
3	Male	PhD	Over 20 years	Manager of the Risk Department of Bank Melli	Accounting
4	Male	PhD	Over 20 years	Director and Partner of the Audit Institution and Member of the Insurance and Banking Task Force	Accounting
5	Male	PhD	Over 10 years	University Professor and Faculty Member	Accounting
6	Male	PhD	Over 40 years	Director and Partner of the Audit Institution and Member of the Insurance and Banking Task Force	Accounting
7	Male	PhD	Over 30 years	University Professor and Faculty Member - Certified Accountant	Accounting
8	Male	PhD	Over 20 years	Manager of the Risk Department of Bank Tejarat	Accounting
9	Male	PhD	Over 30 years	University Professor and Faculty Member - Certified Accountant	Accounting
10	Male	PhD	Over 20 years	Director and Partner of the Audit and Certified Accountant Institution	Accounting
11	Male	PhD	Over 15 years	Faculty Member, Certified Financial Accountant, Official Expert of the Judiciary	Accounting
12	Male	PhD	Over 20 years	Manager of the Risk Department of Bank Melli	Accounting
13	Male	PhD	Over 20 years	Director and Partner of the Audit Institution and Member of the Insurance and Banking Task Force	Accounting
14	Female	PhD	Over 10 years	University Professor and Faculty Member	Accounting
15	Male	PhD	Over 15 years	Director and Partner of the Audit Institution and Certified Accountant	Accounting

4. Findings

To collect data for this study, qualitative interviews were conducted. All interviews were recorded, and audio files were fully implemented. While theoretical saturation was achieved in the last two interviews, additional interviews were conducted to ensure data adequacy. In each interview, the research purpose and the interview process were explained to the interviewee. Both closed and open-ended questions were used to extract the desired information. The aim was to have interviewees narrate all components of the foundational data theory approach in the pattern of risk appetite in banks comprehensively. The analysis of these samples was conducted step by step after each interview concluded. After transcription, key points and concepts were gradually extracted.

Furthermore, the coding process involved identifying speech evidence, conceptual elaboration (code extraction), conceptualization (central coding), and identifying the overall research model (selective coding). Speech evidence or key points are small events with independent meaningful content. Conceptual elaboration, referred to as coding, was applied in this research under the name of codes. After identifying and naming existing concepts, similar concepts were categorized under sub-themes and specific themes. It should be noted that a theme must be more abstract than other concepts. The naming of sub-themes in this research is also more abstract than the concepts that make up each sub-theme. This process was followed for sub-themes.

4.1 Stage One: Open Coding

In open coding, each interview was read multiple times, and after marking and breaking down the data, any concept that came to mind was considered. There was no limit to naming concepts in this stage, resulting in a large number of codes. However, due to the repetitive nature of the information, these codes decreased over time. Similar concepts were identified in this stage, and under the title of sub-themes and specific themes, they were classified. It is important to note that a theme should be more abstract than other concepts (Gharekhani, 2017). The names chosen for sub-themes in this research are also more abstract than the concepts that make up each sub-theme. This process was followed for sub-themes.

4.1.1 Data Analysis and Model Formation

Data obtained from the interviews were carefully studied, examined, and analyzed. Similar data were assigned corresponding concepts, and thus, all themes and concepts were extracted and identified. In total, 13 themes and 100 concepts were identified, as shown in Table 2.

Table 2: Extracted Concepts and Themes from Data Coding

Row	Category	Concept
1	Organizational Maturity	Capital Adequacy Ratio
		NPL Index
		LCR Index
		Ratio of the top 100 borrower's facilities to total loans
		Ratio of the top 100 depositor's deposits to total deposits
		Ratio of facilities for 20 beneficiaries to total facilities
		Organizational culture
		Regulatory bodies
		Competitors
		Interest rate level
		Customer acquisition and marketing approach
2	Organizational Factors	Workflow processes
		Level of commitment and acceptance of risk appetite in each organization
		Access to appropriate financial resources portfolio
		Customer diversity
		Access and facilities
		Banks' risk capacity
		External factors
		Liquidity status
		Economic factors
3	Appropriate Risk Approaches	Risk-taking approach of the board of directors
		Risk-averse approach of the board of directors
		Bank's own plans
		Central bank regulations on risks
		Non-performing claims risk
4	Management Methods	Management methods in banks
		Decision-making structure in banks
		Independence of banks in decision-making, independent of external factors
		Independence of banks in planning, independent of external factors
		Determining risk appetites
		Determining risk tolerance in key bank risk indicators
5	Risk Situation	Current risk situation
		Acceptable risk situation
		Importance for capital
		Organization management by senior management
		Costs resulting from risk

Row	Category	Concept
1	Organizational Maturity	Capital Adequacy Ratio
6	Expansion and Communication Framework	Internal credit scoring system
		Stakeholder and related person system
		Documentation and guarantees system
		Asset and liabilities management system (resources and knowledge)
		Current status
		Laws and regulations
		Organizational structure
		Internal control structure
		Decision-making committees
		Bank's goals and strategies
7	Improving Risk Appetite Framework	Corporate governance culture
		Existence of information infrastructure
		Resource growth
		Having a strategic plan
		Defining the main and sub-goals of the organization
		Identifying the risks of the main and sub-goals of the organization
		Understanding risk calculation methods
8	Regulatory Expectations	Interaction with the central bank's check and commitments system for obtaining records of bounced checks and customer facilities and commitments
		Understanding the organization's risk capacity before shaping the strategy and setting risk appetites
		Bank's compliance with laws and regulations
		Investment in strong infrastructure to support banking business
		Existence of an effective risk appetite framework
		Strong and active interaction by the board of directors and senior management
		Strong internal relationships within the company
9	Risk Monitoring and Feedback Strategies	High responsibility of senior management for risk appetites
		Self-risk assessment and control
		Monitoring the bank's risk within the risk appetite framework
		Existence of regulatory bodies
		Existence of qualitative statements and risk criteria
		Strengthening information technology and data infrastructure
10	Risks Related to Banks	Risks related to the economic environment
		Risks related to the social environment
		Risks related to the political environment
		Sanctions
		Economic recession
		Determining the directive interest rate

Row	Category	Concept
1	Organizational Maturity	Capital Adequacy Ratio
11	Laws and Regulations	Determining the directive banking interest rate
		Exchange rate fluctuations
		Economic prosperity
		Gross national product
		Constant changes in laws and regulations
		Employee support
		Managers' lack of awareness of risks
12	Continuity of Activity	Improving risk management processes in banks
		Risk appetite planning for each risk
		Identifying markets
		Need for communication between units
		Interconnectivity of various bank units
		Preparation of comprehensive policies
		Unified risk management
13	Organizational Excellence	Environmental factors
		Income stability
		Profit stability
		Performance stability
		Increase in bank credit rating
		Facilities and facilitation
		Increased efficiency
		Increased effectiveness
		Non-waste of employees' time
		Responsiveness to available resources
		Organization survival
		Cost savings
		Continuous growth of banks and confidence in system control

4.2 Stage Two: Central Coding

In central coding and selection, the extracted concepts from open coding are classified into six categories, including central concept, causal conditions, intervening conditions, contextual conditions, strategies (actions and reactions), and consequences, based on the systematic paradigm theory of Strauss and Corbin (1990).

4.3 Stage Three: Selective Coding and Theory Building

As mentioned earlier, grounded theory is a qualitative research method derived from theory development based on data (grounded theory). It emerged as an alternative strategy to traditional approaches in scientific research, which heavily relied on hypothesis testing and confirmation,

verification techniques, and quantitative analytical methods. In the current research, aiming to "develop a structural model of factors affecting risk appetites in banks accepted in the stock market," the researcher dedicated all efforts to using a systematic set of qualitative techniques (based on grounded theory) for an inductive approach to formulate a theory regarding the factors influencing risk appetites in banks (Gong et al., 2021).

Importantly, the researcher applied various strategies to balance creativity and science in developing a systematic theory, including (1) iterative backward reviewing and questioning, (2) adopting a skeptical attitude, and so on.

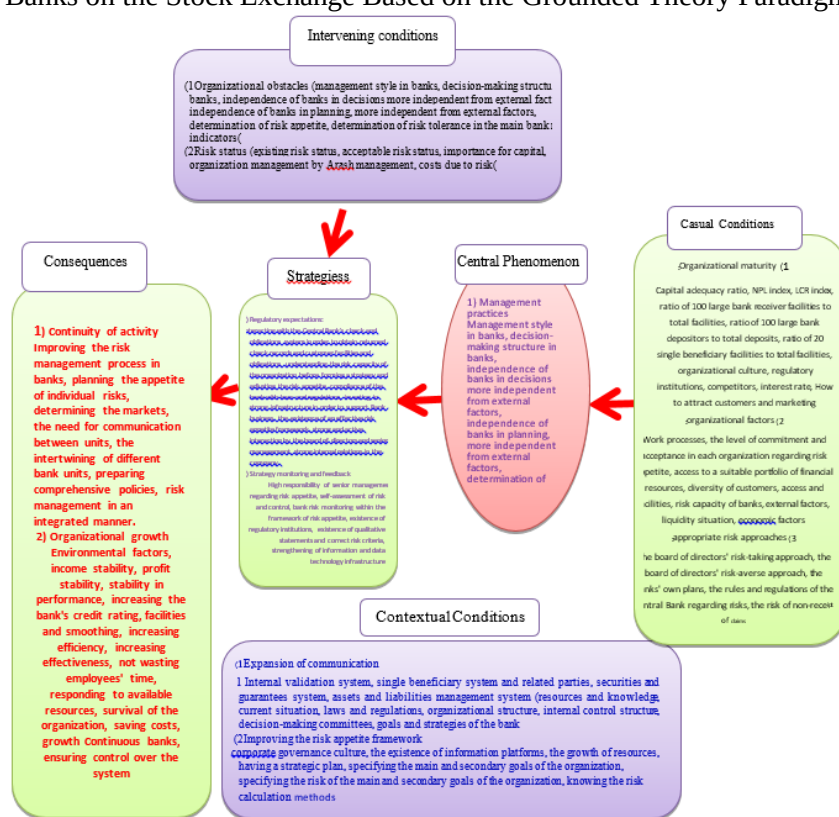
The model described in the text demonstrates how specific factors and conditions interact with each other, leading to the emergence of a structural pattern of native factors influencing risk appetites in banks accepted in the stock market. These factors can be broadly categorized into organizational maturity and organizational factors. Additionally, the model shows that the occurrence of these factors takes place within a specific framework that significantly influences the model of factors influencing risk appetites in banks. Among these influential factors, the expansion and communication framework are highlighted (Hasan et al., 2022).

Purposeful actions and reactions to specific issues can lead to the development and utilization of the studied pattern. This includes categories such as risk management status, improvement of risk appetite framework, appropriate risk approaches, risks related to banks, laws and regulations, and regulatory expectations.

It is evident that attention to factors such as organizational maturity and organizational factors is crucial for policymaking regarding factors influencing risk appetites in banks. In the next step, other parameters and factors need to be carefully considered, as they are equally important and provide the necessary context for an effective process. The occurrence of these events will be guided and controlled through managerial strategies in directing and controlling the central monitoring and feedback phenomenon. Ultimately, the achieved results include the consequences of organizational continuity and excellence.

Therefore, selective coding is a crucial stage in grounded theory development that, based on the results of axial and central coding, leads to the formulation of a theory. Selective coding is the process of integration, improvement, and refinement of concepts to organize them systematically for the presentation and shaping of a theory. At this level, an attempt is made to create a systematic relationship between concepts around the central concept as the main theme, presenting a theoretical narrative for the phenomenon. The results of data analysis indicate that managerial approaches and risk status can accurately evaluate, measure, and determine the appropriate level of behavioral accounting management, ultimately managing the situation of factors influencing risk appetites in banks. The results of selective coding have led to the extraction of a proposed model, and based on these explanations, the model of selective coding and theory creation is presented in Figure 2.

Figure 2: Structural Model of Factors Influencing Risk Appetite in Accepted Banks on the Stock Exchange Based on the Grounded Theory Paradigm



5. Model validation

It should be noted that in this section, a questionnaire based on the indicators, components, concepts and categories of the proposed model has been prepared, and this questionnaire (Likert scale) includes 100 questions about the dimensions and components in the model based on the grounded theory paradigm. After testing questionnaire validity (based on the opinion of experts and specialists) and reliability (according to Cronbach's alpha, 78% is more than the corresponding sample (70%)), 385 questionnaires were collected to do the analysis. To do the data analysis we used structural equation modeling method and SmartPLS software. The standardized estimation output of the structural equation model is shown for the conceptual model of the research.

According to the results presented in Table 3 to 8 we find that our model is valid. Because all path coefficients are greater than 0.3 and t statistics are greater than 1.96. Therefore, Validation tests show that all components of our model based on grounded theory paradigm are significant and we can generalize our findings to the society. Details of tests outputs are given in Table 3 and 4.

Table 3: Test of existing structural relationships related to the variable of causal conditions in the final model

Model Elements	Components	Subcomponents	Path Coefficient	t	Result
conditions Causal	Organizational maturity	Capital adequacy ratio	0.46	3.00	Not Rejected
		NPL index	0.42	5.37	Not Rejected
		LCR index	0.49	5.87	Not Rejected
		The ratio of the 100 largest bank receiver facilities to the total facilities	0.43	5.94	Not Rejected
		The ratio of the 100 largest bank depositors to total deposits	0.42	5.48	Not Rejected
		The ratio of the facilities of 20 single beneficiaries to the total facilities	0.54	5.74	Not Rejected

Model Elements	Components	Subcomponents	Path Coefficient	t	Result
		Organizational culture	0.51	6.17	Not Rejected
		Regulatory bodies	0.42	6.6	Not Rejected
		Competitors	0.51	6.15	Not Rejected
		Interest rate	0.5	6.24	Not Rejected
		How to attract customers and marketing	0.43	4.96	Not Rejected
	maturity Organizational	Capital adequacy ratio	0.63	3.00	Not Rejected
		NPL index	0.52	9.28	Not Rejected
		LCR index	0.47	9.80	Not Rejected
		The ratio of the 100 largest bank receiver facilities to the total facilities	0.44	7.83	Not Rejected
		The ratio of the 100 largest bank depositors to total deposits	0.42	7.90	Not Rejected
		The ratio of the facilities of 20 single beneficiaries to the total facilities	0.42	8.53	Not Rejected
		Organizational culture	0.47	8.91	Not Rejected
		Regulatory bodies	0.48	7.68	Not Rejected
		Competitors	0.51	9.34	Not Rejected
	Appropriate risk approaches	Risk taking approach of the board of directors	0.48	3.00	Not Rejected
		Risk-averse approach of the board of directors	0.58	9.92	Not Rejected
		Banks' own programs	0.54	9.14	Not Rejected
		The rules and regulations of the Central Bank regarding risks	0.61	10.29	Not Rejected
		Risk of non-collection of claims	0.62	10.05	Not Rejected

Table 4 Test of existing structural relationships related to the variable of The Contextual conditions in the final model

Model Elements	Components	Subcomponents	Path Coefficient	t	Result
The central Phenomenon	Management practices	Management method in banks	0.57	8.57	Not Rejected
		Decision making structure in banks	0.57	10.36	Not Rejected
		The independence of banks in making decisions more independent from external factors	0.59	9.91	Not Rejected
		Independence of banks in planning, more independent from external factors	0.64	10.13	Not Rejected
		Determining risk appetite	0.48	8.76	Not Rejected
		Determining risk tolerance in the main bank risk indicators	0.49	7.61	Not Rejected
	Risk status	Existing risk status	0.41	7.41	Not Rejected
		Acceptable risk status	0.48	7.30	Not Rejected
		Importance for capital	0.43	6.83	Not Rejected
		Management of the organization by senior management	0.64	7.93	Not Rejected
		Costs due to risk	0.55	7.70	Not Rejected

6. Discussion

The present research aimed to develop and validate a structural model of factors influencing risk appetite in banks accepted on the stock exchange based on the Grounded Theory paradigm. The research progressed through stages, following the steps of grounded theory data-driven theory

development. The literature review and interviews with 15 experts in the field contributed to the identification of 100 concepts and 13 categories.

The central category identified in this study is "Supervision and Feedback on Risk Strategy," around which 12 other categories revolve, forming the elements of the grounded theory derived from the research. These categories are classified into six groups: Causal Conditions (2 categories), Strategies (1 category), Context or Background (1 category), Intervention Conditions (6 categories), and Consequences (2 categories).

Causal Conditions: Two categories, "Organizational Maturity and Organizational Factors," are considered as causal conditions. Organizational maturity includes factors such as capital adequacy ratio, NPL index, LCR index, the ratio of large borrowers to total facilities, and more, as identified in Table 2. Organizational factors include processes, commitment levels, and acceptance within each organization regarding risk appetite, access to suitable financial resources, and more.

Intervention or Mediating Conditions (General Conditions): Among other categories, six categories, including "Appropriate Risk Approaches, Improvement of Risk Appetite Framework, Risk Status, Risks Related to Banks, Regulations and Laws; Supervisory Expectations," are considered as general intervention conditions that either limit or facilitate action and interaction.

1. Risks Related to Banks encompass risks related to the economic, social, political environment, sanctions, economic downturns, and determination of the interest rate policy.
2. Regulations and Laws include concepts such as determining the interest rate policy, exchange rate fluctuations, economic prosperity, gross national product, and more.
3. Supervisory Expectations include concepts related to interaction with the check system and central bank commitments to obtain the records of bounced checks and facilities and customer commitments, understanding the organization's risk capacity before forming a strategy, and regulating risk appetite.

4. Improvement of Risk Appetite Framework includes concepts related to corporate governance culture, information infrastructure, resource growth, having a strategic plan, defining the organization's main and subsidiary goals, determining risk objectives, and recognizing risk calculation methods.
5. Risk Status includes the current risk status, acceptable risk status, importance to capital, organizational management by senior management, and costs arising from risk.
6. Appropriate Risk Approaches include risk-tolerant and risk-averse approaches by the board of directors, banks' own plans, central bank regulations on risks, and the risk of non-recovery of claims.

The results of this qualitative study align with the findings of several prior research studies, including those by Gharakhani (2017), Sadeghi and Sadeghi (2016), Mio et al. (2022), and Mare (2019). These studies collectively emphasize the importance of possessing and presenting a risk appetite framework as a tool for determining risk tolerance limits, preventing the bankruptcy of companies and financial institutions.

The study also resonates with the insights from ISO Guide 73 (2009), which emphasizes that the organizational approach to risk significantly affects risk inclination and tolerance levels. The research reinforces the notion that the effective management of risk involves a cohesive set of strategies aimed at balancing returns and associated risks, utilizing organizational resources efficiently, and achieving organizational goals.

7. Conclusion

This study designed and validated a structural model of the factors influencing risk appetite in banks listed on the stock exchange, employing the Grounded Theory Paradigm. The research, through a series of semi-structured interviews with accounting experts, uncovered critical causal, intervening, and outcome-related factors impacting risk appetite. The study highlights the importance of organizational maturity, communication expansion, and robust risk management strategies as key drivers in maintaining organizational continuity and growth, particularly

in the face of financial instability and market uncertainties. The model was further validated using confirmatory and discriminant analysis methods, reinforcing the reliability and applicability of the findings to the banking sector.

The implications of this research are twofold. First, it emphasizes the necessity for banks to adopt a more integrated approach to risk management that aligns risk appetite with organizational goals and market conditions. Second, the model offers a practical framework that can guide banks in improving their risk assessment processes and risk appetite documentation, ultimately leading to better risk mitigation and organizational performance. Future research can expand upon these findings by applying the model to other financial institutions and exploring its applicability in different market environments.

Overall, this study contributes to the growing body of knowledge on risk management in the banking sector and provides actionable insights for practitioners and policymakers striving to optimize risk appetite frameworks in today's dynamic financial landscape.

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Research on the Impact of Bank Activities on Economic Dynamics: International Experience

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ABSTRACT

The study scrutinized the regulatory approaches to banking in countries such as the USA, Germany, Switzerland, Turkey, Azerbaijan, and Uzbekistan through a detailed analysis of their legal and financial practices, which revealed the main principles and differences in banking regulation. The methodological approach included analysis of data from official websites of central banks and financial institutions of the USA, Germany, Switzerland, Turkey, Azerbaijan and Uzbekistan, as well as reports and analytical materials of leading financial publications. The study compares banking regulation approaches in developed (USA, Switzerland, Germany, Turkey) and transition (Azerbaijan, Uzbekistan) economies, examining the impact of financial innovations on banking activities. The effectiveness of regulatory reforms is assessed, key factors influencing economic dynamics and financial stability are identified, and challenges in the context of globalization and fintech development are outlined. Recommendations are proposed to enhance banking regulation and promote economic stability and growth. The obtained results confirmed that efficient banking activity is an important factor of economic dynamics. The experience of other countries serves as a valuable source of knowledge in forming an effective strategy for the development of the banking system and the economy as a whole.

ملخص

تتناول هذه الدراسة بالتدقيق الأساليب التنظيمية للعمل المصرفي في بلدان مثل الولايات المتحدة الأمريكية وألمانيا وسويسرا وتركيا وأذربيجان وأوزبكستان، وذلك من خلال تحليل مفصل لممارساتها القانونية والمالية، وتكشف عن أبرز المبادئ وأوجه الاختلاف في التنظيم المصرفي. وشملت المقاربة المنهجية تحليل البيانات من المواقع الإلكترونية الرسمية للبنوك المركزية والمؤسسات المالية في البلدان

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السالفة الذكر، بالإضافة إلى التقارير والمواد التحليلية من المنشورات المالية الرائدة. وأهم نتائج البحث تتجسد في المقارنة بين المقاربات القائمة في الوقت الراهن لتنظيم البنوك في البلدان ذات الاقتصادات المتقدمة (الولايات المتحدة الأمريكية وسويسرا وألمانيا وتركيا) والاقتصادات التي تمر بمرحلة انتقالية (أذربيجان وأوزبكستان)؛ وتمت دراسة تأثير الابتكارات المالية على النشاط المصرفي؛ وتم تقييم كفاءة الإصلاحات التنظيمية في القطاع المصرفي (على سبيل المثال: الولايات المتحدة الأمريكية وألمانيا وسويسرا وتركيا وأذربيجان وأوزبكستان)؛ وتم الكشف عن الجوانب الرئيسية التي تؤثر على الديناميكيات الاقتصادية والاستقرار المالي للنشاط المصرفي، كما تم تحديد الاتجاهات والتحديات التي تواجه النظم المصرفية في سياق العولمة والتطور السريع للتكنولوجيات المالية؛ وتم اقتراح توصيات لتحسين سياسة تنظيم وتحفيز الأنشطة المصرفية لتعزيز الاستقرار الاقتصادي وتعزيز النمو الاقتصادي المستدام. وأكدت النتائج المتوصل إليها أن النشاط المصرفي الفعال من العوامل الهامة لتعزيز الديناميات الاقتصادية. وتشكل تجربة البلدان الأخرى مصدرا قيما للمعرفة في تشكيل استراتيجية فعالة لتطوير النظام المصرفي والاقتصاد ككل.

RESUME

L'étude a examiné les approches réglementaires du secteur bancaire dans des pays tels que les États-Unis, l'Allemagne, la Suisse, la Türkiye, l'Azerbaïdjan et l'Ouzbékistan à travers une analyse détaillée de leurs pratiques juridiques et financières, qui a révélé les principaux principes et différences en matière de réglementation bancaire. L'approche méthodologique comprenait l'analyse de données provenant des sites web officiels des banques centrales et des institutions financières des États-Unis, de l'Allemagne, de la Suisse, de la Türkiye, de l'Azerbaïdjan et de l'Ouzbékistan, ainsi que des rapports et des documents analytiques de publications financières de premier plan. Les principaux résultats de la recherche sont la comparaison des approches existantes en matière de réglementation des banques dans les pays aux économies développées (États-Unis, Suisse, Allemagne, Türkiye) et les économies en transition (Azerbaïdjan, Ouzbékistan) ; l'impact des innovations financières sur l'activité bancaire a été étudié ; l'efficacité des réformes réglementaires dans le secteur bancaire a été évaluée (sur l'exemple des États-Unis, de l'Allemagne, de la Suisse, de la Turquie, de l'Azerbaïdjan et de l'Ouzbékistan) ; les aspects clés affectant la dynamique économique et la stabilité financière de l'activité bancaire ont été révélés, et les tendances et les défis auxquels sont confrontés les systèmes bancaires dans le contexte de la mondialisation et du développement rapide des technologies financières ont été définis ; des recommandations visant à améliorer la politique de régulation et de stimulation des activités bancaires ont été proposées pour renforcer la stabilité économique et promouvoir une croissance économique durable. Les résultats obtenus ont confirmé que l'efficacité de l'activité bancaire est un facteur

important de la dynamique économique. L'expérience d'autres pays est une source précieuse de connaissances pour élaborer une stratégie efficace de développement du système bancaire et de l'économie dans son ensemble.

Keywords: Financial Crises, Innovations, Globalization of Finance, Regulatory Reforms, Financial Stability

JEL Classification: E44, G21, G28

1. Introduction

The role of banking institutions in the modern economy is key, as they fulfil the function of the main financial intermediaries, providing redistribution of capital, lending to enterprises and households, as well as supporting the payment system. Their activities have a direct impact on investment activity, employment, and overall economic stability. In particular, the effects of the Global Financial Crisis (2008) clearly demonstrated that the stability of the banking sector is an essential prerequisite for sustainable economic growth. The need to investigate the impact of banks' activities on economic dynamics has arisen for a number of reasons. Banks play a pivotal role in the stability of financial systems and have a significant impact on macroeconomic indicators such as inflation, employment and economic growth. However, the mechanisms of this influence are not always well understood and researched. The financial crises of recent decades, in particular, the Global Financial Crisis of 2008, have demonstrated the vulnerability of economies to problems in the banking sector, emphasizing the need for a better understanding of the role of banks in the economic system.

The research problem of this branch is an insufficient understanding of the mechanisms of influence of banking strategies and policies on macroeconomic indicators such as inflation, employment, and economic growth, particularly in both developed and transition economies. Although banks play an essential role in preserving financial stability, it is unclear how precisely these banking operations affect more general economic dynamics. In particular, the questions concern the impact of currency devaluations on banking sectors, the sustainability of banks under tight monetary policy and the specifics of international banking in post-Soviet and post-transition countries of the European Union. Authors who have studied these topics, including Mammadov and Ahmadov (2021), Shalashna (2023), Nogoibaeva et al. (2024), Bayar et al. (2021),

Jiang et al. (2024), conducted a number of studies to analyse the relationships between financial development, banks and economic growth. The analyses revealed the existence of a two-way relationship between financial development and economic growth in Azerbaijan. Also, the empirical results show that exchange rate fluctuations have a negative and statistically significant impact on the profitability of banks in Azerbaijan. Therefore, in considering the international expansion strategy of banks of post-Soviet states, the impact of capabilities and institutional features on their operations in developing countries was analysed (Mostovenko, 2023). Furthermore, the integration relationship between banking sector stability and economic growth in the post-transition countries of the European Union (EU) and the complexity and multidimensionality of this relationship has been noted. In addition, it was disclosed that rising interest rates have led to a 10 per cent decline in the value of US banking assets, risking the stability of banks with high asset losses and uninsured leverage.

In turn, when considering the economic security of banks, the concept of state regulation of the banking system and the proposals of the initiative related to the introduction of “green” banking authors Abdullaev and Abdullaeva (2021), Prymostka and Kysil (2023), Lomachynska et al. (2023), Stender (2023), Sharma and Choubey (2022) made conclusions about the economic security of the banking system, proposing a system of evaluation of indicators and recommendations for improving banking services and the use of information technology. It was also suggested to introduce a taxonomic approach to the regulation of the banking system, which allows better analysing the impact of regulation on the development of the national economy. The problems of the banking system in Azerbaijan and other countries under difficult conditions were also studied, noting the need for measures to improve the resilience of commercial banks in different economic contexts. In addition, the study found that enhanced surveillance reduces the risks of the US banking sector without negatively affecting their profitability and growth. It is revealed that most banks are adopting green banking products and processes, thereby enhancing customer confidence and improving the image of the banks.

Existing studies have mainly focused on developed economies such as the US and EU countries, while the impact of banking in developing countries such as Azerbaijan and Uzbekistan have been neglected. Analysing the

banking systems of these countries provides a comprehensive understanding of the problem. In addition, many studies focus on macroeconomic indicators, leaving aside microeconomic aspects such as the behaviour of individual banks and their impact on local markets. The study aims to examine the impact of different approaches to regulating and incentivizing banking on economic dynamics in different countries, in particular, how these approaches shape financial stability. To achieve this goal, several tasks were accomplished: to analyse and compare existing approaches to bank regulation in different countries, including the United States, Germany, Switzerland, Turkey, Azerbaijan, and Uzbekistan; to examine how new financial innovations such as digital currencies, financial technology (FinTech), and new payment systems affect the functioning of banking institutions and economic dynamics in general; to investigate the results of regulatory reforms (using the examples of the United States, Germany, Switzerland, Turkey, Azerbaijan, and Uzbekistan) introduced after economic crises or other significant changes in the banking sector; it was analysed how the interaction between banks and government agencies affects economic dynamics and financial stability; it was considered how banking activities affect socio-economic development; formulated practical recommendations for improving the policy of regulation and stimulation of banking activities.

2. Materials and Methods

To begin with, we collected data on banking activity from official sources and databases of international organizations. The models were compared by criteria of effectiveness in ensuring financial stability, impact on economic growth and risk control mechanisms. The analysis included a study of regulatory acts and supervisory policies to identify the strengths and weaknesses of each model and determine the most effective approaches for the stability of the banking system. Next, the impact of banking strategies on economic performance was assessed. This task investigated how banks' strategies and policies affect macroeconomic indicators such as inflation, employment, investment and economic growth. Then, in order to examine the impact of financial innovations on banking activities, the factors how these innovations change money circulation patterns, facilitate access to financial services and affect banks' operational performance were analysed. In addition, the results of reforms introduced after economic crises, in particular, the global crisis of 2008, are examined. Changes in financial

regulation, their impact on the stability of financial systems and the effectiveness of reforms in reducing financial risks and improving economic conditions are analysed. To examine the coordination mechanisms between banks and government institutions, the policy and regulatory initiatives that have affected banks have been examined and their role in supporting financial stability has been assessed using data from official reports, central bank and regulator publications, and analytical reports.

Based on the analysis of banking activities and their impact on the economic and social sphere, a number of practical recommendations were formulated. Suggestions were considered to improve regulatory standards, stimulate innovation, optimize credit policies and increase access to finance. To analyse the existing approaches to regulation in banks, data from official websites were used: Federal Reserve System of the United States Central Bank (Agencies remind banks of..., 2024), Swiss Confederation (Swiss financial centre, 2024), Official website of the central bank Deutsche Bundesbank, European Banking Authority (The Basel framework..., 2024), Official website of the head office of the Central Bank of the Republic of Turkey (Banking system in Azerbaijan, 2024). In addition, the following Internet resources were used: McKinsey Financial Services (Inflection point..., 2024), Infopro Digital Risk, The Tashkent Times (Uzbekistan's banking sector..., 2024), Global Finance Magazine (Murad and Kilburn, 2023), JPMorgan Chase and Co (Digital Innovation, 2024), Flow (Transforming banking..., 2023), 4IRE (Azerbaijan Bank's Automation..., 2024), BBVA Spark (Ballestrin and Climente, 2023), Avenga (Zubenko, 2023), Carstys (Bank "International Bank of Tajikistan"..., 2024), Citigroup (International Bank of Tajikistan..., 2024), Citigroup banking, Council on Foreign Relations (Berman, 2023), Investopedia (Liberto, 2024), European Council (Structural reform of..., 2020), The Elcano Royal Institute (Steinberg, 2018), The International Trade Administration (Azerbaijan – Banking and Financing, 2024), Embassy of the Republic of Uzbekistan in the United Kingdom of Great Britain and Northern Ireland (Uzbekistan: Financial services..., 2024) for a more thorough analysis and clarification of the reforms introduced in the analysed countries after the financial crisis in 2008. The research also utilized information from Unctad's report et al. (2023), providing valuable data and analyses that helped to deepen the understanding of global economic trends and prospects and their impact on banking activities in different countries. Utilizing these resources allowed us to explore a variety of approaches to bank regulation and their impact on the financial stability and economic growth of each of the countries examined.

3. Results

In the context of global economic integration and financial instability, the issue of banking regulation is of particular relevance. Different countries have unique approaches to regulating the banking sector, reflecting their economic, political and social conditions. Therefore, a detailed review and comparison of existing approaches to bank regulation in different countries, including the United States, Switzerland, Germany, Turkey, Azerbaijan, and Uzbekistan, was conducted. This allowed us to find out which of the studied models are the most effective in the context of ensuring financial stability and economic growth (Figure 1).

Figure 1: Existing Models for Regulating Banks in Developed and Transition Economies



Source: created by the authors based on Agencies remind banks of potential risks associated with third-party deposit arrangements and request additional information on bank-fintech arrangements (2024), Swiss financial centre (2024), The Basel framework: The global regulatory standards for banks (2024), Banking system in Azerbaijan (2024), Inflection point: Seven transformative shifts in US retail banking (2024), Uzbekistan's banking sector: Gradual transformation amid structural challenges and new risks – Fitch (2024).

Having analysed the models provided, it was found that effective regulatory models should include strict capital and liquidity requirements, regular supervision and auditing, and adaptation to the specific conditions of national economies. The economies of the United States, Switzerland and Germany demonstrate a high level of regulatory control, which contributes to financial stability. At the same time, Azerbaijan and Uzbekistan are actively implementing reforms to improve banking regulation. Studying best practices and adapting to specific conditions can help countries to ensure sustainable economic growth and financial stability.

In today's financial environment, the latest financial innovations such as digital currencies, financial technologies and new payment systems play a key role in the transformation of the banking sector. Therefore, the impact of these innovations on the functioning of banking institutions and overall economic dynamics has been studied (Table 1).

Table 1: Impact of Financial Innovations on Banking Activities

Name of innovation	Description	Example of use
Digital currencies of central banks	Digital currencies issued by central banks provide legal tender in digital form. They are part of the national currency and provide stability in the monetary system.	Switzerland is also exploring the potential of the digital franc to improve financial sustainability. China is actively testing the digital yuan (e-CNY) to reduce transaction costs and improve monetary efficiency.
Financial technology	FinTech includes technologies to improve financial services such as mobile banking apps, online lending and automated investment management.	Many banks, such as JPMorgan Chase (US), are implementing FinTech solutions to simplify lending processes and increase access to financial services through mobile platforms.
Blockchain technologies	Blockchain is a distributive registry that provides transparency and security of transactions through multiple, verifying and confirming information.	Deutsche Bank (Germany) uses blockchain to process financial transactions and mitigate transaction risks. The technology blocks transactions at different stages of their processing, which significantly increases security and reduces the cost of international transactions by reducing the time it takes to complete them.

Name of innovation	Description	Example of use
Smart contracts	Smart contracts automatically fulfil the terms of the contract without the need for intermediaries, thanks to the software code running on the blockchain platform.	International Bank of Azerbaijan is introducing smart contracts to automate its lending and transaction execution processes. This increases the efficiency of loan application processing and reduces administrative costs due to the transparency and accuracy of automated transactions.
Application Programming Interfaces (APIs)	APIs allow banking systems to be integrated with other applications and services, enabling efficient data exchange and functionality.	Banks such as Banco Bilbao Vizcaya Argentaria (Spain) use APIs to create new financial products and services that integrate with third-party platforms to improve the user experience.
Analysing Big Data	Big data analytics allows banks to process and analyse large amounts of information to identify trends and correlations.	Banks such as Bank of America (US) are using big data to improve risk prediction, credit management and personalization of financial services.
Mobile payments and virtual wallets	Mobile payment systems and virtual wallets allow making financial transactions via mobile devices.	Most banks, including Citibank (Ukraine) and Ipak Yuli (Uzbekistan), offer their customers the ability to make payments and manage their accounts through mobile apps and payment systems such as Apple Pay and Google Wallet.

Source: created by the authors based on Agencies remind banks of potential risks associated with third-party deposit arrangements and request additional information on bank-fintech arrangements (2024), Swiss financial centre (2024), The Basel framework: The global regulatory standards for banks (2024), Banking system in Azerbaijan (2024), Inflection point: Seven transformative shifts in US retail banking (2024), Uzbekistan's banking sector: Gradual transformation amid structural challenges and new risks – Fitch (2024).

Innovations in the financial sector such as digital currencies, financial technologies, blockchain, smart contracts, APIs, big data analytics and mobile payments are significantly transforming banking and economic dynamics. These technologies are improving the efficiency of banking operations, enhancing transaction security and providing new opportunities for financial services integration and automation. They are also helping to reduce costs and make financial services more accessible,

which ultimately has a positive impact on overall economic stability and growth.

Whereas, assessing the effectiveness of regulatory reforms in the banking sector is critical to understanding their impact on the stability of financial systems and overall economic dynamics. Following economic crises or significant changes in the financial environment, many countries introduce various regulatory measures to strengthen banking institutions and prevent future crises. Analyses of these reforms reveal both positive results and shortcomings that need to be corrected. An examination of the different approaches and outcomes of regulatory reforms in countries such as the United States, Germany, Switzerland, Turkey, Azerbaijan, and Uzbekistan will help determine which models are most effective in ensuring financial stability and promoting economic growth (Table 2).

Table 2: Estimates of Efficiency of Regulatory Reforms in the Banking Sector (on the Example of the USA, Germany, Switzerland, Turkey, Azerbaijan, and Uzbekistan)

Country	Reason for reforms	Description of the reforms	Results of the reforms	Conclusions
USA	The economic crisis of 2008	Introduction of the Dodd-Frank Act	Improving transparency of financial institutions, reducing risks of systemic bankruptcy	The changes have increased the stability of the financial system but required further improvements
Germany and Switzerland	European debt crisis	Regulatory reform of banks and financial markets	Increased capital requirements, establishment of the European Stability Mechanism	Effectively strengthened financial resilience but require greater coordination among countries
Turkey	Economic crisis 2018	Currency regulation and banking system reforms	Reduction of volatility in the foreign exchange market, improvement of bank liquidity	The reforms have helped stabilize the economy, but new challenges to regulators have emerged

Country	Reason for reforms	Description of the reforms	Results of the reforms	Conclusions
Azerbaijan	Economic crisis of 2015	Improvement of legislation on banks and financial markets	Increased confidence in the banking system, reduced inflation	Positive effect on financial sustainability, but more attention is needed to the regulation of non-financial risks
Uzbekistan	Financial sector reforms	Reforms in mobile financial services and lending	Expanding access to financial services, reducing credit risks	Reforms have helped to bring more people into the financial system, but further modernization is needed

Source: created by the authors based on Murad and Kilburn (2023), Digital Innovation (2024), Transforming banking with DLT (2023), Azerbaijan Bank's Automation with Sizable Productivity Boosts (2024), Ballestrin and Climente (2023), Zubenko (2023), Bank "International Bank of Tajikistan" together with VISA International launched a digital wallet in the mobile application IBT24 (2024).

The analysis of regulatory reforms in the banking sector of the analysed countries revealed that these reforms play a key role in ensuring financial stability and overcoming economic crises. In the US, Germany and Switzerland, reforms such as the Dodd-Frank Act and strengthening banking requirements have shown a positive impact on the transparency and stability of financial systems. While in Turkey and Azerbaijan, regulatory changes have helped to reduce economic shocks and stabilize currency markets. In Uzbekistan, on the other hand, reforms, particularly in the area of mobile financial services, have helped expand access to financial services. While these reforms have generally been effective in stabilizing financial systems and supporting economic growth, they have also identified a number of new challenges and the need for further improvement.

The success of reforms often depends on adapting to the specific conditions of each country and further improving regulatory mechanisms. Effective coordination between national and international regulators, as well as continuous monitoring and policy adaptation, is critical to ensure long-term financial stability (Bischof et al., 2021). Analysing the

interactions between banks and public authorities, such as central banks and financial regulators, is key to understanding how these interactions affect economic dynamics and financial stability. The study of the economic dynamics and financial stability of banking involves several key aspects that significantly determine the functioning of financial institutions. These aspects include monetary policy, risk management, supervision and control, credit policy, strategic initiatives and financial inclusion. These elements interact with each other to form an overall picture of the impact of banking on economic processes and the stability of financial systems. In turn, the monetary policy of central banks has a key impact on economic dynamics and the activities of banking institutions by regulating the money supply and setting interest rates (Karadima and Louri, 2021). In particular, lower interest rates increase the availability of credit to businesses and consumers, which stimulates investment activity, increased consumer spending and overall economic growth. This approach helps to create favourable conditions for economic expansion and business development. In addition, higher interest rates can have a dampening effect on economic activity, as higher borrowing costs limit the availability of credit and reduce borrowing costs. This is an important tool for controlling inflationary processes, as lower consumer demand and investment activity helps to contain inflationary pressures. Thus, central banks, using monetary policy instruments, can effectively influence economic activity and financial stability by adapting their actions to changing economic conditions and macroeconomic objectives.

Financial regulators implement regulatory requirements for banks covering aspects of capital reserves, risk management, and liquidity provisioning. These regulatory measures reduce the likelihood of bank failures and financial crises, thereby contributing to the stability of the financial system. Such requirements force banks to maintain sufficient capital reserves to cover potential losses, thus ensuring their resilience in crisis situations. Risk management includes procedures and strategies to help banks identify, assess and minimize financial risks and maintain adequate liquidity to meet their obligations (Barongo and Mbelwa, 2024). Whereas, regular supervision and auditing by government regulators are key mechanisms for identifying and addressing potential problems in the functioning of banking institutions (Hirtle et al., 2020). Such activities include systematic monitoring of banks' financial performance, assessing their compliance with regulatory requirements and conducting independent audits. These measures help to maintain public confidence in

the financial system by reducing the likelihood of systemic crises. Through close supervision, regulators are able to identify weaknesses in the financial condition of banks in a timely manner, thus ensuring preventive intervention and adjustment, which minimizes risks and enhances the stability of the financial sector.

Government programmes such as agriculture, manufacturing and innovative technologies play a pivotal role in stimulating the development of priority sectors of the credit economy (Bayar et al., 2021). These programmes provide for preferential loans or subsidized interest rates for enterprises operating in these sectors. This makes it possible to target financial resources to maintain and expand economic activity in strategically crucial sectors, contributing to their growth and development. In addition, such credit initiatives can stimulate investment in new technologies, increasing the international competitiveness of the national economy. Government credit programmes ensure economic development by lowering financial barriers to business, which allows for the necessary investments in innovation and expansion of production capabilities (Hamdaoui and Maktouf, 2020). In turn, governments often collaborate with banking institutions to implement national economic strategies that include support for small and medium-sized enterprises (SMEs), infrastructure development and digitalization of financial services. This cooperation is key to implementing long-term economic plans aimed at achieving sustainable development. Through strategic initiatives, governments can effectively channel financial resources to stimulate economic growth, in particular, by providing credit programmes, subsidies and other forms of support. Infrastructure development through cooperation with banks enables large-scale projects that improve a country's transport, energy and digital infrastructure. The digitalization of financial services in turn contributes to the efficiency and accessibility of financial products and services, ensuring inclusive economic development. Such integrated measures help governments achieve their economic goals and contribute to long-term stability and prosperity.

Collaboration between banking institutions and government agencies in financial inclusion programmes helps to increase access to financial services for different segments of the population (Chauhan et al., 2022). These initiatives allow a broader range of citizens to be involved in economic activity, including those groups that were previously unable to

access banking products and services. Financial inclusion programmes increase economic activity by enabling new users of financial services to open accounts, obtain credit, save and invest. This, in turn, leads to economic growth and increases the general welfare of the population. In addition, financial inclusion contributes to reducing social inequalities by providing access to financial resources and services to vulnerable and marginalized groups, helping them to integrate into the formal economy and improve their financial situation (Djalilov and Hartwell, 2024). The interaction between banks and public authorities is fundamental to creating a stable and sustainable economic environment. Through integrated and coherent action, effective risk management, sustained economic growth and financial stability can be achieved.

Assessing the impact of banks on socio-economic development is an essential aspect of understanding the role of financial institutions in modern society (Djalilov and Hartwell, 2024). Banking activities have a significant impact on access to finance for small and medium-sized enterprises, which is a driver of economic growth and job creation. In addition, banks play a key role in supporting and financing social programmes that help reduce social inequalities and improve welfare. Considering the impact of banking on relevant societal issues provides a deeper understanding of how financial institutions can contribute to sustainable development by supporting various economic and social initiatives. Analysing these aspects helps to develop effective strategies and policies to enhance the positive impact of banks on the economic and social environment. Banking has a significant impact on socio-economic development through several key aspects. One of them is access to finance for SMEs. SMEs are the backbone of many economies, contributing to job creation, innovation and economic growth. Banks, by providing loans and other monetary products to SMEs, help these companies to grow, enter newer markets and increase their competitiveness. Access to finance for SMEs contributes to the diversification of the economy and reduces its vulnerability to economic shocks (Ghosh, 2017; Nogoibaeva et al., 2024).

Another important aspect is the impact of banking on social programmes. Banks, working with governments and non-governmental organizations, can support various social initiatives such as health, education, housing, and poverty alleviation programmes. Financial support for these programmes contributes to improving living standards, reducing social

inequalities and creating a more just society (Mostovenko, 2023). Banks can also contribute to the development of infrastructure and sustainable environmental projects that have a long-term positive impact on society. Thus, banking has a wide range of impacts on socio-economic development, supporting economic activity and social well-being. Banking activities also have an impact on people's access to financial services. The proliferation of bank branches, the development of online banking and the introduction of mobile payment systems are all contributing to financial inclusion. This is particularly critical for rural and remote areas where access to traditional banking services may be limited. Providing access to financial services enables people to save money, access credit and invest in education or business development. In this way, financial inclusion contributes to reducing poverty and improving economic opportunities for a wide range of people. In addition, banks play a key role in maintaining the stability and development of a country's financial system. They provide credit to businesses and households, which contributes to economic growth and development. Banks also provide liquidity to the financial system by maintaining the solvency of other financial institutions (Murad and Kilburn, 2023). Banking regulation by central banks and other financial regulators helps to reduce the risks of monetary crises and ensure the stability of the economy. Consequently, a stable and efficient banking system is a key element for sustained socio-economic development and prosperity of the society. Based on the analysis of the impact of the interaction between banks and government agencies on economic dynamics and financial stability, the following practical recommendations for improving the policy of regulating and stimulating banking activities have been formulated.

Strengthening the monetary policy of central banks can be achieved by improving monetary policy instruments and increasing the transparency of communication. The central bank should regularly analyse macroeconomic indicators to determine optimal levels of interest rates, and use open market instruments to control the volume of money supply in the economy (Ding and He, 2023). An important step is the introduction of new mechanisms, such as securities lending operations, which will provide flexible liquidity management in the market. An improved communication strategy, including regular release of monetary policy reports and forecasts, press conferences and public speeches by central bankers, will help reduce market uncertainty. Coordination with fiscal

policy and interaction with international financial institutions are key aspects of an effective monetary policy. Cooperation with the government to ensure coherence between monetary and fiscal policies will lead to more stable economic growth. Developing joint programmes and activities with international organizations such as the International Monetary Fund (IMF) and the World Bank will help improve national monetary policy (Karadima and Louri, 2021). Innovations such as the use of central bank digital currencies (CBDCs) and the use of modern analytical tools to analyse large amounts of economic data will help improve the effectiveness of monetary policy and provide more flexible regulation of the money supply. These measures will contribute to economic growth and stability of the financial system.

Firstly, regulatory requirements for banks' capital reserves should be improved to increase their resilience to economic shocks and reduce the likelihood of bank failures. For this purpose, new capitalization standards should be developed that take into account the risks associated with different types of banks' assets (Abdullaev and Abdullaeva, 2021). Introducing stricter capital reserve requirements for risky assets would provide additional protection to the financial system. In addition, regular stress tests of banking institutions should be conducted to assess their ability to withstand potential economic crises. The implementation of this recommendation is possible through updating the legislative framework and establishing an effective mechanism to monitor compliance with the new regulations. Central banks and financial regulators should work closely with banking institutions to ensure that they understand and comply with the new requirements. It is also necessary to introduce training and capacity-building programmes for bank staff to enable them to effectively manage risks and meet the new standards. It is also relevant to establish mechanisms to support banks that may have temporary difficulties in complying with the new requirements through the provision of advice and financial assistance. It is recommended to actively encourage the introduction of FinTech in the banking sector, which will significantly simplify access to financial services and improve the quality of customer service. The integration of FinTech solutions will allow banks to automate many processes, reduce operating costs and provide a more personalized approach to each customer (Tkachuk et al., 2024). The introduction of such technologies as mobile banking applications, online lending and automated investment management can significantly improve the convenience and accessibility of financial services for the public.

This recommendation can be implemented by creating a favourable regulatory environment for FinTech companies and encouraging partnerships between traditional banks and technology start-ups. Government agencies should develop and implement regulations that protect consumer rights while fostering innovation in the financial sector. It is also important to support training and skills development programmes for bank employees so that they can make effective use of new technologies (Bayar et al., 2021). In addition, the government can provide financial support to FinTech start-ups and innovative projects to accelerate their development and integration into the banking sector. It is recommended to strengthen supervision of banking institutions and introduce regular audits to identify potential problems and correct them in a timely manner. These measures will help to ensure more transparent and sound banking operations, which will contribute to increased confidence on the part of customers and investors. Effective supervision will help identify weaknesses in financial institutions and prevent the accumulation of risks that could lead to financial crises. Regular audits and reporting will also help to detect fraud and non-compliance with regulations, which will enhance the stability of the financial system. This recommendation can be implemented through the development and implementation of modern tools for monitoring and evaluating banking activities, as well as by improving the qualifications of regulatory staff. Central banks and financial regulators should develop clear audit standards and procedures and enforce them. In addition, it is crucial to introduce early warning systems for potential problems in banks, which will be based on the analysis of key financial indicators. Close cooperation between regulators in different countries to share information and co-ordinate actions in case of identifying problems at the global level is also critical.

It is recommended to ensure close cooperation between banks and governments in implementing national economic strategies, such as support for SMEs, infrastructure development and digitalization of financial services. Cooperation in this area will allow banks to better target their lending and investment policies to support priority sectors of the economy, thus contributing to sustainable economic development. For example, government programmes aimed at stimulating SMEs can be supported by banks through the provision of favourable credit terms and financial products tailored to the specific needs of these businesses. In order to implement this recommendation, effective communication and

coordination mechanisms between governments and the banking sector need to be put in place. This could include the establishment of joint working groups, regular meetings and forums to discuss policy issues, and the development of joint programmes and initiatives. In addition, it is important to introduce innovative financial technologies to improve access to and quality of financial services. Banks can adopt digital platforms for service delivery to increase customer outreach and promote more efficient use of financial resources. Governments, for their part, can help create an enabling environment for financial sector development by improving the regulatory environment and fostering innovation.

The effectiveness of regulatory reforms undertaken in the banking sector should be regularly reviewed and evaluated. This would allow for timely adaptation of policies to changes in the economic environment and ensure the stability of financial systems. Such a review could include analysing economic performance, assessing the impact of reforms on financial institutions, and incorporating feedback from banks and other stakeholders. Regular monitoring and evaluation will allow timely identification of shortcomings in the reforms introduced and the necessary adjustments to improve their effectiveness. The implementation of these recommendations will not only improve the efficiency of banking activities, but also ensure sustainable economic growth and financial stability in different countries. For this purpose, it is necessary to establish specialized analytical units in government agencies and financial regulators that are engaged in systematic collection and analysis of data related to banking reforms. In addition, it is critical to ensure that the assessment process is open and transparent, involving experts and representatives of the banking community. This will help to increase confidence in the financial system and ensure a more effective response to the challenges facing the banking sector in the current economic environment.

4. Discussion

Banking activity is an essential factor in influencing economic dynamics, as banks act as the main intermediaries in financial flows, lending to enterprises and individuals, as well as in the implementation of investment projects. The impact of banks on the economy largely determines the stability and sustainability of economic systems. However, as numerous studies have shown, the effectiveness of banking practices

and strategies can vary significantly between countries depending on their economic development, regulatory environment and level of financial innovation. Thus, the study of international experience in this area is extremely relevant and can have a significant impact on the formation of scientific and practical approaches to improving banking activities.

The results of scientific research Azmi et al. (2021), Djalilov and Hartwell (2024) revealed a significant, although heterogeneous, impact of environmental, social and governance (ESG) and corporate social responsibility (CSR) activities on the value and stability of banks. Environmental aspects are particularly important and have the greatest impact on bank value and stability. To maximize positive effects, banks were advised to strategically implement ESG/CSR practices by focusing on environmental innovation and adapting policies to the specific conditions of their banking system. This coincides with the findings of the study, which emphasizes that effective implementation of ESG/CSR practices contributes to increased financial sustainability and improved economic performance of banking institutions.

The results of the study underline the importance of banking system concentration as a mechanism to reduce the negative effects of economic uncertainty and demonstrate how problem loans in different sectors affect key macroeconomic indicators and labour markets. Coincidence with the results of the study by Berger et al. (2020) argues that banking has a positive impact on the real economy. They affirm that an efficient banking system contributes to economic growth by improving access to finance, stimulating investment and supporting entrepreneurship. This confirms the importance of banks as a key factor for stable economic development. At the same time, the works of researchers Ghosh (2017), Karadima and Louri (2021) outlined the uncertainty of economic policies that contributes to the growth of problem loans in the euro area, but the high concentration of the banking system reduces this negative impact. The study also shows that problem loans in the US have different effects on sectors of the economy, in particular, the greatest impact is observed in real estate loans reflected in the housing market, real GDP and construction, and problem loans in the construction and commercial segments negatively affect employment in the respective industries.

In the studies of scientists Bischof et al. (2021), Hamdaoui and Maktouf (2020), Ghelani et al. (2022), the authors examined that during the

financial crisis of 2007-2009, banks often delayed risk disclosure and loss recognition, which had a negative impact on financial stability. The main reason for these delays was the incentives for banks to delay reporting, suggesting that there is a need to improve banking supervision and credit risk accounting to enhance transparency and stability in the banking sector. An analysis of the impact of financial reforms on banking vulnerability shows that the effects of financial liberalization vary depending on the time elapsed since the last regulatory changes. In developed countries, regulatory updates may reduce the fragility of the banking system, while in developing countries the destabilizing effect of liberalization remains significant, even in the presence of new regulatory measures. In addition, modern cybersecurity challenges emphasize the importance of protecting data from attackers. This coincides with the findings of the study, which point out the importance of timely disclosure and loss recognition to ensure the financial stability of banks. In today's technology environment, the importance of cybersecurity is becoming increasingly evident, and the use of biometric methods and machine learning is proving to be effective in protecting data from cybercriminals and securing online banking.

But there are also inconsistencies in the studies of scholars Massoc (2020), Bell et al. (2023) because of their focus on specific aspects of banking that do not always reflect the broad economic context. One study focuses on political and institutional dynamics in Europe, which is related to bank policymaking rather than the direct economic impact of banks. Another study, on the other hand, analyses the impact of interest rate changes on central bank profitability, focusing on monetary effects and the ability of banks to achieve policy objectives, rather than the international influence of banks on economic dynamics. These studies do not include a comprehensive analysis of banking in an international context, which is key to understanding its impact on economic dynamics on a global scale.

Banks play a key role in financing projects that promote environmental sustainability, social well-being and economic growth. Analysing the factors that contribute to the creation of a time bank for sustainable social and economic growth and community development is important for understanding how financial institutions can support local communities and economies through innovative approaches. Such a time bank can be an effective tool to address social issues, improve quality of life and

promote environmental initiatives, which in turn will positively impact banks' financial performance and market sustainability. These results are in line with the studies of Bătae et al. (2021), Kakar (2020) who studied that emission reduction has a positive effect on the financial performance of banks, while product quality and social responsibility policies can have the opposite effect. It is also found that improving the quality of the corporate governance system has a negative effect on financial performance, which is contrary to agency theory. This may indicate that market investors do not value banks' participation in social responsibility initiatives and do not favour the implementation of best governance practices.

At the same time, the development of the modern banking system model, innovative approaches and the implementation of digital transformation in the banking industry also include important aspects analysed in detail in the studies of Ding and He (2023), Zarutskia et al. (2020), Barongo and Mbelwa (2024), Begenau and Landvoigt (2022). The authors' results note that the integration of digital technologies has a significant impact on the adaptation of banking models to new economic conditions, improving the efficiency of risk management and monetary policies. They also demonstrate how innovative regulatory and governance approaches can reduce the vulnerability of financial institutions to external shocks, while increasing the resilience and competitiveness of the banking system.

However, the results of researchers Chauhan et al. (2022), Zhang et al. (2023), Park and Kim (2020), Akomea-Frimpong et al. (2022) indicate the importance of the transition to green banking, but do not coincide with the results of this study, focusing on the relationship between traditional banking indicators and economic dynamics, demonstrating other aspects of the impact of banking on macroeconomic processes. The study demonstrates that banks' environmental performance has a positive impact on their efficiency and green finance in Bangladesh, particularly through the mediating influence of green finance. The main challenges include a lack of customer awareness, high costs and technical barriers, while the benefits are increased competitiveness, reduced costs and carbon emissions. Green banking as a tool for creating competitive advantage and risk management is also examined, emphasizing the importance of environmental initiatives by central banks and private institutions. The introduction of efficient banking strategies and innovative financial products is important to stimulate economic growth,

as evidenced by international experience, particularly in the US, India, and Azerbaijan. However, there are challenges such as regulatory constraints, economic instability and risks associated with digital transformation that need to be addressed and resolved.

5. Conclusion

The study conducted a detailed review and comparison of approaches to bank regulation in different economies and found that the effectiveness of bank regulation is directly related to the specifics of the economic environment and regulatory practices. The economies of the US, Germany, Switzerland, and Turkey demonstrate high financial stability due to comprehensive and flexible regulatory systems. Azerbaijan and Uzbekistan, while gradually adopting modern practices, face challenges in adapting to global standards and ensuring stability. Further, when examining the impact of new financial innovations such as digital currencies, financial technologies and new payment systems, it shows that these technologies are radically changing the functioning of banks and economic dynamics.

When analysing the results of regulatory reforms undertaken in advanced (the US, Germany, Switzerland, Turkey) and transition economies (Azerbaijan and Uzbekistan), it shows that these reforms have played a key role in ensuring the stability of financial systems following economic crises and significant changes in the banking sector. Reforms in advanced economies often focused on tightening capital requirements and improving controls and supervision. In transition economies, the focus has been on structural changes in regulation and improvements in financial infrastructure. The results indicated that effective cooperation between banks and regulators can significantly improve the stability of the financial environment and ensure sustainable economic growth. Research shows that banks support small and medium-sized enterprises, which creates new jobs and stimulates economic growth. Access to finance also has a positive impact on social programmes and improving living conditions. Based on the findings, recommendations for improving the policy of regulating and incentivizing banking activities have been developed. It is proposed to focus on adapting regulatory standards to the changing economic environment, introducing new technologies to improve financial services, and strengthening bank supervision to prevent crises.

The study's conclusions have important implications for banking organisations and policymakers alike, providing important new information on how banking policies and practices affect macroeconomic stability. This paper offers a framework for improving banking practices in both developed and transition economies by emphasising the need of sound banking policies. According to the findings, regulatory changes and financial innovations need to be carefully planned to strike a balance between the stability of the banking industry and the more general objectives of economic growth. In addition, comparing banking systems across different areas provides valuable insights into the possible effects of international banking strategy, indicating that regulatory alignment and cross-border collaboration may improve global financial stability. Thus, this study aids in the creation of better banking regulations that can promote economic resilience, especially in developing nations dealing with difficult issues.

In turn, the limitations of the study are related to difficulties in accessing relevant data, methodological complications due to differences in fiscal approaches across countries, and variations in economic and social contexts that may affect the findings. To further improve, it is important to regularly review regulatory standards, integrate new financial technologies, and strengthen international co-operation in banking regulation. This will help to improve the efficiency of the banking system and global financial stability.

Acknowledgements

There are no acknowledgements.

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Beyond the Immediate Crisis: The Economic Costs of Hosting Rohingya Refugees in Bangladesh

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ABSTRACT

This study uses an ARDL model to evaluate both the short- and long-term implications of the Rohingya refugee issue on Bangladesh's economic growth. Although Bangladesh's GDP has continued to grow steadily, the financial strain of providing for refugees threatens the long-term viability of the nation's development. The results show that while there have been short-term economic benefits from the Rohingya refugee crisis in Bangladesh, there are also serious long-term issues. Due to temporary employment creation and higher consumer demand, the immigrant population has temporarily boosted local economies. But as time has gone on, the burden on public services, infrastructure, and government resources has led to a rise in inequality, heightened competition for jobs, and pressure on public services. These elements have impeded long-term economic expansion. Because of the increased demand from the refugee population, which is made worse by the refugee crisis, important variables including labor force participation and educational spending were found to decrease long-term growth. While the economy shows some resilience, with a 61% rate of adjustment to shocks, long-term negative impacts are expected to outweigh any temporary gains. The analysis highlights that Bangladesh's economic resilience allows for a relatively quick adjustment to shocks, but without major reforms, the long-term adverse effects will persist. The study emphasizes the need for policies focused on refugee repatriation, international aid, infrastructure investment, and labor market reforms to mitigate these challenges and promote sustainable economic development

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ملخص

تستخدم هذه الدراسة نموذج الانحدار الذاتي للإبطاء الموزع لتقييم الآثار القصيرة والطويلة الأجل لقضية لاجئي الروهينجا على النمو الاقتصادي في بنغلاديش. وبالرغم من أن الناتج المحلي الإجمالي لبنغلاديش يستمر بالنمو بشكل مطرد، إلا أن العبء المالي الناجم عن توفير احتياجات اللاجئين يهدد استمرار تنمية البلاد على المدى الطويل. تظهر النتائج أنه رغم وجود فوائد اقتصادية قصيرة الأجل لأزمة لاجئي الروهينجا في بنغلاديش، إلا أن هناك مشاكل خطيرة على المدى الطويل. فنظرا للزيادة المؤقتة في فرص العمل وارتفاع الطلب الاستهلاكي، ساهم السكان اللجئون في تنشيط الاقتصادات المحلية بشكل مؤقت. لكن مع مرور الوقت، أدى العبء الواقع على الخدمات العامة والبنية التحتية وموارد الحكومة إلى تزايد فجوة التفاوت، وتزايد المنافسة على الوظائف، وزيادة الضغط على الخدمات العامة. وقد شكلت هذه العوامل عائقا أمام التوسع الاقتصادي على المدى الطويل. حيث أدت زيادة الطلب الناتجة عن السكان اللاجئين، والتي تفاقمت بفعل أزمة اللاجئين، إلى تراجع بعض المتغيرات الهامة مثل مشاركة القوى العاملة والإنفاق على التعليم، مما أدى إلى انخفاض وتيرة النمو على المدى الطويل. ورغم أن الاقتصاد يظهر قدرا من الصمود، بمعدل تكيف مع الصدمات يبلغ 61%، إلا أن الآثار السلبية طويلة الأمد يتوقع أن تتجاوز المكاسب المؤقتة. ويبرز التحليل أن قدرة الاقتصاد البنغلاديشي على الصمود تتيح له التكيف السريع نسبيا مع الصدمات، ولكن من دون تنفيذ إصلاحات أساسية، ستبقى الآثار السلبية على المدى الطويل قائمة. وتؤكد الدراسة على ضرورة إرساء سياسات تركز على عودة اللاجئين إلى وطنهم، والمعونة الدولية والاستثمار في البنية التحتية وإصلاح سوق العمل، من أجل التخفيف من هذه التحديات وتعزيز التنمية الاقتصادية المستدامة.

RESUME

Cette étude utilise un modèle ARDL pour évaluer les implications à court et à long terme de la question des réfugiés rohingyas sur la croissance économique du Bangladesh. Bien que le PIB du Bangladesh ait continué à croître régulièrement, la pression financière liée à la prise en charge des réfugiés menace la viabilité à long terme du développement du pays. Les résultats montrent que si la crise des réfugiés rohingyas au Bangladesh a eu des retombées économiques à court terme, elle pose également de graves problèmes à long terme. Grâce à la création d'emplois temporaires et à l'augmentation de la demande des consommateurs, la population immigrée a temporairement stimulé les économies locales. Mais au fil du temps, la charge qui pèse sur les services publics, les infrastructures et les ressources gouvernementales a entraîné une augmentation des inégalités, une concurrence accrue pour les emplois et une pression sur

les services publics. Ces éléments ont entravé l'expansion économique à long terme. En raison de la demande accrue de la population réfugiée, aggravée par la crise des réfugiés, il a été constaté que des variables importantes telles que la participation à la population active et les dépenses d'éducation diminuaient la croissance à long terme. Bien que l'économie fasse preuve d'une certaine résilience, avec un taux d'ajustement aux chocs de 61 %, les effets négatifs à long terme devraient l'emporter sur les gains temporaires. L'analyse souligne que la résilience économique du Bangladesh permet un ajustement relativement rapide aux chocs, mais qu'en l'absence de réformes majeures, les effets négatifs à long terme persisteront. L'étude souligne la nécessité de politiques axées sur le rapatriement des réfugiés, l'aide internationale, l'investissement dans les infrastructures et les réformes du marché du travail pour atténuer ces défis et promouvoir un développement économique durable.

1. Introduction

The influx of Rohingya refugees into Bangladesh has had a profound and multidimensional impact on the nation, particularly in economic terms. Bangladesh, a developing country with limited resources, has long faced numerous socio-economic challenges (Talukder, 2022). Since August 2017, the country has hosted nearly a million Rohingya refugees fleeing persecution and violence in Myanmar's Rakhine State, further straining these limited resources. Despite Bangladesh's remarkable humanitarian efforts in providing shelter to the Rohingya population, the economic burden of sustaining such a large number of refugees has been significant (UNHCR, 2022; Islam, 2021).

The Rohingya situation is not new in Bangladesh. Since the late twentieth century, the country has seen successive waves of Rohingya refugees, with the largest numbers arriving in 1978 and 1991-92. However, the 2017 flood, which saw over 742,000 Rohingya cross the border in a short span, is still the greatest in history. As of 2023, approximately 965,000 Rohingya refugees are sheltered in 33 temporary camps in the Cox's Bazar region, with over 100,000 children born there since 2017 (IOM, 2023). This vast migration has caused demographic shifts in southeastern Bangladesh, as well as a slew of economic, environmental, and social issues that require immediate response (Köppl & Schratzenstaller, 2024; Rahman et al., 2022; Saha, 2022).

The Rohingya crisis in Bangladesh has serious economic repercussions, from resource depletion to mounting pressure on labor markets, government services, and the environment. The majority of refugees reside in Cox's Bazar, which was already experiencing economic instability because of its heavy reliance on tourism and agriculture (Lubna & Saha, 2024). Both the host and refugee populations have suffered greatly as a result of the unanticipated population surge, which has placed a tremendous burden on the local infrastructure, economy, and natural resources (Mahmood & Ahsan, 2023; World Bank, 2023).

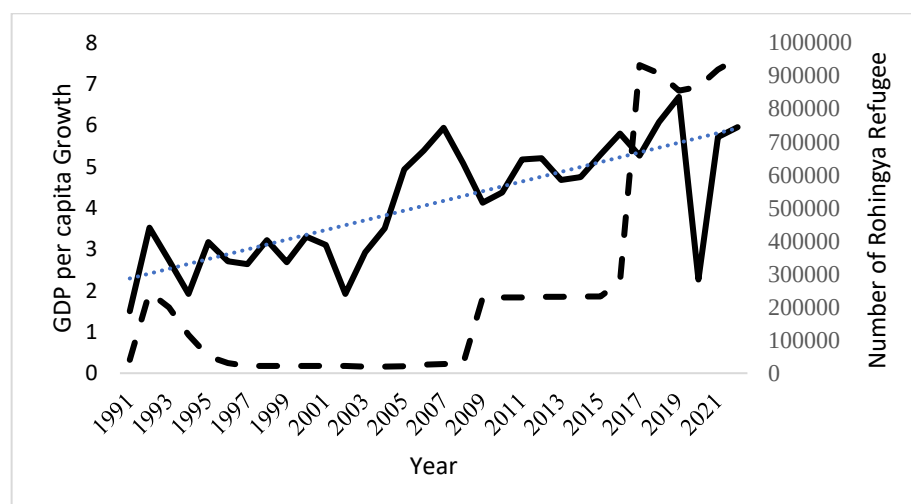
The basic needs of the Rohingya refugees, such as food, shelter, medical treatment, and education, continue to be largely funded by Bangladesh. According to estimates, the country spends between \$800 million and \$1 billion each year to sustain its refugee population. This is a considerable investment for Bangladesh, where per capita income was \$2,765 in 2024 (World Bank, 2023).

Financial support has been given by international aid agencies like the United Nations High Commissioner for Refugees (UNHCR) and other NGOs. But this assistance has been patchy and insufficient. The financial imbalance has put more strain on Bangladesh's national resources as the world's attention is split between several refugee crises. As a result, the nation has had trouble directing funds toward other crucial areas including infrastructure improvement, reducing poverty, and providing healthcare for its own people (UNHCR, 2023; ICG, 2023). In order to mitigate the long-term socioeconomic effects on Bangladesh and provide proper care for the refugee population, this circumstance emphasizes the critical need for ongoing international financial assistance.

International aid groups, including the United Nations High Commissioner for Refugees (UNHCR) and several non-governmental organizations (NGOs), have contributed financial help. However, this support has been uneven and insufficient. With global attention split between several refugee crises around the world, the financing vacuum has put further strain on Bangladesh's state resources. As a result, the country has struggled to allocate resources to other critical sectors such as infrastructure development, poverty reduction, and healthcare for its inhabitants (UNHCR, 2023; ICG, 2023).

The Rohingya refugee crisis has had one of the most direct effects on the local labor markets in Cox's Bazar and the neighboring areas. Earnings for low-skilled workers in the host community have decreased as a result of the significant influx of refugees, many of whom are willing to labor for lower rates. A study by Ullah et al. (2021) claims that the availability of inexpensive labor has caused local workers' wages to be suppressed, especially in industries like construction, agriculture, and informal employment. Since many households in the area were already barely making ends meet, this has made poverty levels even worse.

Figure 1: Trend of GDP per capita growth and Rohingya Refugee in Bangladesh during study period.



The influx of refugees has also increased competition for jobs, particularly in the informal sector, where many Rohingya have found work despite the restrictions on their legal right to work in Bangladesh. The rise in labor supply has led to a reduction in wages, with local workers experiencing a 24% decline in income since the refugee crisis began (Khatri, 2022). This decline in wages is particularly concerning given Bangladesh's recent history of robust economic growth, with GDP increasing by more than 6% annually. The impact of the refugee crisis on wages has slowed this growth, particularly in the affected regions.

Along with the economic effects on wages and labor markets, the Rohingya refugee crisis has seriously harmed the environment in the Cox's Bazar area. Approximately 2283 hectares of forest reserve land and

1,500 hectares of wildlife habitat have been destroyed as a result of the quick setup of temporary camps (Hassan et al., 2018). The local ecology has been negatively impacted by this deforestation, which has increased susceptibility to landslides and flooding, decreased biodiversity, and eroded soil.

Economic repercussions have also resulted from the refugee camps' environmental damage. The amount of timber and other natural resources that local residents depend on for their livelihoods has decreased as a result of the loss of forest regions. Additionally, local tourism, which is a major source of revenue for many Cox's Bazar people, has been impacted by the loss of wildlife habitat. The potential for tourism-driven economic growth declines as the region's natural beauty deteriorates, thereby restricting the economic opportunities accessible to the host towns.

The study is significant because it offers insight on the complex issues presented by one of the world's major refugee crises. The report provides policymakers with critical insights into how the presence of over a million migrants has stressed labor markets, environmental resources, public services, and infrastructure. It underlines the critical need for specific policies and long-term solutions to manage these pressures, such as relocation initiatives like Bhasan Char.

By assessing the impact on Bangladesh's economic stability and development trajectory, the report highlights potential threats to the country's growth and poverty-reduction initiatives while also laying the groundwork for foreign financial assistance (Eğri et al., 2024). Humanitarian organizations, such as the United Nations and international non-governmental organizations (NGOs), can benefit from the study's extensive analysis by informing resource allocation and long-term strategy for successful aid distribution. The study also underscores the enormous environmental degradation caused by refugee camps, which has an impact on local residents' livelihoods and poses risks to industries such as tourism.

The influx of Rohingya refugees has had a severe negative economic impact on Bangladesh. Key challenges include rising living costs, regional employment crises, and lower daily wages (Ahmad & Naeem, 2020). The tourism industry has sustained significant losses, particularly in Cox's Bazar (Ahmad & Naeem, 2020; Yilmaz & Talukder, 2019; Islam

& Rahman, 2023). Government spending on health and security has increased since 2017 (Ahmad & Naeem, 2020). Environmental devastation, deforestation, and land acquisition have sparked conflict between refugees and host communities (Zahed, 2023; Haq et al., 2024). Shortages of international funding intensify these effects (Zahed, 2023). To solve these issues, appropriate repatriation procedures are required (Ahmad & Naeem, 2020). The international community must step in to end the crisis and help Bangladesh recover (Yilmaz & Talukder, 2019).

The refugee issue has a considerable influence on food security and prices in host communities. A study on the Rohingya influx in Bangladesh discovered that overall food costs increased by 8%, with protein and vegetable prices jumping by 7% and 36%, respectively (Alam et al., 2022). The impact of refugee inflows on local food security is unevenly distributed (Mabiso et al., 2014). To address these difficulties, land use planning and land banks play critical roles in improving refugees' food security. These initiatives provide access to arable land, diversify livelihoods, build infrastructure, protect land rights, and encourage responsible resource management (Nimko, 2023). As the worldwide refugee crisis worsens, applying these ideas becomes increasingly critical for assisting displaced communities and ensuring their long-term viability. The study emphasizes the need to foster self-sufficiency and economic empowerment among refugee populations worldwide.

The study provides unique insights and major contributions by focusing on the economic ramifications for a developing country like Bangladesh, which struggles to handle such a huge refugee population due to limited resources and infrastructure. It provides a detailed study of the consequences on economic growth, as well as an examination of the short and long-term implications. The analysis includes environmental deterioration caused by refugee camps, such as deforestation and resource depletion, and connects these difficulties to long-term economic effects, such as decreased agricultural output and tourism potential. Furthermore, the study's policy-oriented approach makes specific recommendations for resource management, economic sustainability, and international collaboration, while its long-term perspective on the financial sustainability of refugee support provides a framework for understanding how the continued presence of refugees may strain Bangladesh's economy. This study is an important contribution to refugee studies and

policy formulation in refugee-hosting countries since it addresses the long-term viability of the economy.

Several studies have investigated the impact of Rohingya refugees on Bangladesh, focusing on various dimensions such as environmental degradation affecting agriculture and local ecosystems (Sakamoto et al., 2024), depletion of natural resources and deforestation (Zahed, 2023), a decrease in raw materials and biodiversity (Sarkar et al., 2023), and an increase in living costs and inflationary pressures (Islam, 2021). However, this study stands out by investigating the broader macroeconomic consequences of the refugee crisis, since earlier research has mainly focused on specific areas of Bangladesh's issues using micro or primary data. Bangladesh, a densely populated country suffering with poverty, hunger, food insecurity, and other security problems, has faced new challenges as a result of the Rohingya crisis throughout the previous five decades, notably in the last ten years. This crisis has further stressed the country's economy, increasing both domestic and foreign pressures and demanding a variety of governmental actions to ensure the country's general well-being.

This work provides several important contributions to the literature. 1) The study presents a targeted analysis of how the Rohingya refugee flow is affecting a developing nation's economy, specifically via the lens of GDP growth. 2) This study is innovative in that it uses the ARDL model to provide an econometric method that captures both the short-term and long-term effects of the refugee influx on GDP. This contrasts with much of the previous literature, which generally studies either short-term implications or employs simpler models. 3) The findings are likely to help governments balance humanitarian responsibilities with long-term economic development. This is significant in nations like Bangladesh, where resources are scarce and long-term economic stability is essential. 4) The paper is one of the first to provide an empirical examination of the economic effects of the Rohingya refugee crisis in Bangladesh, employing a model appropriate to the country's economic setting.

Methodologically, we use Autoregressive Distributed Lag (ARDL) estimate approaches to investigate both short- and long-term correlations and causal dynamics between variables. This study is important given the need for long-term economic development, proper use of domestic resources, and effective policymaking.

Our study is unique in that it scientifically analyzes the various implications of the refugee crisis on Bangladesh's economy. We hope to reconcile the interplay between economic growth and the refugee issue in the developmental trajectory by examining the intrinsic dynamics of each. Finally, our study provides a theoretical foundation for addressing Rohingya refugee difficulties while also promoting economic development in Bangladesh, providing practical insights to help the country's sustainable development initiatives.

Figure 1 depicts a dual-axis trend graph of Bangladesh's GDP per capita growth (solid line, left Y-axis) versus the number of Rohingya refugees (dashed line, right Y-axis) from 1991 to 2021. GDP per capita growth varies over time, with major peaks in the mid-1990s, mid-2000s, and late 2010s, followed by a severe drop about 2020, most likely caused by the COVID-19 pandemic. The Rohingya refugee population remained relatively low and stable until 2017, when it skyrocketed following the mass migration from Myanmar, reaching over 900,000 in 2019. Despite the enormous number of refugees, Bangladesh's GDP per capita growth has remained generally positive, while there have been swings that might be attributed to key events such as the refugee crisis and pandemic. This comparison investigates the possible impact of the refugee crisis on the country's economic performance.

Using time series data from 1991 to 2022, this study seeks to validate proven relationships in the Bangladeshi context and investigates the consequences of Rohingya refugees on the Bangladeshi economy. Notable is the discovery of the impact of new variables such as trade openness, labor force participation rate, government educational spending, and gross capital creation.

Background and current status of Rohingya refugee crisis in Bangladesh

The Rohingya problem has its roots in colonialism and Myanmar's complicated ethnopolitical terrain. For decades, the Rohingya, a Muslim minority in predominately Buddhist Myanmar, have called Rakhine State home. However, their position has been a source of controversy for decades. Despite their historical presence, the Rohingya have been systematically marginalized, being refused citizenship under Myanmar's 1982 Citizenship Law. This law effectively rendered them stateless by

classifying them as "foreigners" and excluding them from the country's officially recognized ethnic groups (Leider, 2018).

For decades, the Rohingya have faced occasional bouts of violence and persecution, which are often fueled by ethnic and religious conflicts. Significant outbreaks of violence occurred in 1978, 1991-1992, and 2012, with substantial numbers of Rohingya fleeing to Bangladesh each time (Saha, 2025; Milton et al. 2017). However, the situation became severe in August 2017, when Myanmar's military started a savage crackdown in response to an attack on police positions by the Arakan Rohingya Salvation Army (ARSA), a Rohingya rebel group. The military action, labeled as "ethnic cleansing" by the United Nations (UN), resulted in mass deaths, sexual abuse, and the devastation of Rohingya villages, leading approximately 742,000 Rohingya to flee to Bangladesh within months (UNHCR, 2023).

Despite its limited resources, Bangladesh opened its borders to the fleeing Rohingya, with the majority settling in improvised settlements in the southeastern province of Cox's Bazar. The 2017 flight adds to the already sizable Rohingya population that had fled Myanmar after earlier outbreaks of violence. By 2024, Bangladesh is expected to accommodate over 1.2 million Rohingya refugees (UNHCR, 2023), making it the world's largest refugee settlement.

Cox's Bazar, once a tranquil seaside town known for tourism, has become a massive center of refugee camps, with the Kutupalong camp serving as the world's largest refugee settlement. The abrupt rush of refugees overloaded local infrastructure, resulting in substantial humanitarian difficulties such as overcrowding, poor sanitation, food insecurity, and healthcare shortages. The Bangladeshi government, with the assistance of international organizations such as the UN Refugee Agency (UNHCR), UNICEF, and the World Food Programme (WFP), launched a massive humanitarian response. However, the sheer magnitude of the issue has taxed resources and infrastructure to the breaking point.

As of 2024, the Rohingya situation is still unsolved, with little movement toward repatriation or relocation. Rohingya refugees in Bangladesh remain restricted to camps, with limited access to basic rights such as education, healthcare, and employment. Most live in makeshift bamboo

and plastic sheeting shelters, which are prone to monsoons and landslides, exacerbating their difficult circumstances (ACAPS, 2023).

The international community, despite giving financial and humanitarian aid, has struggled to find a long-term solution to the situation. Repatriation attempts, led by Bangladesh and Myanmar, have continually stopped due to the Rohingya's dread of returning to Myanmar, where they suffer ongoing persecution and a lack of citizenship rights. In 2018 and 2019, repatriation attempts failed when no Rohingya volunteered to return, citing concerns over their safety and the lack of assurances regarding their citizenship status (ICG, 2023).

In 2023, Bangladesh and Myanmar agreed to resume repatriation talks, with China serving as a mediator. However, little progress has been made because Myanmar refuses to meet the Rohingya's primary demands, which include citizenship rights, security, and land restitution. As a result, the chances of voluntary, safe, and dignified repatriation remain slim (ICG, 2023).

The Rohingya's protracted presence in Bangladesh has posed substantial humanitarian and economic concerns. Bangladesh has suffered a significant financial burden, spending between \$800 million and \$1 billion per year on refugee relief (World Bank, 2023). This expenditure places a substantial pressure on a country that, despite recent great economic progress, continues to suffer from widespread poverty and resource limits.

The local economy in Cox's Bazar has also been significantly impacted. The flood of refugees has increased competition for resources, particularly land and water, and has resulted in food price inflation. While the entrance of international aid boosted particular sectors, such as transportation and retail, the overall economic impact on the host community was negative, with increased unemployment and environmental damage (Akhi et al., 2024; Filipski et al., 2019; Alam et al., 2020).

Furthermore, the crisis has had a serious environmental impact. The building of refugee camps has resulted in widespread deforestation, which contributes to soil erosion and raises the risk of landslides during the monsoon season (Akter et al., 2024; Saha & Saha, 2023). Efforts to

mitigate environmental damage have been implemented, but the scale of the damage is immense, and reversing it will require long-term investments (ACAPS, 2023).

The international response to the Rohingya crisis has been significant, but insufficient to satisfy the needs of both refugees and host countries. The United Nations and other non-governmental organizations (NGOs) have offered vital assistance in the form of food, healthcare, housing, and education. However, budget shortages remain an ongoing issue. For example, the 2023 Joint Response Plan for the Rohingya Humanitarian Crisis received only 50% funding, leaving severe gaps in relief delivery (UNHCR, 2023).

Diplomatic attempts to address the crisis have proved similarly difficult. While nations such as the United States, Canada, and the European Union have slapped sanctions on Myanmar's military commanders for their involvement in the atrocities against the Rohingya, international pressure has yet to produce major changes in Myanmar's policy. The geopolitical complexities of the region, particularly Myanmar's close ties with China, have made it difficult to achieve a consensus on stronger international action (ICG, 2023).

The Rohingya refugee crisis is still a complex and unsolved issue, with no clear end in sight. Bangladesh continues to shoulder the brunt of the crisis, offering humanitarian assistance to over a million refugees despite inadequate resources. While international aid has helped to lessen some of the burden, the long duration of the crisis and the lack of progress toward repatriation or resettlement have put additional strain on Bangladesh's economy and infrastructure.

The international community must continue to work on finding long-term solutions to the Rohingya situation. This includes ongoing financial assistance to Bangladesh, pressure on Myanmar to address the underlying causes of the crisis, and measures to ensure that the Rohingya can return to their homeland with dignity and security. Without such concerted efforts, the Rohingya crisis will continue to pose a significant humanitarian and economic challenge for Bangladesh and the wider region.

2. Literature Review

Theoretical background

Theoretical theories for the refugee issue provide various perspectives on the crisis. According to the Economics of Migration Theory, while migration can benefit host economies through labor contributions, it can also strain resources and increase competition for jobs and services, as seen in Cox's Bazar, where wages and employment opportunities have been negatively impacted by the influx (Borjas 1999; Filipski et al., 2019). Human Capital Theory emphasizes that many Rohingya refugees have insufficient skills and education, which limits their formal economic integration and increases their dependency on informal labor (Becker, 1993; Milton et al., 2017; Aksu et al., 2022).

The Refugee Studies Framework emphasizes refugees' vulnerabilities, such as restricted legal status and limited employment prospects, which contribute to their economic precarity (Zetter, 2017; Khan et al., 2020). Finally, the Resilience Framework emphasizes the importance of adaptive capacities in both refugee and host communities, arguing for policies that promote social cohesion and improve access to critical services in order to offset negative economic repercussions (Folke, 2006; ACAPS, 2023). Together, these frameworks give a comprehensive understanding of the complex difficulties and opportunities presented by Bangladesh's refugee crisis, guiding policy actions that address both immediate needs and long-term socioeconomic stability.

Empirical literature preview

The extant literature on refugees focuses mostly on the challenges they present to host countries, generally highlighting the economic and social consequences. The predominant view is that the influx of migrants causes rising food and commodity prices, downward pressure on local wages, budgetary stress on public services, and environmental degradation, all of which outweigh the possible benefits (Betts et al., 2024; Shellito, 2016). Much of the studies is based on descriptive reports and primary surveys, which have constraints regarding data validity and model parameters (Alix-Garcia & Saah, 2010; Maystadt & Duranton, 2019). While recent study has begun to investigate refugees' economic contributions under certain conditions, a large portion of the literature remains focused on the

moral and humanitarian aspects of refugee crises, frequently emphasizing the human rights perspective and international responsibility (Huysmans, 2000; Salehyan & Gleditsch, 2006; Connor, 2010; Berti, 2015; Herlina, 2022). Furthermore, there is a growing corpus of research that investigates refugees' long-term economic integration and possible contributions to development, however these findings are overshadowed by worries about the immediate costs to host economies (Ruiz & Vargas-Silva, 2013).

The literature on the economic impact of refugees gives two opposing viewpoints. One line of research emphasizes the potential positive contributions that refugees can make to host economies, citing benefits such as increased labor supply, entrepreneurship, and the influx of humanitarian help and economic assets (Betts et al., 2017; Ruiz & Vargas-Silva, 2013). Critics claim that migrants often put a strain on public services, compete for resources with locals, and pose social and security hazards (Maystadt & Verwimp, 2014; Zetter, 2015). Jacobsen (2002) offered early evidence of the positive influx of resources that accompany refugee crises, such as aid and human capital, while also acknowledging the economic, security, and environmental concerns that host countries face. However, Jacobsen stated that if host governments can properly manage refugee populations, refugees can contribute to state-building and economic development, emphasizing the significance of deliberate policy responses to maximize the potential benefits.

Hosting large numbers of refugees frequently puts a strain on resources and infrastructure, with both short- and long-term repercussions. On the plus side, refugees can boost local investment, close labor market gaps, and promote commerce between host and origin countries (Ruiz & Vargas-Silva, 2013). In some circumstances, cash aid to refugees might result in considerable positive income spillovers in local economies, increasing consumption and demand for goods and services (Kumar et al., 2023). However, the inflow of migrants can put a strain on public services including healthcare, education, and housing, resulting in increasing societal tensions and pressure on local communities (Zhou et al., 2023). The overall impact is determined by factors such as the size of the aid package and the host country's economic resiliency. For example, Afghan refugees in Pakistan contributed positively to the labor market in the long run while causing short-term unemployment (Qaisrani, 2021). In contrast, the Rohingya issue in Bangladesh increased the country's reliance on international help and hindered development efforts (Hangartner et al.,

2021). These diverse outcomes underline the importance of context-specific ways to manage refugee influxes, balancing economic gains and reducing problems (Tschunkert, 2024).

Refugees can boost GDP per capita and government consumption, especially in West African countries where refugee inflows have been shown to have a beneficial impact (Nkwatoh & Ibrahim, 2021). In Lebanon, the influx of refugees has had no negative impact on high-skilled native workers, indicating that certain industries may benefit (David et al., 2019). Refugees frequently compete with locals for basic resources like housing, healthcare, and education, resulting in increased demand and potential shortages (Barman, 2020). This competition has the potential to worsen existing socioeconomic inequities, especially among disadvantaged populations (David et al., 2019). The fiscal balance of host nations may suffer as a result of increased government spending on public services, emphasizing the necessity for foreign assistance to alleviate these effects (Nkwatoh and Ibrahim, 2021).

The economic impact of refugees on host countries is a complicated and multidimensional subject. According to Shellito (2016), refugees can assist host countries by improving infrastructure, providing skilled labor, and bridging demographic gaps, but they also pose concerns such as pricing manipulation, environmental degradation, and social instability. Schneiderheinze and Lücke (2020) observed that in the short run, regions absorbing high numbers of migrants frequently see a GDP boost due to increased help and consumption of goods and services. Taylor et al. (2016) emphasized the positive impact of monetary aid in Congolese refugee camps in Rwanda, claiming that it generates significant local money, encourages commerce, and directly benefits companies and individuals.

Kudrat-E-Khuda (2020) and Islam and Rahman (2023) identified the Rohingya situation in Bangladesh as an economic burden, disrupting local labor markets, raising food shortages and pricing, and harming tourism. This strain has also caused health problems in nations receiving refugees from surrounding regions, including as Turkey, Jordan, and Lebanon (Saleh et al., 2018). Despite considerable international humanitarian assistance, the Bangladeshi community near the border has yet to fully recover from the economic setbacks caused by the Rohingya influx (Alam et al, 2023). According to Ullah et al. (2021), while Bangladesh's GDP

has increased, the native population's annual income has decreased by 24% as a result of the refugee influx. Gattinara (2017). Setiawan and Hamka (2020) investigated the contradictory relationship between foreign policy, refugee influxes, and their consequences, highlighting the security threats and regional instability associated with the presence of refugee camps. These studies illustrate the ongoing discussion among academics, including anthropologists, sociologists, and economists, about whether refugees are an economic burden or an opportunity for host countries.

The flood of refugees can have a considerable economic impact on the host countries. According to studies, refugee crises might result in higher housing and food prices in impacted areas (Akgündüz et al., 2015; Tumen, 2016). Refugees may partially replace for native informal workers in labor markets, resulting in mild job losses. However, natives' total employment rates in various skill areas remain substantially unchanged (Akgündüz et al., 2015). Refugee arrivals can support long-term investment, close demographic imbalances, and boost bilateral trade with home nations (Shellito, 2016). In contrast, they may put a pressure on public resources and lead to economic overcrowding. According to Ceritoğlu et al. (2015), disadvantaged groups, including women, younger workers, and those with lower education levels, are more likely to experience unfavorable labor market outcomes. These findings emphasize the broad and multifaceted economic consequences of refugee crises for host countries.

The influx of refugees can have a considerable impact on local markets, resulting in inflation and trade imbalances. Increased demand for basic items, such as food and housing, frequently leads to price inflation, reducing local residents' purchasing power. For example, studies show that the presence of Afghan migrants in Pakistan has caused inflation and economic strain, compromising local economic stability. Similarly, the entrance of Syrian migrants in Turkey initially increased prices, but the long-term consequences were mitigated by regional arbitrage (Genc et al., 2021). Furthermore, the necessity for imports to meet increased demand might worsen trade imbalances, as shown in some host countries (Lucas, 2024; Khundadze & Palmer, 2023; Maystadt et al., 2019). Informal cross-border trade may also thrive, undercutting formal trade regulations and reducing government revenue through tariffs (Mahmood, 2022). However, some studies imply that with effective integration efforts,

refugees' economic impact can be minimized, perhaps leading to beneficial long-term consequences (Maystadt et al., 2019).

While refugees may put a strain on public services and infrastructure (Shellito, 2016), they can also encourage long-term investment and bilateral trade. The effects are frequently unevenly dispersed among host communities, with both good and negative consequences likely (Maystadt et al., 2019). Infrastructure development, commerce, and labor markets are important conduits for determining these impacts (Maystadt et al., 2019). Investments in road infrastructure and increased trade with refugees' home countries can boost resilience (Maystadt et al., 2019). However, inadequate resources may make it difficult for underdeveloped countries to maintain or grow their infrastructure (Joshua, 2016). International help for refugee populations can temporarily increase gross fixed capital, but the gains may be unevenly distributed (Ruadel & Morrison-Métois, 2017; Matlin et al., 2018). Bridging the gap between humanitarian and development programming is crucial for effective response to protracted crises (Ruadel & Morrison-Métois, 2017).

The inflow of refugees can severely disrupt local economy, resulting in inflation and trade imbalances. Increased demand for vital products like food and housing frequently leads to price inflation, reducing local residents' purchasing power. For example, the presence of Afghan refugees in Pakistan has been connected to economic strain and inflation, reducing local economic security (Nisar et al., 2024). Similarly, Syrian refugees in Turkey originally increased prices, but regional arbitrage mitigated the long-term effects (Tschunkert, 2022). Furthermore, increased demand can exacerbate trade imbalances, as shown in several host countries, but informal cross-border commerce might undercut formal trade policy (Lucas, 2024; Oliver et al., 2024). However, good integration strategies can reduce the economic burden of refugees, perhaps leading to beneficial consequences in the long run (Tariq et al., 2024). Despite these challenges, some studies suggest that refugees can also contribute positively to local economies by providing goods and services, thus creating opportunities for economic growth and integration, if supported by appropriate policies (Oliver et al., 2024).

The impact of the refugee crisis on gross capital production varies greatly between situations, with both positive and negative consequences for host economies. On the one hand, migrants can boost long-term investment

and fill labor market gaps, potentially increasing capital accumulation and economic growth (Shellito, 2016). For example, the flood of Ukrainian refugees into Europe has increased labor supply, which, while initially straining current capital structures, is predicted to raise real GDP in the long run as capital accumulates (Caliendo et al., 2023). According to research in Kenya, an increase in the number of refugees interacts negatively with GDP, implying that the immediate economic burden may outweigh potential advantages (Wahogo & Ruigu, 2016). Furthermore, while refugee admissions have a short-term beneficial impact on GDP per capita in West African nations, they are also associated with higher fiscal constraints (Nkwatoh & Ibrahim, 2021). The inflow of Syrian migrants has had different effects on host countries' educational systems and budgets. In Jordan, the presence of refugees increased public education spending (Alshoubaki & Harris, 2019), but had no substantial impact on Jordanian students' educational outcomes (Assaad et al., 2023). This lack of influence is ascribed to government initiatives such as instituting second shifts in schools and establishing new schools in refugee camps (Assaad et al., 2023; Assaad et al., 2018). However, in Uganda, increased refugee concentrations in government schools had a negative impact on native students' English and math performance (Sakaue & Wokadala, 2022). Although the inflow of refugees may lead to a rise in the demand for public services and spending (Alshoubaki & Harris, 2019), suitable policy responses can support the preservation of educational quality for both host and refugee populations.

On the other hand, some contend that the long-term advantages of integrating refugees, such as increased productivity and demographic balance, may eventually surpass the short-term financial hardships and result in a future economy that is more resilient. In order to optimize the beneficial effects of refugee crises on capital formation and economic growth, this viewpoint highlights the significance of effective governmental responses.

This study fills gaps in the existing literature by integrating a variety of previously unconsidered attributes. There is little research that explicitly addresses the crisis's impact on broader economic indicators to ensure sustainable development, even though prior studies have mostly concentrated on the humanitarian and social aspects of the crisis. This is because a large number of refugees puts a lot of strain on the economy of a developing nation like Bangladesh. This study is among the first to

address this topic in Bangladesh in this way. Studies that measures the immediate and long-term effects of the Rohingya refugee crisis on the economy is lacking, making it difficult to assess how government policies are influencing long-term economic sustainability in order to address and ameliorate this problem and guide more sensible legislation. To fully comprehend the crisis's economic ramifications and develop more potent policy solutions, these gaps must be filled.

Table 1: Data Source

Variable	Symbol	Definition	Data Source
GDP per capita growth	GDPPG	The annual GDP per capita growth rate measures the percentage increase in a country's economic output per person, using constant local currency.	World Bank (2024)
Rohingya Refugee	ROH_REF	The Rohingya refugee population residing in the Bangladeshi territory	UNHCR (2024)
Trade openness	TO	Summation of export and import as % of GDP.	World Bank (2024)
Gross fixed capital formation	GFCF	Formerly known as gross domestic fixed investment	World Bank (2024)
Labor force participation rate	LFPR	LFPR is the proportion of the population ages 15-24 that is economically active.	World Bank (2024)
Government Educational expenditure	EDU_EXP	General government expenditure on education is expressed as a percentage of GDP	World Bank (2024)

3. Data and Methodology

Data and Variables

The current study gathered data from a variety of sources to explore the dynamics of the short- and long-run implications of the Rohingya refugee crisis on Bangladeshi economic growth from 1991 to 2022. The World Bank's World Development Indicators (WDI) have served as the primary data source. Table 2 summarizes the variable descriptions and data sources used in our growth-refugee model. Pesaran et al. (2001) developed the ARDL model, which is used in this work. Furthermore, the study uses Granger causality Wald tests to investigate the causal

relationship between rural electrification and Bangladesh's economic growth, offering light on how these factors interact.

Methodology

The study used the Auto-Regressive-Distributed Lag (ARDL) methodology, created by Pesaran et al. (2001), to analyze co-integration relationships among variables, preferring it over classic methods such as Engle and Granger (1987) and Johansen and Juselius (1990). The ARDL model solves endogeneity difficulties by allowing for concurrent estimate of long- and short-run parameters, as well as addressing omitted variables and autocorrelation. It eliminates the requirement to provide variable integration orders and pre-test for unit roots by assuming stationarity at levels ($I(0)$), first difference ($I(1)$), or fractionally integrated. To maintain co-integrating relevance, it is critical to ensure that the dependent variable possesses first difference stationarity. The advantage of this method is that it may be applied to any type of series, regardless of integration level. The regressors may be a mix of $I(0)$ and $I(1)$ series or fractionally cointegrated (Pesaran & Pesaran, 1997).

Pesaran et al. (2001) recommended that the dependent variable be first difference stationary to ensure the co-integrating connection remains relevant. Rahman and Islam (2020) also feel that any $I(2)$ variable(s) could cause the system to crash. . As a result, efficient unit root tests are recommended to ensure that no $I(2)$ variable(s) exist in the model. Pesaran et al. (2001) discovered that the short and long-run parameters estimated using the ARDL methodology are trustworthy and efficient for small sample analyses, whereas the Engle and Granger and Johansen and Juselius methods are inefficient and inconsistent in such investigations. According to Nguyen (2020), the ARDL bounds testing methodology works much better with a limited sample size. Another advantage of this method is that the model requires a sufficient number of lags to represent the data generation process in a general-to-specific modeling framework (Laurenceson and Chai, 2003). This results in an additional benefit of no endogeneity issues in the models, as both dependent and independent variables can be added into the model via lags. However, it is suggested against using $I(2)$ variables to prevent system instability, which would necessitate efficient unit root tests.

Pesaran et al. (2001) state that the ARDL methodology is reliable and efficient, particularly in investigations with small sample numbers. Nguyen (2020) emphasizes the ARDL limits testing methodology's higher performance in small samples when compared to multivariate co-integration. Furthermore, the ARDL model's adaptability allows for additional variables and different lag structures, giving it an edge over vector autoregressive (VAR) models.

The study applies the Engle-Granger causality test to investigate the influence of the refugee crisis on economic growth using the ARDL approach. Furthermore, diagnostic assessments, such as CUSUM and CUSUMQ tests within the ARDL model, ensure model stability by verifying coefficient values and finding structural breakpoints, hence enhancing study robustness and reliability.

Analytical Framework

The functional form of the model is given by the following equation:

$$\text{GDPPG} = F(\text{ROH\_REF}, \text{TO}, \text{GFCE}, \text{LFPR}, \text{EDU\_EXP}) \dots \dots \dots (1)$$

Where,

GDPPG = GDP per capital growth

ROH_REF = Number of Rohingya refugee

TO = Trade Openness

LFPR = Labor force capital formation

EDU_EXP = Educational Expenditure

Econometric Specification

The generalized log linear form of the model used in the present study is given by the following

equation:

$$GDPPG_t = \beta_0 + \beta_1 ROH\_REF(t) + \beta_2 TO(t) + \beta_3 GFCF(t) + \beta_4 LFPR(t) + \beta_5 EDU\_EXP(t) + \varepsilon_t \dots \dots \dots (2)$$

In Eq. (2) while portraying the constant term; β_0 , β_1 , β_2 , β_3 , β_4 and β_5 are present as the coefficients of the independent variables.

The ARDL model is explained in an approach that addresses both short-run dynamics and the long-run relationship

$$\Delta GDPPG_t = \alpha_1 + \sum_{i=0}^n \mu_i \Delta GDPPG_{t-i} + \sum_{i=0}^n \delta_{1i} \Delta ROH\_REF_{t-i} + \sum_{i=0}^n \delta_{2i} \Delta TO_{t-i} + \sum_{i=0}^n \delta_{3i} \Delta GFCF_{t-i} + \sum_{i=0}^n \delta_{4i} \Delta LFPR_{t-i} + \sum_{i=0}^n \delta_{5i} \Delta EDU\_EXP_{t-i} + \beta_1 \Delta GDPPG_{t-1} + \beta_2 \Delta ROH\_REF_{t-1} + \beta_3 \Delta TO_{t-1} + \beta_4 \Delta GFCF_{t-1} + \beta_5 \Delta LFPR_{t-1} + \beta_6 \Delta EDU\_EXP_{t-1} + \varepsilon_{i,t} \dots \dots \dots (3)$$

The model applies the ARDL approach to examine the relationship between variables in both the short and long run. The first difference operator is represented by Δ . The initial part of the equation, denoted μ_i , δ_{1i} , δ_{2i} , δ_{3i} , δ_{4i} , δ_{5i} , corresponds to the short-run coefficients, while the later part, marked as β_1 , β_2 , β_3 , β_4 , β_5 , β_6 , refers to the long-run coefficients. The null hypothesis ($H_0: \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 = 0$) suggests no cointegration, while the alternative hypothesis ($H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$) indicates the presence of cointegration among the variables. The significance of the lagged variable coefficients is assessed using the F-statistic, particularly when regressors are $I(d)$, where $0 \leq d \leq 1$, to evaluate the possibility of long-run relationships. Cointegration is tested using critical values for both lower ($I(0)$) and upper ($I(1)$) bounds. If the F-statistic exceeds the upper critical value, the null hypothesis is rejected, signaling a long-run relationship. If it falls below the lower critical value, the null hypothesis of no long-run association is accepted. However, values between these bounds lead to inconclusive results (Pesaran et al., 2001). The ARDL model is employed in the following equation to explore the long-term or level form relationship:

$$GDPPG_t = \pi_1 + \sum_{i=1}^n \beta_{1i} GDPPG_{t-i} + \sum_{i=0}^n \beta_{2i} ROH\_REF_{t-i} + \sum_{i=0}^n \beta_{3i} TO_{t-i} + \sum_{i=0}^n \beta_{4i} GFCF_{t-i} + \sum_{i=0}^n \beta_{5i} LFPR_{t-i} + \sum_{i=0}^n \beta_{6i} EDU\_EXP_{t-i} + \varepsilon_t \dots \dots \dots (4)$$

We use an error correction model to predict short-run parameters based on the long-term estimates. The final stage is to obtain the short-run

dynamic characteristics required for the development of an ECM. An ECM consists of two major components. First, the estimated short-run coefficients are shown, followed by the error correction term (ECT), which provides the rate of adjustment at which short-run dynamics converge to the long-run equilibrium path in our model. ECM is estimated as follows:

$$\Delta GDPPG_t = \phi_1 + \sum_{i=1}^n \mu_i \Delta GDPPG_{t-i} + \sum_{i=1}^n \delta_1 \Delta ROH\_REF_{t-i} + \sum_{i=1}^n \delta_2 \Delta TO_{t-i} + \sum_{i=1}^n \delta_3 \Delta GFCF_{t-i} + \sum_{i=1}^n \delta_4 \Delta LFPR_{t-i} + \sum_{i=1}^n \delta_5 \Delta EDU\_EXP_{t-i} + \eta ECT_{t-1} + \varepsilon_t \dots \dots \dots (5)$$

Where η is the coefficient of the speed of error correction term and is expected to have a negative sign.

4. Results discussion

Table 2: Descriptive Statistics

	GDPPG	ROH_REF	TO	GFCF	LFPR	EDU_EXP
Mean	4.111435	258.6703	32.53724	25.53115	44.82306	1.942571
Std. dev.	1.449505	329.0025	7.994413	4.540232	4.048392	0.190365
Min	1.500471	19.743	18.88983	16.89595	38.041	1.42566
Max	6.687663	952.365	48.11092	32.21373	49.537	2.221
Skewness	-.0648465	1.32867	.4270476	-.3267281	-.2689902	-.7237337
Kurtosis	1.756792	3.15699	2.248878	2.173762	1.441833	3.002774
Observations	32	32	32	32	32	32
CORRELATION						
GDPPG	1					
ROH_REF	0.4959	1				
TO	0.616	-0.0141	1			
GFCF	0.7601	0.6932	0.5433	1		
LFPR	-0.7319	-0.7088	-0.5574	-0.9081	1	
EDU_EXP	0.2348	-0.3838	0.5444	0.2522	-0.0942	1

5. Preliminary Results

Table 2 shows descriptive statistics for the variables in the study. GDP per capita has a mean of 4.11, with moderate variability and a minor bias

to the left. The number of refugees varies greatly, from 19.74 to 952.365, indicating a vast variance of refugee concentrations throughout time periods. The trade-to-GDP ratio has a mean of 32.54, indicating a moderately open economy. The data is left-skewed with generally normal kurtosis. Gross fixed capital formation (capital) and labor force participation have modest variability, with a minor left skewness. Government spending on education is quite stable, with a mean of 1.94 and a normal distribution.

In addition, a correlation analysis was performed to assess the degree and severity of multi-collinearity among the explanatory variables in the empirical model. According to Babu et al. (2020), a correlation coefficient of more than ± 0.80 between two explanatory variables indicates substantial collinearity. Table 2 shows the Spearman rank-order correlation test results. Table 2 shows no evidence of significant multicollinearity or linear dependency between the estimate model's explanatory variables. The greatest correlation between any paired regressors was discovered to be 79%, which is lower than the normally acceptable criterion of 80%.

Table 2 also shows the findings of the correlation analysis. It shows a moderate positive correlation (0.4959) between GDPPG and ROH_REF, implying a plausible relationship, however other factors may influence this. A stronger positive correlation (0.616) between GDPPG and TO implies that increased trade corresponds to higher GDP per capita, and an even stronger connection (0.7601) with GFCF suggests that fixed asset investment greatly enhances economic growth. On the other hand, the negative correlation (-0.7319) between GDPPG and LFPR could indicate structural concerns, such as unemployment or low labor productivity. The slight positive correlation (0.2348) between GDPPG and EDU_EXP suggests a minor association between educational spending and economic growth.

The series' integration order must be determined before to doing the analysis. This is accomplished by using unit root tests, notably the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, to determine stationarity. The initial analysis showed that the variables had non-zero means and non-constant variances. To solve these concerns, the differencing approach was used to convert the data series to a stationary state with constant variance and mean for all variables. We used ADF and

PP tests to confirm the transformation's effectiveness. These tests revealed that after the first differences, all variables were stationary (meaning they no longer exhibit a trend or random walk). Thus, the results confirm that all regressors are stationary, either I(0) or I(1), and none of the variables are I(2). This confirms that the transformation successfully eliminated the non-stationarity issues in the original data. This signifies that the variables' statistical variances and means remain consistent over time. The results are shown in Table 3, and they show that all variables are non-stationary at the level except for government health expenditure, which is stationary at the level form. As a result, unit root testing provides compelling evidence to support the use of ARDL as an estimation technique.

Table 3: Unit root tests

Variable	Augmented Dickey-Fuller test		Phillips-Perron test	
	Level	First Difference	Level	First Difference
GDPPG	-2.924 (0.0426)	-8.360 (0.000)	-2.863 (0.0498)	-9.894 (0.000)
ROH_REF	-0.137 (0.9456)	5.507 (0.000)	0.041 (0.9618)	5.522 (0.000)
TO	-1.943 (0.3119)	-4.519 (0.000)	-1.969 (0.305)	-4.444 (0.000)
GFCF	-1.687 (0.4379)	-3.773 (0.003)	-1.739 (0.4109)	-3.612 (0.005)
LFPR	0.006 (0.9591)	-4.082 (0.001)	-0.175 (0.9414)	-4.100 (0.001)
EDU_EXP	-3.4 (0.0110)	-6.912 (0.000)	-3.403 (0.0109)	-7.040 (0.000)

Source: Author calculations. *p*-values are in parenthesis. All the statistics include only constant.

Table 4: Johansen tests for cointegration

Maximum Rank (r)	Param ¹	LL ²	Eigen Values	Trace statistic	Critical Values	
					5%	1%
0	42	-282.00379		117.1423	94.15	103.18
1	53	-264.53333	0.68798	82.2014	68.52	76.07
2	62	-247.96986	0.66853	49.0745	47.21	54.46
3	69	-235.20162	0.57310	23.5380*	29.68	35.65
4	74	-226.37093	0.44496	5.8766	15.41	20.04
5	77	-223.44391	0.17728	0.0226	3.76	6.65
6	78	-223.43263	0.00075			

¹Parameter, ²Log likelihood. * Indicates cointegration rank.

Source: Author calculations,

Johansen cointegration tests were conducted to further examine the long-run relationship between exogenous and endogenous variables. The table 4 presents trace statistics and critical values for different ranks of cointegration. A higher rank suggests more relationships.

Table 5: Estimated ARDL Model Dependent Variable: GDP Growth, ARDL (3,3,3,0,3,3)

	(1) GDPPG	(2) Standard Error
GDPPG(-1)	-0.372	(0.114)
GDPPG(-2)	-0.0728	(0.102)
GDPPG(-3)	0.830*	(0.195)
ROH_REF	-0.00192	(0.00254)
ROH_REF (-1)	-0.00304	(0.00226)
ROH_REF (-2)	-0.00642	(0.00231)
ROH_REF (-3)	-0.00348	(0.00139)
TO	0.111*	(0.0279)
TO(-1)	-0.0333	(0.0494)
TO(-2)	-0.0909*	(0.0429)
TO(-3)	-0.137*	0.0402
GFCF	0.734	(0.244)
LFPR	-0.0195	(0.674)
LFPR(-1)	-0.559	(0.716)
LFPR(-2)	1.095	(0.608)
LFPR(-3)	-1.077*	(0.470)
EDU_EXP	-1.126	(0.887)
EDU_EXP(-1)	-2.424*	(1.091)
EDU_EXP(-2)	-2.098	(1.140)
EDU_EXP(-3)	-5.067*	(1.502)
Constant	37.96	(15.88)
N	29	
R ²	0.987	
Breusch–Godfrey LM test for autocorrelation	0.076 (0.7821)	
LM test for autoregressive conditional heteroskedasticity (ARCH ¹)	0.132 (0.7159)	
Cook–Weisberg test for heteroscedasticity	0.87 (0.3521)	
Ramsey RESET test for omitted variables	0.23(0.8712)	
Jarque-bera test for normality	2.083 (0.3529)	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, ¹Autoregressive Conditional Heteroscedasticity

By comparing test statistics to critical values, we discover strong evidence for at least three cointegration relationships between the variables in this research. This suggests that these variables are likely to move together in the long run, and that any short-term deviations in their interactions will

eventually return to equilibrium. For a 5% significance level, the trace statistic's first non-rejection occurs at $r \leq 3$, and the eigenvalue statistic follows suit. As a result, you do not reject the null hypothesis that the data is cointegrated, with a cointegration rank of 3. This validates the long-run cointegration of the examined series.

Table 6: ARDL bound Test

ARDL Model GFCF, LFPR, EDU_EXP)		Model: GDPPG = F(ROH_REF, TO,
Model	F-Statistics	K
GDPPG (1991-2022)	26.64	5
Critical Values	Lower Bound I (0)	Upper bound I (1)
10% significance Level	2.26	3.35
5% significance Level	2.62	3.79
1% significance Level	3.41	4.68

Source: Author calculations. *, ** and *** indicate significance at 1%, 5% and 10% levels, respectively. k represents no. of independent factors.

To investigate the effects of migrants on economic growth, we identify three optimal ARDL lag lengths based on Akaike's information criterion (AIC). Kripfganz and Schneider (2022) argue that AIC may have better properties for selecting the correct order in small samples. The study's observations are made on a yearly basis, with a sample size of 29 people and five parameters. Because of the small number of observations and the need to retain degrees of freedom, an optimal lag length of 3 was determined and applied to the dependent variable and regressors using the Akaike Information Criterion (AIC). The results are shown in Table 5.

Finally, we investigated the long-term stability of the parameters as well as the equations' short-run motions. Diagnostic tests, including the Breusch-Godfrey serial correlation test, the Jarque-Bera normalcy test, the Ramsey RESET functional form test for model specification, and the Breusch-Pagan-Godfrey test for heteroscedasticity, all validated the estimated equation's validity. For the test, we used Borensztein et al.'s (1998) cumulative sum (CUSUM) and cumulative sum of squares

(CUSUMSQ) tests. M. H. Pesaran and Pesaran (1997), Suleiman (2005), and Tiwari and Shahbaz (2013) all used the same approach to verify the long-run coefficients' stability. Figures 2 and 3 show the CUSUM and CUSUM of squares statistics, and the plots of CUSUM and CUSUMSQ remain within the critical 5% bounds, confirming the long-run relationships among variables and demonstrating the coefficients' stability over the sample period. Thus, the diagnostic tests indicate that the equation possesses the desired econometric features.

Table 9 displays the findings of the Engle-Granger Causality Test, which identifies directional links among key economic parameters. It demonstrates that the flood of Rohingya refugees (ROH_REF) has a one-way effect on key economic indices in Bangladesh. Specifically, refugees affect GDP growth (GDPPG), trade openness (TO), gross fixed capital formation (GFCF), labor force participation rate (LFPR), and, to a lesser extent, education spending (EDU_EXP). Furthermore, there is bidirectional correlation between GDP growth, trade openness, labor force participation, and capital formation, demonstrating that these factors influence one another.

The ARDL bounds testing approach utilizes the F-test to examine whether there is a long-run relationship between the variables in question and to evaluate the collective significance of the lagged level variables in the model. Table 6 presents the results of the bounds test for cointegration among the variables in the equation. The calculated F-statistic of 26.64 exceeds the critical values provided by Pesaran et al. (2001), and is statistically significant at the 1% level. This leads to the rejection of the null hypothesis of no cointegration, confirming the existence of a long-term relationship between the dependent and independent variables. This finding suggests a stable and significant association between economic growth and refugee intake in the sample area. Having confirmed cointegration, we proceed to estimate the long-run relationship (equation 4) and the short-run dynamics (equation 5).

6. Baseline Results

Long run effects of Rohingya Refugee Crisis on Economic Effects in Bangladesh

To quantify the long-run effects of Rohingya refugees on Bangladesh's economic growth, the study used the conditional ARDL long-run model for Eq. 4. The long-run estimated outcomes are shown in Table 7. The results of the long-run model demonstrate that Rohingya refugees have a negative and extremely substantial impact on Bangladesh's economic growth. The estimated coefficient for refugees is -0.02416, which is significant at a 5% confidence level, implying that every 1% rise in the number of refugees results in a 0.02416% loss in economic growth. This may appear insignificant, yet it can have far-reaching repercussions over time. The significance of this coefficient at the 5% confidence level suggests that there is strong evidence to support this negative effect, meaning the result is unlikely to be due to chance.

Table 7: Estimates of Long Run Results

Dependent Variable: GDPPG, ARDL (3,3,3,0,3,3) Selected Based on Akaike Information Criteria						
Regressors	Coefficients	Std error	t-statistic	p- value	Confidence interval	
ROH_R	-0.02416**	0.009901	-2.44	0.041	-0.04699	-0.00133
EF						
TO	-0.24388	0.149239	-1.63	0.141	-0.58803	0.100266
GFCF	1.193291	0.671957	1.78	0.114	-0.35624	2.742826
LFPR	-0.91005*	0.480142	-1.9	0.095	-2.01726	0.197162
EDU_E	-17.4259*	8.760735	-1.99	0.082	-37.6282	2.776347
XP						

Source: Author calculations *, **and *** indicate significance at 1%, 5% and 10% levels, respectively.

This means that refugees sponsored in Bangladesh have a major negative impact on real economic activity. As a result, the highly significant coefficient of refugee inflow indicates that the flood of refugees to Bangladesh has major economic effects for growth. According to research, refugee influxes can have a major negative economic impact on host countries. Afghan refugees in Pakistan have been shown to have a

significant negative impact on economic growth in both the short and long term (Baloch et al., 2017; Mahmood, 2022). Similarly, the Rohingya flood into Bangladesh has resulted in higher living costs, regional employment issues, lower daily salaries, and losses in the tourism industry (Ahmad and Naeem, 2020; Yilmaz & Talukder, 2019). The economic costs of hosting refugees are especially harsh in underdeveloped nations such as Bangladesh, which must boost government spending on health and security (Ahmad and Naeem, 2020). However, the link between foreign capital inflows and economic growth is complex. In the long run, economic integration for refugees remains difficult, as many Rohingya face major impediments to entrepreneurship and employment, leading to reliance on charity (Moses & Kengatharan, 2018).

According to the model, the refugees welcomed by Bangladesh cause a significant decline in the country's real economic activity. As a result, the influx of migrants puts a strain on resources, infrastructure, and social services, reducing economic productivity and growth. Similar to the findings on Rohingya migrants in Bangladesh, these negative consequences are linked to economic stress, such as increased competition for jobs, higher unemployment, and pressure on public services and infrastructure, resulting in inflation and poverty (Mahmood, 2022). Socially, the migration exacerbates inequality and weakens social safety nets by diverting resources to refugee assistance (Baloch et al., 2022; Mahmood, 2022). Furthermore, the presence of migrants generates broader externalities that affect regional stability and economic prospects beyond the host country (Stakanov, 2016).

In terms of the effect of other control variables, except for gross fixed capital, trade openness, labor force participation rate, and government educational expenditure all appear to have a negative effect on economic growth. However, the coefficients of gross fixed capital and trade openness are minor, with the latter staying negative.

While labor force participation generally has a beneficial short-term effect on economic growth in Bangladesh, it exhibits deleterious implications in the long run (Haque et al., 2019). These findings indicate that refugees' negative influence on the labor market may increase the long-term negative consequences of labor force participation on economic growth.

The negative impact of Rohingya refugees on Bangladesh's economic growth may cause a drop in labor force participation, exacerbating economic difficulties (Irawan & Khoirudin, 2024). Increased competition for jobs owing to the refugee inflow may cut salaries and reduce possibilities for local workers, particularly in low-skilled industries, causing some to leave the labor market and potentially displacing local workers (Filipski et al., 2019; Ahmad & Naeem, 2020). Furthermore, the burden on public services, healthcare, education, and infrastructure created by the influx depletes resources for the native workers, decreasing their standard of living and discouraging participation, particularly among vulnerable populations. Social conflicts and rising inequality can also discourage certain people from entering the labor force (Idrish & Ahmed, 2024). As labor force participation falls, economic productivity declines, creating a feedback loop that exacerbates the overall negative impact on growth.

Government expenditure on education has a negative and considerable impact on economic growth. According to the statement, Rohingya refugee influx and rising government educational expenditures have a negative impact on Bangladesh's economic growth. While these two things may appear unrelated, they are linked by a complex web of economic and social forces.

According to previous literature, the inflow of Rohingya refugees has had a negative impact on Bangladesh's economy, raising living costs and putting a pressure on government resources. While public spending on education generally boosts economic growth (Muktdair-Al-Mukit, 2012; Saha et al., 2022), the refugee crisis may divert funding away from education to fulfill immediate needs. Government educational spending is constrained as finances are diverted to support the immediate needs of approximately one million refugees, such as shelter and healthcare (Sakamoto et al., 2024; Ishwary & Rosdiana, 2024). This diversion diminishes the effectiveness of educational efforts, resulting in congested schools and lower quality education for both native and refugee children (Hossain, 2024). This could reduce the effectiveness of educational spending, potentially leading to negative long-term impacts on economic growth.

Table 8: Estimates of Short Run Results

Dependent Variable: GDPPG, ARDL (3,3,3,0,3,3) Selected Based on Akaike Information Criteria						
Regressors	Coefficients	Std error	t-statistic	p- value	Confidence interval	
DGDPPG(-1)	-0.75701***	0.199684	-3.79	0.005	-1.21748	-0.29653
DGDPPG(-2)	-0.8298***	0.194657	-4.26	0.003	-1.27868	-0.38092
DROH_REF	0.012933***	0.002427	5.33	0.001	0.007337	0.018529
DROH_REF (-1)	0.009898***	0.001576	6.28	0.000	0.006263	0.013533
DROH_REF(-2)	0.003483**	0.001392	2.5	0.037	0.000273	0.006693
GFCF	0.0973	0.2377	-0.41	0.694	0.1709	1.29
DTO	0.261253**	0.085837	3.04	0.016	0.063312	0.459194
DTO(-1)	0.227914***	0.06004	3.8	0.005	0.08946	0.366367
DTO(-2)	0.137049***	0.040187	3.41	0.009	0.044378	0.229721
DLFPR.	0.540089	0.482331	1.12	0.295	-0.57217	1.652346
DLFPR (-1).	-0.01853	0.382471	-0.05	0.963	-0.90051	0.863451
DLFPR (-2).	1.076742*	0.469971	2.29	0.051	-0.00701	2.160496
DEDU_EXP	9.588118***	2.502878	3.83	0.005	3.816471	15.35977
DEDU_EXP(-1)	7.16452***	1.941968	3.69	0.006	2.686334	11.64271
DEDU_EXP(-2)	5.066546**	1.502141	3.37	0.01	1.602604	8.530489
Constant	37.95612*	15.88307	2.39	0.044	1.3297	74.58254
ECM(-1)	-0.61486	0.217133	-2.83	0.022	-1.11557	-0.1141454

Source: Author calculations. *, ** and *** indicate significance at 1%, 5% and 10% levels, respectively.

Islam and Shindaini (2022) and Saha (2023) discovered that government expenditure on education has a detrimental long-term influence on Bangladesh's economic growth, although having a good short-term impact. Ahmed (2020) found a negative link between government consumption expenditure and GDP growth. Refugee children face barriers to education due to trauma and cultural norms (Hossain, 2024; Islam et al., 2024). Long-term effects include reduced creativity and productivity (Sakamoto et al., 2024). These findings indicate that the

refugee crisis may worsen current issues in successfully allocating government resources for education and economic growth, potentially impeding Bangladesh's long-term economic progress.

Short run effects (ECM) of Rohingya Refugee Crisis on Economic growth in Bangladesh

Table 6 shows the model's short-run dynamics estimated outcomes. Table 6 shows that the model's error-correction term is very significant and suitably signed during the study period. The error-correction term has a coefficient of -0.61, indicating that 61% of the deviations from the long-run growth rate in output induced by prior years' shocks return to long-run equilibrium in the current year. It was also negative, significant, and smaller than one, indicating that the projected coefficients from this study can be utilized to guide policy decisions.

The coefficients for the first, first, and second differences among Rohingya refugees (ROH_REF) are positive and statistically significant, showing a complicated economic impact. While the long-run impact of Rohingya refugees on Bangladesh's economic growth is negative (as shown in Table 7), there is a favorable correlation with short-run growth (as shown in Table 8). This supports a dual economic narrative: in the near term, the surge of migrants boosted local economies by increasing consumer demand and labor supply, particularly in Cox's Bazar. Local businesses have adapted to meet the needs of refugees, resulting in increased demand in local markets, the establishment of new economic activities in which both Rohingya and Bangladeshis trade (Filipski et al., 2020), and temporary job opportunities for locals in refugee-related services (Filipski et al., 2019). These short-term gains provide an economic boost, even though long-term challenges remain. It is important to highlight that we are mainly interested in the long-run consequences of refugee inflows on real economic growth in Bangladesh, as economic growth is a long-term phenomenon. Furthermore, the aforementioned empirical technique is widely stressed for demonstrating long-term benefits.

MODEL STABILITY TEST GRAPHS OF CUSUM AND SQUARE OF CUSUM

CUSUM

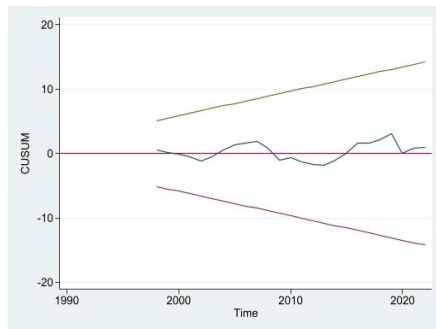


Figure 2

CUSUM square

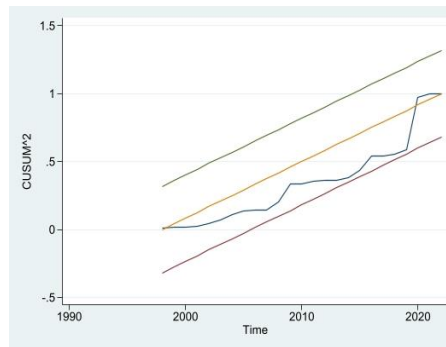


Figure 3

In terms of control variables, the coefficients of trade openness, labor force participation rate, and education spending are all positive and significant, while gross fixed capital formation has a positive but statistically insignificant coefficient.

The approximated findings in this study represent one of the earliest efforts to explore the economic effects of refugee influxes on neighboring developing countries. Currently, there is insufficient data to draw reliable conclusions about the winners and losers in refugee crises. Although some preliminary research based on surveys exists, it fails to capture the potentially harmful impacts refugees may have on host nations. These surveys tend to focus on broad assumptions and are often limited to humanitarian and related issues. In contrast, this study shifts the focus to the economic dimension by analyzing available macroeconomic data, acknowledging that the refugee situation is highly complex, with far-reaching consequences for a host country's social, economic, political, legal, humanitarian, and institutional systems. This research aims to unravel one key aspect of that complexity by concentrating exclusively on the economic impact of refugees in the context of a developing host country.

Table 9: Engle- Granger Causality Test results

Variables		Chi Sq	p-value	
ROH_REF GDPPG	causes	17.37	0.00	
ROH_REF	causes TO	47.019	0.00	} Uni-directional
ROH_REF GFCF	causes	7.07	0.03	
ROH_REF LFPR	Causes	21.87	0.00	
ROH_REF EDU_EXP	Causes	7.53	0.066	
GDPPG	causes TO	5.42	0.03	
GDPPG	causes LFPR	5.51	0.01	} Bi-directional
LFPR	causes GDPPG	11.24	0.00	
GFCF	causes GDPPG	5.40	0.067	
GFCF EDU_EXP	causes	7.26	0.027	} Uni-directional
LFPR	causes TO	55.54	0.000	
LFPR	causes ED_EXP	5.92	0.052	
GFCF	causes LFPR	24.621	0.00	} Bi-directional
LFPR	causes GFCF	22.68	0.00	

Our findings indicate that Pakistan has faced significant negative effects from the surge of refugees, as previously noted. While the number of refugees fleeing the ongoing civil conflict continues to rise, the economic impact of these migrants on host countries remains a topic of debate and is not fully understood. One key challenge has been the lack of reliable data. To assess the economic effects of refugee inflows on neighboring host countries, we employed the ARDL bounds testing approach, utilizing macroeconomic data from both refugees and host countries. Our results are consistent with the studies of Rother et al. (2016) and Taylor et al. (2016), providing substantial evidence that refugee arrivals have notable economic consequences for host economies, both in the short and long term.

These findings suggest that the current refugee crises, at both national and international levels, will have significant implications for host countries. Finally, the study suggests that host countries could potentially leverage refugees as assets if they implement strategies to incorporate them into domestic economic activities.

7. Conclusion and Policy Suggestions

The analysis indicates that the inflow of Rohingya refugees into Bangladesh provides both short-term benefits and long-term challenges to the economy. In the near term, the presence of refugees has boosted local economies, most likely by increasing consumer demand, generating temporary work possibilities, and encouraging trade between refugees and local residents. However, the long-term impact of the refugee influx is predominantly unfavorable. Refugees' long-term presence puts a burden on government resources, infrastructure, and public services, resulting in greater job competition, pressure on social services, and rising inequality. These factors contribute to a slowing of overall economic growth, with major long-term consequences for Bangladesh's development trajectory.

Key variables, including as labor force participation and educational spending, were discovered to slow growth in the long run as a result of increased demand from refugees. This shows that, while the refugee influx provides immediate economic benefits, the long-term structural repercussions are negative to sustainable growth.

The phrase "error-correction" shows that the economy responds quite quickly—at a rate of 61%—to shocks and imbalances generated by the refugee crisis. This demonstrates that, despite short-term fluctuations, Bangladesh's economy is relatively resilient. However, without serious adjustments, the long-term negative consequences will overwhelm any momentary benefits.

To solve the issues raised by the Rohingya refugee flow, many critical solutions are required. First, effective repatriation protocols must be started, ensuring the safe and voluntary return of refugees to their home countries. This calls for diplomatic efforts and international cooperation, as well as pressure on Myanmar to provide conditions conducive to return.

Third-country resettlement options should also be considered to reduce Bangladesh's demographic and economic load.

Economic support for refugee-hosting countries is critical. To boost the local economy, the government should invest in infrastructure, support local businesses, and promote refugee-led entrepreneurial activities. This can help to mitigate the negative economic impact by increasing employment possibilities and productivity. Targeted investments in public services, such as healthcare, education, and transportation, are critical to alleviating resource constraints and ensuring that both refugees and local residents have access to high-quality services.

Another alternative is to reform the labor market. Bangladesh can lessen rivalry in the employment market by focusing on skill development and vocational training for both refugees and native workers. These improvements may also result in long-term economic growth, as trained workers are more likely to contribute positively to the economy.

The study's conclusions provide several policy recommendations. First, Bangladesh should seek international aid and technical assistance to deal with the refugee situation. Such assistance can help the country shoulder the financial burden of providing for the refugees while putting less strain on its own resources. In addition, the government must prioritize infrastructure development in refugee-hosting communities, as well as improving living circumstances and lowering conflicts between locals and migrants.

Local integration initiatives should also be implemented, which would enable refugees to contribute to the economy through official employment. Bangladesh might collaborate with international groups to develop livelihood programs for both refugees and host communities. These programs should include microfinance initiatives and entrepreneurship opportunities.

Furthermore, public service improvements—particularly in healthcare and education—are critical. Investments in these industries would not only benefit refugees but also ensure that local communities receive necessary services. This will reduce social tensions caused by perceived inequities in resource allocation.

Bangladesh should also participate in regional and international diplomacy to address the underlying causes of the refugee crisis. The international community must continue to apply pressure on Myanmar to end the war and create conditions for the safe return of the Rohingya people.

To summarize, the migration of Rohingya immigrants into Bangladesh creates a dual economic dynamic: short-term gains and long-term problems. While humanitarian aid and increased consumer demand have temporarily improved the local economy, the long-term presence of refugees has put significant strain on the country's infrastructure, social services, and labor markets. The empirical findings indicate that, while the refugee crisis boosts economic growth in the short term, it ultimately impedes long-term development.

To address these issues, Bangladesh must employ a combination of diplomatic, economic, and social strategies. International cooperation is critical for obtaining financial and technical assistance to manage the refugee situation, while repatriation operations and third-country resettlement possibilities must be addressed. Furthermore, targeted investments in infrastructure, public services, and labor market reforms are critical for promoting long-term economic stability and minimizing resource constraints.

This study emphasizes the importance of region-specific strategies that meet the various issues that refugee-hosting communities face. Bangladesh can better handle the economic impact of the Rohingya refugee issue by implementing adaptive solutions and creating economic resilience, all while promoting long-term growth and social harmony.

Finally, the study has numerous limitations, particularly because it is based on historical data from 1991 to 2022, which may not fully reflect the changing dynamics of the Rohingya refugee issue. While discriminating between short- and long-term economic repercussions, it ignores intermediate-term effects and more localized, sector-specific outcomes, especially in areas like Cox's Bazar. The study also undervalues social variables like growing tensions and labor market upheavals, which have the potential to dramatically impact economic conditions. Furthermore, the report does not look at the long-term viability of international aid or the hazards of dependency, and its policy

suggestions are general, with little specificity for region-specific implementation. Finally, the ARDL model utilized may fail to represent the complex, nonlinear connections between migrants and the economy, limiting the depth of the investigation. Addressing these shortcomings in future research might improve our understanding of the refugee crisis's economic impact in Bangladesh.

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Testing The Validity of Okun's Law in Islamic Cooperation Organization Countries: Panel Data Analysis

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ABSTRACT

Okun's law was first studied in the United States sample and appeared in the literature with the study published by Okun in 1962 as an economic law stating that the relationship between unemployment and production loss variables is negative. Okun's law, supported by subsequent studies, is an important research topic in macroeconomic literature in terms of examining the relationship between unemployment and economic growth variables. Testing the validity of Okun's law is taken into consideration in evaluating the role of employment in the growth of national economies. This study analyses the validity of the Okun law on the Organization of Islamic Cooperation countries between 1991 and 2023. As a result of the study examining the relationship between economic growth and unemployment variables with panel data analysis, a general assessment was made that Okun's law is valid. This study contributes to the literature as a result of the study choosing the countries of the Organization of Islamic Cooperation as a sample and not finding any study in this framework.

ملخص

تم دراسة قانون أوكون لأول مرة في عينة من الولايات المتحدة، وظهر في الأدبيات من خلال الدراسة التي نشرها أوكون عام 1962، حيث تم عرضه كقانون اقتصادي يؤكد على أن العلاقة بين متغيري البطالة وخسائر الإنتاج هي علاقة سلبية. ويعد قانون أوكون، الذي دعمته دراسات لاحقة، من المواضيع البحثية الهامة في أدبيات الاقتصاد الكلي فيما يتعلق بدراسة العلاقة بين متغيري البطالة والنمو الاقتصادي. ويؤخذ اختبار صحة قانون أوكون بعين الاعتبار عند تقييم دور التوظيف في نمو الاقتصادات الوطنية. وتتناول هذه الدراسة تحليل مدى صحة قانون أوكون في بلدان منظمة

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التعاون الإسلامي خلال الفترة الممتدة بين عامي 1991 و2023. ونتيجة لدراسة العلاقة بين متغيري النمو الاقتصادي والبطالة باستخدام تحليل بيانات اللوحة، تم التوصل إلى تقييم عام يفيد ب صحة قانون أوكون. وتسهم هذه الدراسة في إثراء الأدبيات من خلال اختيار بلدان منظمة التعاون الإسلامي كعينة للدراسة، مع عدم وجود دراسات سابقة تناولت هذا الإطار تحديداً.

RÉSUMÉ

La loi d'Okun a été étudiée pour la première fois dans l'échantillon des États-Unis et est apparue dans la littérature avec l'étude publiée par Okun en 1962 en tant que loi économique stipulant que la relation entre le chômage et les variables de perte de production est négative. La loi d'Okun, soutenue par des études ultérieures, est un sujet de recherche important dans la littérature macroéconomique en termes d'examen de la relation entre le chômage et les variables de la croissance économique. Le test de la validité de la loi d'Okun est pris en compte dans l'évaluation du rôle de l'emploi dans la croissance des économies nationales. Cette étude analyse la validité de la loi d'Okun sur les pays de l'Organisation de la coopération islamique entre 1991 et 2023. L'examen de la relation entre la croissance économique et les variables du chômage à l'aide d'une analyse de données de panel a permis de conclure à la validité de la loi d'Okun. Cette étude contribue à la littérature en choisissant les pays de l'Organisation de la coopération islamique comme échantillon et en ne trouvant aucune étude dans ce cadre.

Keywords: Okun's Law, Panel Data Analysis, Organization of Islamic Cooperation, Economic Growth, Unemployment

JEL Classification: O47

1. Introduction

While reducing unemployment rates forms the basis of macroeconomic studies, economic growth and inflation, which are among the factors affecting unemployment, are among the most studied keywords. Although there are multiple factors that affect economic growth and are affected as a result of economic growth, such as financial markets, political arrangements, and social development (Araç & Özcan, 2014; Gallas et al., 2024; Ameziane, 2024), the most frequently studied concepts in the literature are unemployment and inflation. The relationship between inflation and unemployment has been widely discussed in the literature after Phillips (1958) study, and many studies have produced different results on the direction of the relationship between the variables. The negative relationship between economic growth and unemployment

entered the literature with Okun (1962) macroeconomic study. As a result of the examination conducted by Arthur Okun in the United States sample, the negative relationship between variables was explained and evaluations on the concept of Okun's law as an important economic theory started. Although Okun explained that the relationship between the variables was negative by conducting an analysis between 1947 and 1960, the outputs that the relationship between the variables was positive increased with the 2000s. The increase in unemployment rates despite the growth of the economy is explained by the concept of unemployment growth, and capacity utilization can be shown as the reason for this situation. (Ayvaz & Öztürk, 2018; Uras, 2016). Although the increase in the capacity utilization rate is expressed as the amount of production produced in the country exceeding the current production, if the reason for this increase is not integrated with the increase in employment rates and is evaluated within the framework of productivity, employment rates do not increase while growth occurs in the economy. This can be a significant cause of jobless growth. As a matter of fact, the increase in capacity utilization rates in the early 2000s leads to growth without employment (Ataman, 2006; Uras, 2016) and Okun's law loses its validity. The positive relationship found in the studies targeting the early 2000s can be explained by this situation.

In this direction, the main starting point of macro-based studies is to reduce unemployment rates by reducing unemployment rates with Okun's law, to encourage employment and to identify the factors that reduce unemployment. Achieving economic growth, just like reducing unemployment, is seen as the main objective of countries and the focus of academic studies in the discipline of economics. The direction of the relationship between economic growth and unemployment has been examined in different studies (Altunöz, 2015, 2019; Barışık et al., 2010; Bilge & Erden, 2021; Binet & Francois, 2013; Canbay, 2020; Christopoulos, 2004; Daştan, 2024; Dixon et al., 2017; Pierdzioch et al., 2011; Rahman & Mustafa, 2017; Soylu et al., 2018; Tari & Abasiz, 2010; Tekgün & Eroğlu, 2023; Üzar & Akyazi, 2018; Villaverde & Maza, 2009; Yayar & Öztaş, 2020; Yüksel & Oktar, 2017) as well as the study in which the Okun's law was adopted (Altunöz, 2019; Bilge & Erden, 2021; Binet & Francois, 2013; Canbay, 2020; Daştan, 2024; Dixon et al., 2017; Pierdzioch et al., 2011; Soylu et al., 2018; Tekgün & Eroğlu, 2023; Üzar & Akyazi, 2018; Villaverde & Maza, 2009; Yayar & Öztaş, 2020; Yüksel & Oktar, 2017) is much higher than the number of studies in which it is not accepted (Altunöz, 2019; Barışık et al., 2010; Tari & Abasiz, 2010).

and it is seen that the common belief is that the Okun's law is valid. In addition to these studies, studies by Binet & Francois (2013), Christopoulos (2004) and Rahman & Mustafa, (2017) among others, show that Okun's law is valid for some of the countries they examined, while it is not valid for others. Detailed information is provided in the literature review section.

This study is designed to examine the validity of Okun's law for the Organization of Islamic Cooperation Countries over the period 1991-2023. While the aim of the Organization is to enhance cooperation among its members, the economic development and stability of countries with economic differences are also among its founding objectives. Although one of the objectives of the organization is to provide a common movement among Islamic countries and to support economic growth, the fact that the countries within the union have different socio-economic structures strengthens the contribution of the output obtained as a result of the review.

Based on this idea, the selected Organization of Islamic Cooperation Countries were subjected to panel data analysis to examine the relationship between economic growth and unemployment.

When the studies in the literature where the validity of Okun's law is tested are analyzed, it is observed that Western countries are commonly evaluated. The fact that this study examines the member countries of the Organization of Islamic Cooperation is different in this respect and the fact that OIC countries have not been examined in the literature before increases the originality of the study and strengthens its contribution. The heterogeneous structure of OIC countries is important in determining the policy necessity and the impact of country differences.

The results of the homogeneity and horizontal cross-section dependence tests applied in the study necessitated the use of 2nd generation unit root tests and the CADF unit root test was used to test for stationarity. After determining whether the series contain unit roots or not, Westerlund (2006) co-integration test is used to provide information about the break periods. Finally, the long-run relationship is identified using the "refuge" estimator. The fourth section of the study provides detailed test results.

2. Literature Review

When the literature is analysed, it is seen that there are studies that present outputs that Okun's law is valid as well as studies that evaluate that it is not valid. When the outputs obtained are evaluated, it is seen that there is a widespread belief that economic growth and unemployment are two negatively related variables, and it can be evaluated that growth without employment is a less common situation. In this section, Table 1 is included in the second part of the study in order to express the studies that are considered to contribute to the literature, the years of publication, the country selected as the sample, the time interval, the methodology used and the output obtained. Fifty per cent of these studies were published in -SC indexed journals and approximately 27% of these studies were included in the literature with TR Index indexed journals. The fact that half of the studies selected from the academic literature within the scope of the subject are preferred from sources that are highly indexed and referenced by most researchers ensures that the scope is at international standards. In addition, the TR Indexed examination provides information about the direction, content and scope of evaluations in the national context.

Table 1: Literature Review

Article	Time Period	Country/Countries	Method	Conclusion
Christopoulos (2004)	1971-1993	Greece	Panel Data Analysis	In 6 regions Okun's law is valid. It is not valid in other regions.
Zagler (2008)	1970:Q1-2000:Q2 1968:Q1-1997:Q4 1970:Q1-2000:Q2 1968:Q1-2000:Q1	France Germany Italy United Kingdom	VECM	Okun's law applies.
Villaverde & Maza (2009)	1980-2004	Spain	Panel Data Analysis	Okun's law applies.
Barışık et al. (2010)	1988-2008	Türkiye	Time Series Analysis	Okun's law does not apply.
Tari & Abasiz (2010)	1968-2008	Türkiye	Error Correction Model	Okun's law does not apply.

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Countries: Panel Data Analysis

Article	Time Period	Country/Countries	Method	Conclusion
Kreishan (2011)	1970-2008	Jordan	Durbin-Watson Cointegration Test	Okun's law does not apply.
Pierdzioch et al. (2011)	1955-1996	G-7 Countries	Panel Data Analysis	Okun's law applies.
Binet & Francois (2013)	1990-2008	France	Panel Data Analysis	Okun's law is valid except for 8 regions.
Dilber et al. (2015)	2001-2011	Turkey EU Countries	Panel Data Analysis	Okun's law applies.
Altunöz (2015)	2000:Q1- 2014:Q1	Turkiye	Johansen Cointegration Analysis	Okun's law does not apply.
Dixon et al. (2017)	1985-2013	20 OECD Countries	Panel Data Analysis	Okun's law applies.
Yüksel & Oktar (2017)	1993-2015	10 Developed and 10 Developing Countries	Panel Data Analysis	Okun's law applies.
Tatoğlu Yerdelen (2017)	2008-2016	AB Countries	Panel Data Analysis	The Okun law applies in 13 countries.
Yildiz et al. (2017)	2005-2015	Turkiye	LM Test	Okun's law applies.
Rahman & Mustafa (2017)	1970-2013	13 Developed Countries	Panel Data Analysis	Okun's law is valid except for 1 country.
Soylu et al. (2018)	1992-2014	Eastern European Countries	Panel Data Analysis	Okun's law applies.
Üzar & Akyazi (2018)	2000-2016	34 OECD Countries	Panel Data Analysis	Okun's law applies.
Altunöz (2019)	2000-2012	Eurozone	Panel Data Analysis	Okun's law applies.
Canbay (2020)	1991-2018	BRICS Countries	Panel Data Analysis	Okun's law is valid except for 2 countries.
Bayrak (2019)	2005-2017	Turkiye	Maki Cointegration Test Toda Yamamoto Causality Test	Okun's law applies.
Yayar & Öztaş (2020)	1998-2017	D-8 Countries	Panel Data Analysis	Okun's law applies.
Bilge & Erden (2021)	1990:01- 2017:04	45 Countries	Panel Data Analysis	Okun's law applies.
Mohsin Hashmi et al. (2021)	1991-2018	BRICS Countries	Panel Data Analysis	Okun's law applies.

Article	Time Period	Country/Countries	Method	Conclusion
Tekgün & Eroğlu (2023)	1991-2019	Fragile Five Countries	Panel Data Analysis	Okun's law applies.
Campos et al. (2024)	1979-2019	Eurozone	Panel Data Analysis	Okun's law applies.
Mohamed (2024)	2000-2021	Somalia	FMOLS/DOLS	Okun's law does not apply.
Nasir et al. (2024)	1988-2021	Malaysia	OLS	Okun's law applies.
Andreescu (2024)	2010-2019	Central and Eastern European Countries	Panel Data Analysis	Okun's law applies.
Ibour & El Aynaoui (2024)	1991-2015	39 African Countries	Panel Data Analysis	Okun's law applies.
Daştan (2024)	1991-2021	BRICS Countries	Panel Data Analysis	Okun's law applies.

When the studies using panel data analysis are analyzed, it is seen that Christopoulos (2004) evaluated the relationship between unemployment and inflation in 13 regions of Greece. In the study, it is determined that Okun's law is valid for 6 regions and these regions are Epirus, Ionian Islands, Western Greece, Central Greece, Peloponnese and Crete. For other regions, it can be stated that the relationship between unemployment and inflation is positive.

Zagler (2008) also examined the relationship between economic growth and unemployment and analyzed the related evaluation for 4 different countries in different year intervals and in the short and long run separately. The study, which was conducted between 1970:Q1-2000:Q2 in France, 1968:Q1-1997:Q4 in Germany, 1970:Q1-2000:Q2 in Italy and 1968:Q1-2000:Q1 in the United Kingdom, concluded that Okun's law holds in the short run. In the long term, there is no assessment that the law is valid.

The study of Villaverde & Maza (2009) analyzed Spain and tested the relationship between unemployment and economic growth in 17 different regions of Spain. Although the results of the study suggest that Okun's law is valid for Spain, a relationship in the same rate and direction has not been detected for all regions. From 1980 to 2004, the study, which presents a wide range of outputs, has an important place in terms of showing that regional growth and development-oriented regulations are needed rather than determining a general economic policy for Spain.

Pierdzioch et al. (2011) test the validity of the law in G-7 countries for the period 1955-1996. It is found that the relationship between unemployment and economic growth is negative for all countries analysed in the study in the relevant year interval. In the same year (Kreishan, 2011) also examined the cointegration relationship and stated that Okun's law was not valid for Jordan between 1970-2008.

Binet & Francois (2013) also used panel data analysis in their study and evaluated unemployment and economic growth variables in 22 different regions of France. It is widely accepted that Okun's law is valid and there is no negative relationship between unemployment and inflation for 8 regions. The study is important in terms of identifying the factor that has an impact on the validity of the law by taking regional differences into account, and the intensity of public employment is considered as a factor that prevents the relationship between unemployment and inflation from being negative. It is among the evaluations that the high value added creation rate of the labour force employed in the public sector may have increased economic growth. In addition, the fact that the study provides information on the differentiating factors of 8 regions increases the effectiveness of the study in the literature.

In his study, also included the relationship between unemployment and economic growth variables for the European Union member countries and Turkey between 2001-2011. Westerlund panel cointegration analysis is applied to evaluate short-run and long-run effects separately. In the long run, an increase in unemployment is found to increase economic growth significantly and in the short run, there is a negative relationship between unemployment and economic growth. Although the validity of Okun's law has been established, the relevant assessment is considered to be valid only in the short term.

Yüksel & Oktar (2017), on the other hand, applied panel causality analysis to test the validity of Okun's law, which argues that the relationship between unemployment and economic growth is inverse. Economic growth and unemployment rates of 20 countries are taken into account in the study and countries are selected according to their development levels. In addition to the aim of the study to determine the effect of the level of development on the Okun's law, the fact that the study provides an output on which variable is the cause of another variable allows an assessment to be made on whether unemployment or inflation will be the starting point in the policy regulations to be implemented in

the field. The fact that Okun's law is valid in all countries shows that economic development has no effect on the validity of the law.

Tatoğlu Yerdelen (2017) also utilized panel data analysis in his study and conducted an analysis in 23 countries among the European Union countries. In the study, in which Okun's law is found to be valid in 13 countries, it is stated that the validity of the law is provided with very low coefficients and it is not possible to talk about the existence of a high negative relationship between unemployment and economic growth. Although Turkey is among the countries with low correlation in the study, it can be considered that the validity will disappear from year to year. As in the study of Tatoğlu Yerdelen (2017), Bilge & Erden (2021) show that the coefficient calculated according to Okun's law is very low and therefore the negative relationship between variables is not very decisive. In the same year, Dixon et al. (2017) tested the validity of Okun's law in OECD countries. As a result of the analysis, it was found that the law is valid for all countries, but the effectiveness of economic growth in reducing the unemployment rates of the young working population is also among the results evaluated. The study of Rahman & Mustafa (2017), which examines Okun's law in more than one country, uses panel data analysis and evaluates Canada, USA, Netherlands, Finland, France, South Korea, Japan, Italy, New Zealand, UK, Australia and Sweden. As a result of the study, the Okun's law is not completely rejected and it is seen that a validity cannot be mentioned only for the Netherlands and that an existing negative relationship can be mentioned for economic growth and unemployment, even if the relationship is weak in other countries. (Yildiz et al., 2017) also found that Okun's law is valid in the evaluation for Turkey between 2005 and 2015.

Soylu et al. (2018) analyzed 8 countries, namely Belarus, Bulgaria, Czech Republic, Romania, Poland, Ukraine, Hungary and Slovakia. When the countries defined as Eastern European countries are evaluated in general, it is determined that 1% growth in the economy has a negative effect of 0.08% on unemployment and thus the validity of Okun's law is accepted. In 2018, another study (Üzar & Akyazi, 2018) tested the validity of the law by considering 34 OECD countries. It is found that there is a bidirectional causality, and the law is valid for all countries considered in the study and appropriate policy recommendations are made.

The study by Altunöz (2019), which evaluates the relationship between variables for the Euro regions, evaluated a 12-year period between 2000

and 2012, which was formed using panel data analysis. In the study, the relationship between unemployment and inflation is analyzed for 17 different countries and these countries are the Netherlands, Spain, Slovakia, France, Slovenia, Portugal, Greece, Cyprus, Luxembourg, Finland, Germany, Ireland, Italy, Estonia, Austria, Malta, Malta and Belgium. Okun's law is valid and it is stated that the relationship between the variables is negative.

Yayar & Öztaş (2020), on the other hand, analyzed the D-8 country group consisting of Bangladesh, Indonesia, Iran, Malaysia, Egypt, Nigeria, Pakistan and Turkey and made an evaluation between 1998-2017. The results obtained in the countries analyzed differ and it is stated that the Okun's law is valid for Indonesia and in this case, Indonesia's high population and population growth are effective. When analyzed for Turkey, it is found that there is no significant inverse relationship between unemployment and economic growth, in other words, the coefficient of the arrow is low. The fact that D-8 countries have agriculture-intensive economies has an impact on the validity of the Okun's law and economic efficiency can be stimulated through agriculture-based policies. The study of Canbay (2020), which was introduced to the literature in 2020, examined the BRICS countries and evaluated the validity of Okun's law between 1991-2018 and stated that Okun's law was valid only in Brazil, South Africa, Russia and India in the relevant time period. Accordingly, it is concluded that the relationship between unemployment and economic growth is positive for China and Turkey.

Tekgün & Eroğlu (2023), utilizing the Panel ARDL method, examined Brazil, Indonesia, India, South Africa and Turkey. This study, which analyses the fragile five countries, contributes to the literature by evaluating the relationship between unemployment and economic growth variables both in the short run and in the long run. When the results obtained are evaluated, it is seen that the Okun's law is not valid in the short run and the inverse relationship between economic growth and unemployment is accepted in the long run.

Daştan (2024) also presented a comprehensive output by testing the period between 1991-2021 using the panel data analysis method and made an evaluation among BRICS countries. It not only analyses the relationship between economic growth and unemployment, but also includes renewable and non-renewable energy consumption as a variable in the study and is taken into consideration in this study as it tests the

validity of Okun's law. As a result of the study, the employment power of the renewable energy sector is evaluated and it is concluded that it does not have the effect of increasing employment at the required level and in this respect, the Okun's law remains valid. The study of Campos et al. (2024), which is among the recent studies, is also included in the literature as another study that provides output that Okun's law is valid. In the study, the Euro area countries were evaluated and the specific evaluations on crisis periods and gender at the end of the study increased the effectiveness of the study in literature. Mohamed (2024) is among the authors who conducted a study in the same year and carried out a study in Somalia between 2000-2021. The study, which finds that Okun's law is not valid, emphasizes the importance of building sustainable economic growth policies in Somalia. Nasir et al. (2024), who conducted a comprehensive analysis in the Malaysian sample between 1988 and 2021 using the least squares method, took into account variables such as population, foreign direct investments and inflation in addition to economic growth and unemployment. As a result of the study, the author concluded that Okun's law is valid. Andreescu (2024) analyzed the sample of Bulgaria, Czech Republic, Hungary, Poland and Romania. The study analyzed the relationship between economic growth and unemployment by using Granger causality test and found that Okun's law was valid between 2010-2019.

3. Data and Methodology

In this section of the study, information about the variables to be used and the tests to be applied in order to determine the validity of Okun's law are given. The variables to be analysed in the study are economic growth and unemployment, and the data are evaluated in the period 1991-2023 for the countries in the Organisation of Islamic Economics. Graphs of the variables are presented in Figures 1 and 2.

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Figure 1: 1991-2023 Economic Growth Data

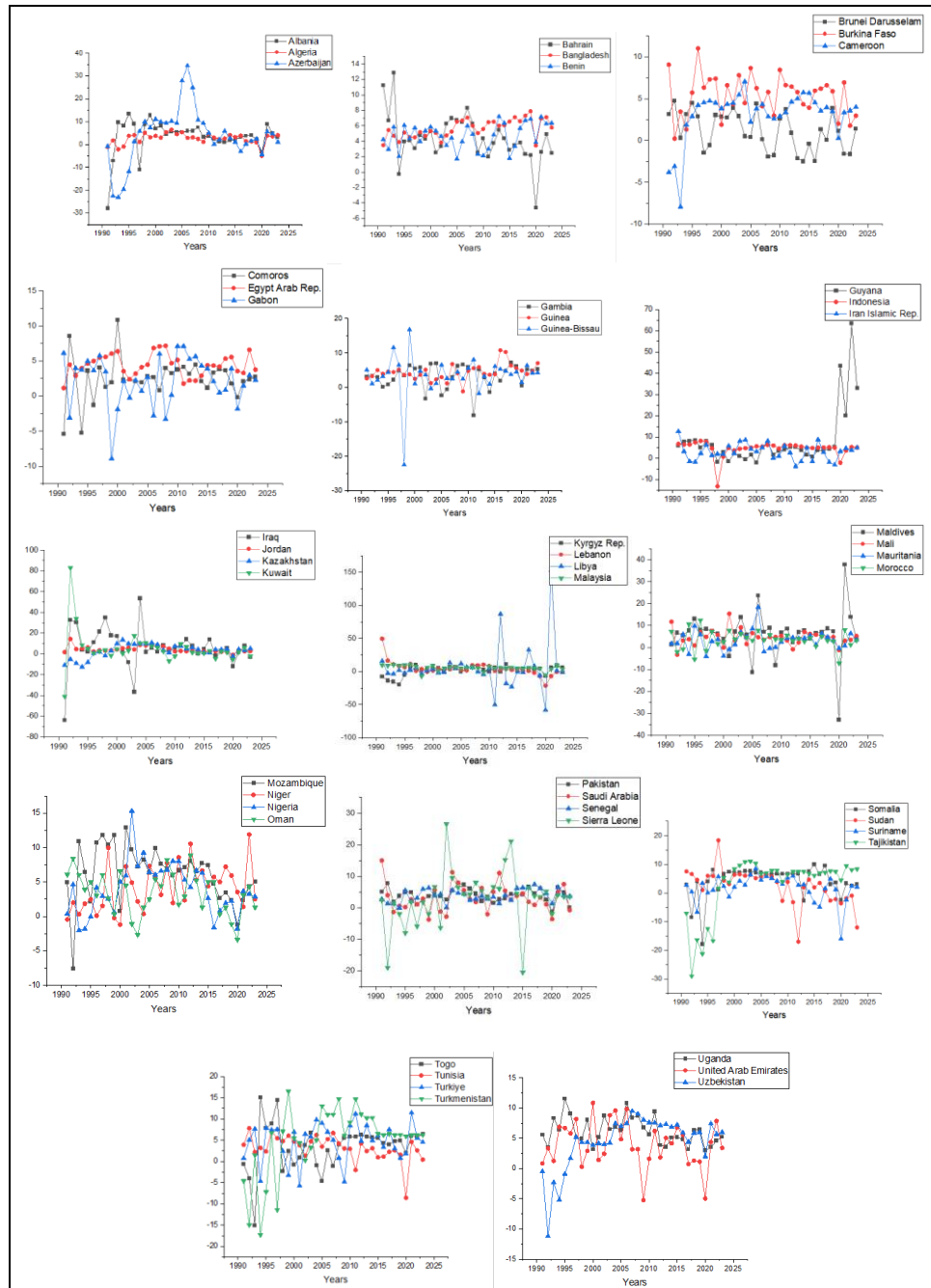
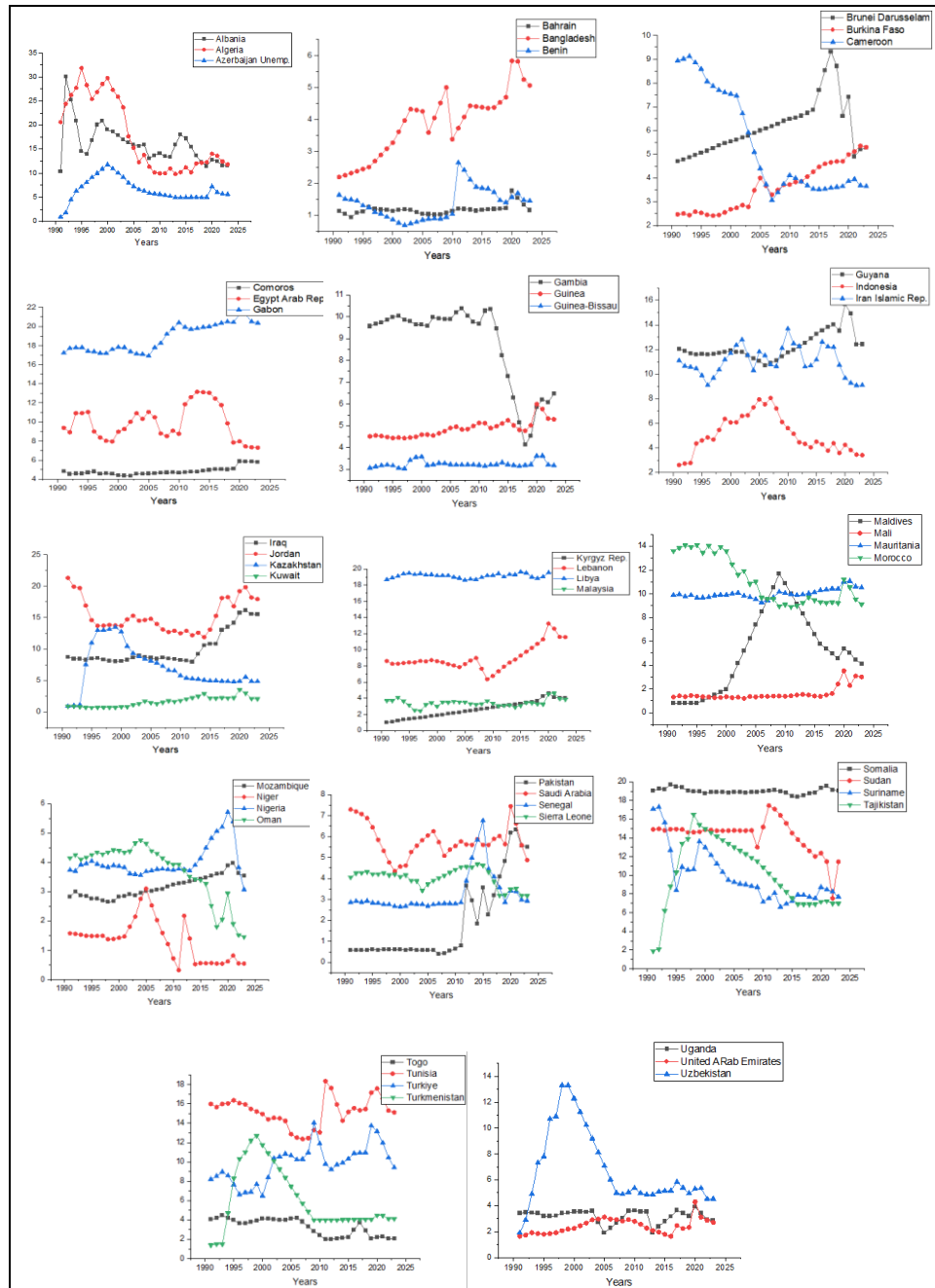


Figure 2: 1991-2023 Unemployment Data

Journal of Economic Cooperation and Development unemployment data of the countries or the proximity of the variables to each other according to the countries. The definitions, average values, minimum and maximum values of economic growth and unemployment variables on a country basis between 1991 and 2023 are presented in Table 2.

Table 2: Descriptive Statistics

Countries	Mean		Median		Max.		Min.		Std. Dev	
	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.
Albania	3.477971	16.03164	4.536524	15.626	13.32233	30.007	-28.0001	10.304	7.480819	4.12069
Algeria	2.651515	17.8107	3.1	13.79	6.5	31.84	-5	9.82	2.355992	7.616328
Azerbaijan	3.916412	6.546848	4.714802	5.86	34.5	11.78	-23.1	0.9	12.14487	2.449942
Bangladesh	5.647596	3.877091	5.571788	4.075	7.881915	5.828	3.448018	2.2	1.17017	1.020143
Bahrain	4.400952	1.173424	4.110006	1.166	12.87001	1.767	-4.64463	0.943	3.084756	0.149737
Benin	4.679205	1.354061	4.811223	1.402	7.191434	2.647	1.713165	0.69	1.644352	0.4938
Brunei Darusselam	1.156586	6.116152	1.133573	5.886	4.758581	9.316	-2.50835	4.7	2.292272	1.161624
Burkina Faso	5.413927	3.595424	5.889205	3.67	11.01474	5.348	0.232711	2.414	2.451393	0.97581
Cameroon	3.115348	5.422515	3.832418	3.989	7.048863	9.118	-7.93206	3.063	2.943553	2.173095
Comoros	2.478611	4.845667	2.646955	4.709	10.84788	5.884	-5.39563	4.369	2.944872	0.420238
Egypt	4.371185	9.892879	4.372019	9.38	7.156284	13.154	1.125405	7.306	1.567936	1.797378
Gabon	2.141004	18.81667	2.676203	18.258	7.091753	21.273	-8.93262	16.91	3.523218	1.45153
Gambia	3.254916	8.709333	4.058074	9.681	7.23489	10.383	-8.13044	4.127	3.477598	1.921693

Countries	Mean		Median		Max.		Min.		Std. Dev	
	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.
Guinea	4.455219	4.863697	4.133016	4.834	10.82063	5.993	-1.12264	4.423	2.292326	0.377643
Guinea- Bissau	3.472474	3.245818	4.19999	3.204	16.81502	3.628	-22.4457	3.03	5.760945	0.149056
Guyana	8.109272	12.24624	4.440913	11.81	63.43986	15.701	-1.95096	10.7	13.56111	1.147775
Indonesia	4.633964	5.067394	5.069786	4.611	8.220007	8.06	-13.1267	2.617	3.692055	1.53416
Iran	3.154663	11.04145	3.189804	10.772	12.71615	13.679	-3.74717	9.085	3.79542	1.187434
Iraq	5.825633	10.00912	5.513791	8.596	53.38179	16.173	-64.0471	7.965	19.81385	2.685853
Jordan	4.236652	15.35227	3.384078	14.6	14.34978	21.311	-1.10275	11.9	2.898301	2.681247
Kazakhstan	2.948485	7.013424	4.1	5.77	13.5	13.46	-12.6	0.9	6.476454	3.467596
Kuwait	5.07678	1.616545	2.479757	1.64	82.80933	3.535	-41.0078	0.694	17.60254	0.779492
Kyrgyzstan	1.900405	2.609727	4.024039	2.558	10.91547	4.63	-20.0852	1	7.404023	1.01348
Lebanon	4.263985	8.999576	2.685779	8.565	49.44738	13.235	-21.3999	6.355	10.45996	1.5769
Libya	5.434241	19.15394	0.749659	19.186	153.4926	19.649	-58.3182	18.613	34.85245	0.283692
Malaysia	5.303581	3.429667	5.584847	3.41	10.0027	4.64	-7.35941	2.45	3.95951	0.462862
Maldives	6.065349	5.143394	7.054539	5.021	37.68719	11.697	-32.9088	0.79	10.73936	3.390453
Mali	4.526026	1.606697	4.756161	1.394	15.37624	3.528	-3.21866	1.206	3.559073	0.575598
Mauritania	3.278914	10.01548	3.383555	9.931	18.3332	11.068	-4.04469	9.287	4.332164	0.398688
Morocco	3.576569	11.09952	3.499557	10.539	12.37288	14.089	-7.17821	8.91	4.038261	2.008605
Mozambique	6.183889	3.155121	6.679729	3.065	12.85168	3.984	-7.57665	2.646	4.177795	0.362691
Niger	4.189538	1.330333	3.550641	1.426	11.9	3.1	-1.20848	0.317	3.409201	0.709446

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Countries	Mean		Median		Max.		Min.		Std. Dev	
	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.	GDP	Unemp.
Nigeria	4.017535	4.021212	4.195924	3.827	15.32916	5.712	-2.03512	3.074	3.728781	0.577514
Oman	3.408548	3.687273	3.875774	4.142	8.863122	4.756	-3.37971	1.46	3.061159	0.969368
Pakistan	3.999102	1.885667	4.217942	0.597	7.831256	6.338	-1.27408	0.398	2.1219	1.958608
Saudi Arabia	3.154067	5.794545	2.788406	5.636	15.0079	7.45	-3.76325	4.346	4.293611	0.782639
Senegal	3.823093	3.264273	3.821856	2.853	7.407486	6.757	-0.04752	2.648	2.001163	0.961646
Sierra Leone	3.010586	4.022061	3.753803	4.159	26.52413	4.678	-20.4911	3.174	8.975328	0.439826
Somalia	4.293358	18.98952	6.694352	18.947	9.9468	19.686	-17.8469	18.372	5.492214	0.285196
Sudan	2.41086	14.24291	3.858242	14.783	18.31266	17.44	-17.0047	7.53	6.147911	1.81927
Suriname	1.703498	9.865697	2.69035	8.832	8.5	17.28	-15.9752	6.6	4.57296	2.841925
Tajikistan	2.778825	10.05161	7.000003	10.187	11	16.5	-29	1.9	10.17732	3.710764
Togo	3.49548	3.259273	4.79506	3.636	14.98241	4.47	-15.0958	1.982	5.477669	0.887979
Tunisia	3.169156	15.18691	3.178411	15.33	7.805729	18.334	-8.59183	12.365	2.965743	1.505166
Türkiye	4.630711	9.847303	5.533469	10.227	11.43938	14.026	-5.75001	6.495	4.453097	1.924988
Turkmenistan	4.919237	6.058818	6.2	4.452	16.5	12.7	-17.2998	1.4	7.973539	3.279061
Uganda	6.165041	3.178576	5.637612	3.418	11.52324	3.914	2.951306	1.9	2.258537	0.498011
United Arab Emirates	3.94344	2.423758	3.403857	2.331	10.8527	4.294	-5.24292	1.64	3.747154	0.578196
Uzbekistan	4.450784	6.77	5.879743	5.345	9.473005	13.3	-11.2	1.9	4.338084	2.972327

Source: World Bank

Descriptive statistics for a total of 49 countries are presented in the table. When the maximum values of the series for the GDP variable expressing economic growth are considered, the first 5 countries are Libya (153.492), Kuwait (82.809), Guyana (63.439) and Iraq (53.381). The top 5 countries with the lowest economic growth in the relevant year range are Libya (0.749), Brunei Darussalam (1.1335), Kuwait (2.479), Comoros (2.646) and Gabon (2.676). It is noteworthy that Libya and Kuwait are among the countries with both the highest economic growth and the lowest economic growth.

In the study, the data of 49 countries, whose variable graphs and descriptive statistics are expressed, are evaluated by using Panel data analysis and the outputs obtained are expressed in tables in the fourth section. In the study, firstly, Cross-sectional Augmented Dickey Fuller (CADF) unit root test will be applied, then the co-integration test introduced to the literature by Westerlund (2006) will be used to evaluate the relationship between the variables and finally the 'Regife' estimators will be used to test the existence of a long-run relationship.

The choice of CADF unit root test is based on the results of homogeneity test and horizontal cross-section dependence test, which indicate that first or second generation unit root tests should be used in the study. In this direction, firstly, the homogeneity of the series of economic growth and unemployment variables to be analyzed was evaluated. For the homogeneity test, Peseran (2006) 's study is utilized, and it is evaluated that homogeneity is accepted in case the H0 hypothesis is accepted and a heterogeneous output is provided in case the H1 hypothesis is accepted. At this point, the test equation to be used in the study is expressed in lines (i) and (ii).

$$LM_{adj} = \left(\frac{2}{N(N-1)} \right)^{\frac{1}{2}} \quad (i)$$

$$\hat{\Delta}_{adj} = \sqrt{N} \left(\frac{N^{-1}S-k}{v(T,k)} \right) N(0,1) \quad (ii)$$

Following the results obtained as a result of the expressed equations, Horizontal cross-section dependence test was applied in the study. The test results with 4 different methods are presented in Table 4. The applied equations are expressed between lines (iii-vi) respectively. In the Results

section, the outputs obtained as a result of the tests are expressed and interpreted.

$$\sum_{i=1}^{N-1} \sum_{j=i+1}^N (\hat{p}_{ij}^2) \quad X^2 \frac{N(N-1)}{2} \quad (\text{Breusch \& Pagan, 1980}) \quad (\text{iii})$$

$$\sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T_{ij} \rho_{ij}^2 - 1) \rightarrow N(0.1) \quad (\text{Pesaran, 2004}) \quad (\text{iv})$$

$$\sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T_{ij} \rho_{ij}^2 - 1) - \frac{N}{2(T-1)} \rightarrow N(0.1) (\text{Pesaran, 2004}) \quad (\text{v})$$

$$\left(\frac{2}{N(N-1)} \right)^{\frac{1}{2}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N [\hat{p}_{ij}^2 \left(\frac{T-K-1 \hat{p}_{ij} - \hat{\mu}_{Tij}}{v_{Tij}} \right)] N(0.1) \quad (\text{Pesaran et al., 2008}) \quad (\text{vi})$$

The outputs obtained as a result of the application of the tests to the relevant variables indicate that it is necessary to utilise the 2nd generation unit root tests in the study. In this direction, CADF unit root test will be used to analyse the stationarity of the series. The related method was introduced to the literature by Peseran (2006) and the equations related to the method are expressed in lines (vii-viii).

$$\Delta \gamma_{it} = \alpha_i + \rho_i^* \gamma_{i,t-1} + d_0 \bar{y}_{t-1} + d_1 \bar{y}_t + \varepsilon_{it} \quad (\text{vii})$$

$$\frac{1}{N} \sum_{i=1}^N CADF_i \quad (\text{viii})$$

The co-integration relationship will be analysed with the study of Westerlund (2006) as stated, and finally, Regife estimators and long-run relationships will be tested with the equations obtained from the study of Bai (2009). In the next section of the study, the outputs obtained as a result of the application of the tests in this section are presented and interpreted in tables.

The study is constructed with the aim of seeking an answer to the question of whether Okun's law is valid in the Organisation of Islamic Cooperation countries in a certain time interval, and among the tests selected to answer this question, the CADF unit root test was selected as appropriate methods to test the existence of a long-run relationship between the variables examined, the use of Regife estimator to strengthen the detection of the relationship between variables, and the Horizontal Cross-Section Dependence test to test the relationship between the samples and the

effect of countries on each other by making homogeneous and heterogeneous distinction.

4. Empirical Results

In the findings section of the study, homogeneity and horizontal cross-section dependence test results are determined, followed by stationarity analysis, cointegration relationship estimation and determination of the validity of the law in the long run. In this direction, firstly, homogeneity test results are presented in Table 3.

Table 3. Homogeneity Test

Variables	Stat.	Prob.
Delta Tilde	-2.125	0.983
Delta Tilde adj	-2.229	0.987

Notes. H_0 : Coefficients are homogenous. H_1 : Coefficients are not homogenous.

The table shows that the probability values for Delta Tilde and Delta Tilde adj are 0.983 and 0.987, respectively. These results lead to the acceptance of H_0 hypothesis since the probability value is greater than the constraint value. Accordingly, the coefficients will be evaluated as homogenous.

Table 4: Horizontal Cross Section Dependence

Applied Tests	Source	Statistical Value		Prob.	
		Unemp.	GDP	Unemp.	GDP
Lagrange Multiplier (LM)	Breusch & Pagan. 1980	8651.427	2326.949	0.000***	0.000***
Cross-Sectional Dependence Lagrange Multiplier (CDlm)	Pesaran. 2004	154.141	23.732	0.000***	0.000***
Cross-Sectional Dependence (CD)	Pesaran. 2004	-2.264	-2.978	0.012**	0.001***
Bias-Adjusted Cross Sectionally Dependence Lagrange Multiplier (LMadj)	Pesaran et al. 2008	83.204	2.561	0.000***	0.005***

Note. In the probability values in the table, '***' indicates that the series is significant at 1% level.

Horizontal cross-section dependence can be calculated with 4 different equations as shown in Table 4. With the equation that started to be used as a result of the study brought to the literature by Breusch & Pagan (1980), it was determined that horizontal cross-section dependence was accepted with a probability value of 0.000 for both unemployment and economic growth. The same conclusion is reached for the tests in Pesaran, (2004) and Pesaran et al. (2008) the hypothesis H_0 is accepted. In this direction, it can be concluded that the values of economic growth and unemployment variables have an effect between each other in the analysed sample. The obtained result requires the use of 2nd generation unit root tests and Table 5 presents the CADF test results.

Table 5: CADF Unit Root Test Results

Countries	GDP		Constant and Trend		Unemployment	
	Lags	Constant	Lags	CADF	Lags	Constant and Trend
Albania	1	-4.554***	1	-4.473**	1	-4.765***
Algeria	1	-2.328	1	-2.301	1	-4.691***
Azerbaijan	1	-3.218*	1	-3.243	1	-4.752**
Bangladesh	1	-3.575**	1	-3.474	1	-4.945***
Bahrain	1	-4.314***	1	-4.288**	1	-5.533***
Benin	1	-3.616**	1	-3.545*	1	-4.941***
Brunei Darussalam	1	-4.549***	1	-4.455**	1	-4.951***
Burkina Faso	1	-3.532**	1	-3.492*	1	-5.036***

Cameroon	1	-3.353**	1	-3.276	1	-3.729**	1	-4.868***
Comoros	1	-3.785**	1	-3.775*	1	-3.405**	1	-4.461**
Egypt	1	-3.615**	1	-3.628*	1	-3.209*	1	-4.556**
Gabon	1	-3.622**	1	-3.523*	1	-3.312*	1	-3.961**
Gambia	1	-3.834**	1	-3.754*	1	-3.053*	1	-3.754*
Guinea	1	-4.096**	1	-4.228**	1	-3.089*	1	-3.68*
Guinea- Bissau	1	-4.977***	1	-4.852***	1	-3.446**	1	-3.832*
Guyana	1	-3.038*	1	-2.961	1	-3.91**	1	-3.904**
Indonesia		-3.683**		-4.115**		-3.119*		-3.096
Iran	1	-4.104**	1	-4.061**	1	-3.198*	1	-3.204
Iraq	1	-5.326***	1	-5.406***	1	-3.664**	1	-3.552*
Jordan	1	-4.608***	1	-4.976***	1	-5.045***	1	-5.183***
Kazakhstan	1	-3.053*	1	-3.229	1	-3.632**	1	-4.382**
Kuwait	1	-4.034**	1	-3.992**	1	-3.783**	1	-4.51***
Kyrgyzstan	1	-4.426***	1	-4.337**	1	-3.803**	1	-4.176**
Lebanon	1	-3.699**	1	-3.808*	1	-3.306*	1	-3.583*
Libya	1	-4.227***	1	-4.217**	1	-4.187***	1	-4.913***
Malaysia	1	-2.505	1	-2.659	1	-4.429***	1	-5.321***
Maldives	1	-3.146*	1	-3.085	1	-4.214***	1	-4.868***
Mali	1	-4.457***	1	-4.718***	1	-4.19***	1	-4.727***
Mauritania	1	-2.561	1	-2.714	1	-3.926**	1	-4.625**
Morocco	1	-4.968***	1	-4.964***	1	-3.685**	1	-4.562**
Mozambique	1	-4.818***	1	-4.832***	1	-3.686**	1	-4.871***
Niger	1	-3.655**	1	-3.826*	1	-3.319*	1	-4.822***
Nigeria	1	-3.958**	1	-3.899**	1	-4.115***	1	-4.093**

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Oman	1	-3.241*	1	-3.317	1	-4.501***	1	-4.432**
Pakistan	1	-2.74	1	-2.727	1	-4.855***	1	-4.767***
Saudi Arabia	1	-3.695**	1	-3.57*	1	-5.035***	1	-4.943***
Senegal	1	-3.562**	1	-3.521*	1	-5.539***	1	-5.852***
Sierra Leone	1	-3.347**	1	-3.361	1	-5.68***	1	-5.761***
Somalia	1	-2.978*	1	-3.102	1	-5.088***	1	-5.096***
Sudan	1	-4.426***	1	-4.717***	1	-4.919***	1	-4.876***
Suriname	1	-3.3*	1	-3.241	1	-5.032***	1	-5.003***
Tajikistan	1	-5.111***	1	-5.095***	1	-5.297***	1	-5.216***
Togo	1	-5.459***	1	-5.361***	1	-6.43***	1	-6.339***
Tunisia	1	-4.235***	1	-4.239**	1	-7.687***	1	-7.917***
Türkiye	1	-3.023*	1	-2.99	1	-7.706***	1	-8.101***
Turkmenistan	1	-3.134*	1	-3.101	1	-6.417***	1	-6.297***
Uganda	1	-3.641**	1	-3.672*	1	-6.054***	1	-5.944***
United Arab Emirates	1	-3.964**	1	-3.856*	1	-5.553***	1	-5.532***
CIPS-Stat.		-3.828**		-3.843*		-4.422***		-4.861***

Note: *** ** and * indicate that the series are stationary at 1%, 5% and 10% significance levels. Critical values are taken as -4.11, -3.34 and -2.96 for the constant and -4.68, -3.87 and -3.49 for the constant and trend series, respectively. The expressed values are obtained from the study of Peseran (2006).

Table 5 expresses the stationarity analyses of the series separately for 49 countries and presents the output for the country group with CIPS-statistic values in the last row of the table. When a collective evaluation is made, it is seen that the probability values for the constant and constant-trend series are -3.828, -3.843 for economic growth and -4.422 and -4.861 for unemployment, respectively. Related values will be interpreted based on the values expressed in Peseran (2006) study. The constraint values expressed in the study are -4.11, -3.34 and -2.96 for the constant series and -4.68, -3.87 and -3.49 for the constant and trend series, respectively. Accordingly, when the results are interpreted, it should be stated that -3.828 is stationary at 5% and 10% levels and -3.843 is stationary at 10% significance level. When the same evaluation is performed for the unemployment variable, it is observed that -4.422 and -4.861 values are calculated for the constant and trend series, respectively, and it is observed that the results obtained show stationarity at all significance levels. It is evaluated that the series do not contain unit root in both variables and in a total of 4 possibilities. If the assumption of non-stationarity of the series on a country basis is evaluated and the countries presenting output in this direction are identified, it can be stated that the series are non-stationary in Mozambique and Maldives in economic growth.

Table 6. Westerlund Panel Cointegration Test Results

Wasterlund (2006)	Constant				Model with Constant Trend			
LM Stat.	13.702				38.184			
Asymptotic Value	0.000***				0.000***			
	Constant Term				Constant and Trend			
Country	Fractures	1.Fracture	2. Fracture	3. Fracture	Fractures	1. Fracture	2. Fracture	3. Fracture
Albania	-	-	-	-	1	1996	-	-
Azerbaijan	2	1996	2008	-	1	2007	-	-
Bangladesh	1	2004	-	-	-	-	-	-
Bahrain	-	-	-	-	-	-	-	-
Benin	-	-	-	-	-	-	-	-
United Arab Emirates	-	-	-	-	1	2006	-	-
Brunei Darussalam	-	-	-	-	-	-	-	-

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Burkina Faso	-	-	-	-	-	-	-	-
Algeria	1	2001	-	-	1	2005	-	-
Indonesia	-	-	-	-	2	1997	2003	-
Morocco	-	-	-	-	-	-	-	-
Gabon	1	2009	-	-	2	1998	2009	-
Gambia	-	-	-	-	-	-	-	-
Guinea	2	2009	2015	-	1	2015	-	-
Guinea-Bissau	-	-	-	-	-	-	-	-
Guyana	1	2017	-	-	1	2017	-	-
Iraq	-	-	-	-	-	-	-	-
Iran Islamic Rep.	-	-	-	-	-	-	-	-
Cameroon	1	2004	-	-	1	1996	-	-
Kazakhstan	2	1999	2007	-	1	1999	-	-
Kyrgyz Republic	1	1996	-	-	1	1996	-	-
Comoros	-	-	-	-	-	-	-	-
Kuwait	-	-	-	-	-	-	-	-
Libya	-	-	-	-	-	-	-	-
Lebanon	1	1996	-	-	1	1996	-	-
Maldives	-	-	-	-	-	-	-	-
Malaysia	1	1996	-	-	1	1998	-	-
Mali	-	-	-	-	-	-	-	-
Egypt	-	-	-	-	2	2000	2008	-
Mozambique	1	2000	-	-	-	-	-	-
Mauritania	-	-	-	-	2	1996	2006	-
Niger	1	2004	-	-	-	-	-	-
Nigeria	2	1999	2014	-	1	2001	-	-
Pakistan	-	-	-	-	-	-	-	-
Uzbekistan	3	1993	1996	2003	1	1996	-	-
Senegal	-	-	-	-	-	-	-	-
Sierra Leon	2	2001	2014	-	1	2014	-	-
Somalia	-	-	-	-	-	-	-	-
Sudan	2	2008	2017	-	2	2006	2012	-
Suriname	1	2013	-	-	-	-	-	-
Saudi Arabia	-	-	-	-	1	2002	-	-
Tajikistan	1	1996	-	-	1	1996	-	-
Togo	-	-	-	-	1	1997	-	-
Tunisia	1	2000	-	-	-	-	-	-
Turkey	1	2001	-	-	1	2001	-	-
Turkmenistan	1	1997	-	-	1	1997	-	-
Uganda	1	2011	-	-	2	1996	2011	-
Jordan	1	2009	-	-	1	2016	-	-
Oman	1	2016	-	-	1			

The cointegration relationship between the variables was introduced to the literature by Westerlund (2006). With his study, the author has contributed to the literature in terms of evaluating the long-run relationship between variables. This evaluation provides important information on the assessment of the years of economic growth and unemployment by years on a country basis.

When Table 6 is analysed, it is observed that the countries that did not experience any break between 1991 and 2023 under the assumption that the series contain a constant term and trend are Bahrain, Benin, Brunei Darussalam, Burkina Faso, Morocco, Gambia, Guinea, Iraq, Iran, Comoros, Kuwait, Libya, Maldives, Mali, Pakistan, Senegal and Somalia. When the entire panel is taken into account, the asymptotic value is found to be 0.000, indicating that there is no cointegration relationship in the entire panel.

Table 7: Regife Predictor Results

GDP	Coefficient	Standard Dev.	Prob.
Inflation	-0.1900008	0.0755826	0.012**

The results obtained in Table 7 are obtained by applying the equation in the study by Bai (2009) to the variables. Determination of the long-run relationship can be expressed as the purpose of using the Regife estimator. The result of the analysis shows that the probability value is 0.012, in other words, it is lower than the constraint value. Although the results obtained are interpreted as economically significant, they show that the relationship between economic growth and unemployment is negative and accordingly Okun's law is valid.

5. Conclusion

This study, which bases the relationship between economic growth and unemployment variables on Okun (1962) study, is designed to test the validity of Okun's proposition that the relationship between unemployment and economic growth variables is negative. Although it is a common belief that reducing unemployment and increasing employment rates are among the factors that ensure economic growth, some studies have shown that economic growth and unemployment rates have a positive relationship for several different countries in different

periods (Barışık et al. 2010; Tari & Abasiz 2010; Rahman & Mustafa 2017; Tatoğlu Yerdelen 2017; Altunöz 2019; Canbay 2020). When this situation is analysed, the concept of growth without employment (Uras 2016; Ayvaz & Öztürk 2018) has emerged and studies involving sectoral evaluations have been focused on. When the capacity utilisation rate is low in a sector or sectors operating in a country, the effectiveness on economic growth is low, and it can be seen that the output obtained as a result of production increases although there is no positive effect on unemployment within the framework of both innovative orientations and productivity studies. Such a situation leads to the conclusion that although there is growth in the economy, there is no increase in employment rates and causes the concept of growth without employment to be used. The increase in the capacity utilisation rate is justified among the reasons for unemployment growth.

The evaluation of the effectiveness of employment in the growth of a country's economy may serve as a guide for macroeconomic-based political arrangements. From this point of view, the aim of the study is to determine the validity of the Okun's law and to draw a template for the countries examined both in academic and political level. While conducting the study, the countries of the Organisation of Islamic Cooperation have been selected as a sample and a comprehensive evaluation will be made between 1991 and 2023. In order to carry out the analysis, two different variables, namely economic growth rates and unemployment rates, have been analysed. By examining the variables in the study, it has been determined that the series are homogeneous and as a result of the analysis carried out in line with this information, it has been concluded that the series are stationary and do not contain unit root. Although it is seen that the economic growth and unemployment series of the Organisation of Islamic Cooperation countries examined between 1991 and 2023 have a co-integration relationship, an economically significant relationship was found and it was concluded that Okun's law is valid. The countries of the Organisation of Islamic Cooperation are among the countries that do not have a high level of economic development but are rich in terms of abundance of natural resources. The fact that countries are rich in natural resources leads to the result that they are considered relatively backward in terms of industrial production and technological development compared to developed and developing countries. Determining the validity of the Okun's law in such a group of countries contributes to the literature in terms of developing appropriate

policies for this group of countries by providing information within the framework of natural resource-rich countries. At the same time the fact that the countries considered constitute a specific group united under a certain roof, that the country characteristics adopt a heterogeneous structure on a political, social and economic basis, that the study covers the entire data range accessed through databases, that the methods applied are preferred among modern methods instead of traditional analysis methods, and that they shed light on the diversity of factors affecting the outputs obtained make this study valuable for the literature. The countries of the Organization of Islamic Cooperation have come together with the desire to establish political, social and economic cooperation, and the output that the Okun's law determined as a result of this study is valid will provide an important guidance in the political economy regulations of the countries. Political arrangements designed to create employment will provide a driving force for the acceleration of economic growth.

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Fiscal Discipline, Size of Government and Economic Growth in A Small Macro-Model of The Nigerian Economy

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ABSTRACT

This study examines the interplay between fiscal discipline, government size, and economic growth within a small macroeconomic model of Nigeria. It addresses the rising fiscal deficits and escalating public debt prevalent in Sub-Saharan Africa, driven by high-interest borrowing, limited revenue collection, and dependence on commodity exports. Using Nigeria as a case study, the research explores how fiscal discipline impacts government size, output growth, and unemployment through simulation scenarios. The study employs an autoregressive distributed lag (ARDL) model and simulations to analyze the responses of key macroeconomic variables to changes in fiscal discipline, including fiscal deficit, government debt, and public expenditure stimuli. Findings reveal that fiscal indiscipline, measured as deficits exceeding 5% of GDP, increases government size, reduces output growth, and exacerbates unemployment. Simulation results show a 5% fiscal deficit stimulus raises government size by 0.5%-2%, decreases output growth by 4.5%-7.5%, and elevates unemployment by 0.8%-5.5%. Furthermore, excessive government debt and spending lead to unsustainable fiscal conditions, underscoring the need for robust fiscal rules and efficient public finance management. This research contributes to understanding fiscal dynamics in resource-dependent economies, offering actionable insights for policymakers aiming to balance growth objectives with fiscal prudence. It highlights the critical role of fiscal discipline in achieving macroeconomic stability and sustainable development, serving as a reference for policy frameworks in Nigeria and Sub-Saharan Africa.

ملخص

تتناول هذه الدراسة التفاعل بين الانضباط المالي وحجم الحكومة والنمو الاقتصادي ضمن نموذج اقتصادي كلي مصغر لنيجيريا. وتتناول الدراسة تصاعد العجز المالي وتزايد الدين العام الشائع في منطقة إفريقيا جنوب الصحراء، نتيجة للاقتراض بفوائد مرتفعة وضعف تحصيل الإيرادات

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والاعتماد على صادرات السلع. وباستخدام نيجيريا كدراسة حالة، تستكشف الدراسة كيف يؤثر الانضباط المالي على حجم الحكومة ونمو الإنتاجية والبطالة، من خلال سيناريوهات محاكاة. وتعتمد الدراسة على نموذج الانحدار الذاتي للإبطاء الموزع والمحاكاة لتحليل استجابات المتغيرات الاقتصادية الكلية الرئيسة لتغيرات الانضباط المالي، بما في ذلك العجز المالي والدين الحكومي ومحفزات الإنفاق العام. وتظهر النتائج أن غياب الانضباط المالي، المقاس بعجز يتجاوز 5% من الناتج المحلي الإجمالي، يؤدي إلى زيادة حجم الحكومة وانخفاض نمو الإنتاجية وتفاقم البطالة. كما تظهر نتائج المحاكاة أن تحفيز العجز المالي بنسبة 5% يؤدي إلى زيادة في حجم الحكومة تتراوح بين 0.5%-2.5%، وانخفاض في نمو الإنتاجية يتراوح بين 4.5%-7.5%، وارتفاع في البطالة يتراوح بين 0.8%-5.5%. وعلاوة على ذلك، فإن الإفراط في الاقتراض الحكومي والإنفاق العام يؤدي إلى أوضاع مالية غير مستدامة، مما يؤكد الحاجة إلى قواعد مالية قوية وإدارة كفؤة للمالية العامة. تسهم هذه الدراسة في فهم الديناميكيات المالية في الاقتصادات المعتمدة على الموارد، ذلك عن طريق تقديم رؤية عملية لصانعي السياسات بهدف تحقيق التوازن بين أهداف النمو والحفاظ على الحصة المالية. كما تسلط الضوء على الدور الحاسم للانضباط المالي في تحقيق استقرار الاقتصاد الكلي والتنمية المستدامة، لتكون مرجعا لأطر السياسات في نيجيريا ومنطقة إفريقيا جنوب الصحراء.

RESUME

Cette étude examine l'interaction entre la discipline fiscale, la taille du gouvernement et la croissance économique dans le cadre d'un petit modèle macroéconomique du Nigeria. Elle aborde la question des déficits budgétaires croissants et de l'escalade de la dette publique qui prévalent en Afrique subsaharienne, en raison d'emprunts à taux d'intérêt élevés, d'une collecte limitée des recettes et d'une dépendance à l'égard des exportations de produits de base. En utilisant le Nigeria comme étude de cas, la recherche explore l'impact de la discipline fiscale sur la taille du gouvernement, la croissance de la production et le chômage à travers des scénarios de simulation. L'étude utilise un modèle autorégressif à décalage distribué (ARDL) et des simulations pour analyser les réponses des variables macroéconomiques clés aux changements de la discipline fiscale, y compris le déficit fiscal, la dette publique et les stimuli des dépenses publiques. Les résultats révèlent que l'indiscipline fiscale, mesurée par des déficits dépassant 5 % du PIB, augmente la taille du gouvernement, réduit la croissance de la production et exacerbe le chômage. Les résultats des simulations montrent qu'un déficit budgétaire de 5 % augmente la taille du gouvernement de 0,5 % à 2 %, diminue la croissance de la production de 4,5 % à 7,5 % et augmente le chômage de 0,8 % à 5,5 %. En outre, une dette et des dépenses publiques excessives conduisent à des conditions budgétaires insoutenables, soulignant la nécessité de règles budgétaires solides et d'une

gestion efficace des finances publiques. Cette recherche contribue à la compréhension de la dynamique fiscale dans les économies dépendantes des ressources naturelles, offrant des informations utiles aux décideurs politiques qui cherchent à équilibrer les objectifs de croissance et la prudence fiscale. Elle met en évidence le rôle essentiel de la discipline budgétaire dans la réalisation de la stabilité macroéconomique et du développement durable, et sert de référence pour les cadres politiques au Nigeria et en Afrique subsaharienne.

Keyword: fiscal discipline, size of government, economic growth, unemployment, small macro model

Jel Code: H3, H4, H62

1. Introduction

The recent sharp and persistent increase in fiscal deficits and public debt in Sub-Saharan Africa as indicated in figure 1.1 has raised concerns about the sustainability of public finance in the region.

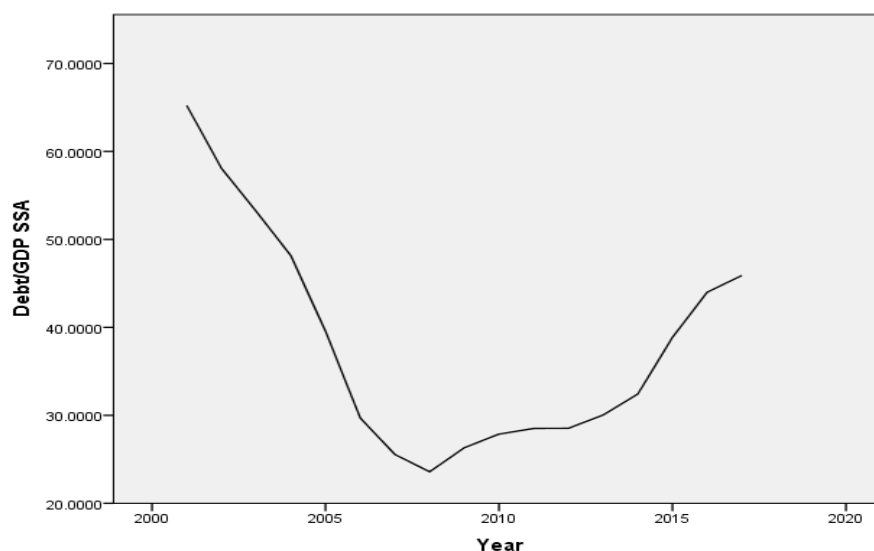


Fig 1.1: Debt to GDP ratio for Sub-Saharan African

Source: IMF, World Economic Outlook, 2018

Though the increases may not appear worrisome when compared with the western standard, however, the high-interest rates spread on government

borrowing in Sub-Saharan Africa which averaged at 8.4 percent for the period of 2001 to 2020 compared with that of the Euro area of 3.8 percent, OECD of 3.5 percent and that of the Middle East and North Africa of 4.2 percent for the same period (WDI, 2021). This high-interest rate in SSA coupled with the smaller capacity of public revenue collection as found in figure 1.2 has made it more difficult for these countries to cope and sustain the higher debt levels.

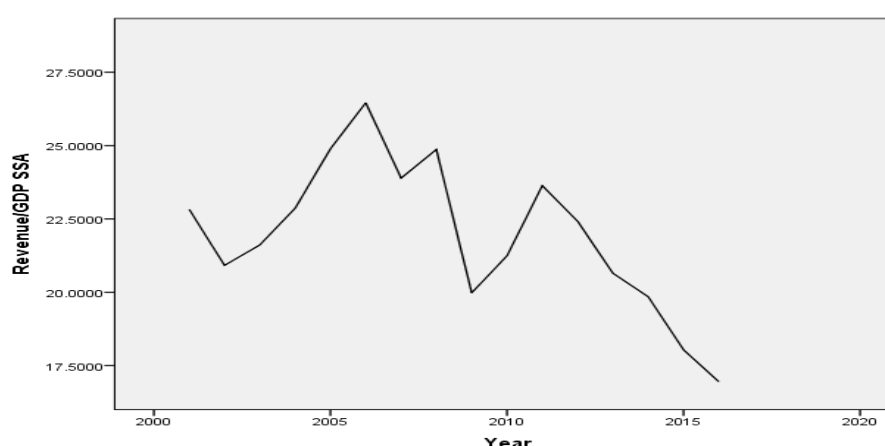


Fig 1.2: Revenue to GDP ratio for Sub-Saharan African
Source: IMF, World Economic Outlook, 2020

The current debt ratio in SSA is the highest since the Heavily Indebted Poor Countries Initiative (HIPC) and the Multilateral Debt Relief Initiative (MDRI) that resulted in substantial debt relief programs in the region. Again, government borrowing in SSA economies has become increasingly non-concessional (at commercial term) (Mupunga & Le Roux 2016; Merotto et al, 2015) and with the fact that external debt exposes economies to exchange rate risks especially in the midst of dwindling rate of export in the region which declined steadily from 11.4 percent in 2011 to 2.1 percent in 2015 (WDI, 2017) leading to high external debt to export ratios in most SSA economies and raising questions relating to SSA economies' ability to pay back those debts.

Because of this trend in government spending in SSA economies, especially ongoing spending and the economy's lack of diversification away from dependence on commodity export, there is a serious threat to the future of the economies that make up Sub Saharan Africa. The

Eurozone crisis of 2010 is a recent lesson and the Sub Saharan may not survive another crisis at this point as another crisis with the vanishing real incomes, and the unbearable levels of unemployment and inflation at 14% and 18.5% respectively (WDI, 2016) and deterioration of public facilities will be quite disheartening and may prevent the creation of opportunities for resilient and sustainable growth and development of the region.

In a bid to address this poor public sector performance, various efforts have been made by both the governments of the individual sub-Saharan African states and world donor agencies like the IMF to improve public sector performance in the region. These measures include at first the Structural adjustment program implementation that championed fiscal deficit reduction and forced on economies facing internal disequilibrium [(IMF, (1987). Though the implementation of this deficit-reducing venture in most sub-Saharan African economies was quite successful, especially in the 1980s and 1990s, the implementation was accompanied by significant economic cost due to the narrow tax base of the region which affected revenue expansion (Akyuz & Gore, 2001).

Another measure is the adoption of the Maastricht treaty criteria of the European Union by most sub-Saharan African economies. The criteria set fiscal rules for all members states in order to enter the 3rd stage of the Economic and Monetary Union before adopting the Euro as their currency (Alexe, & Flavia Tatomir 2012). Part of the fiscal control measures of the treat and the Stability and Growth Pact (SGP) adopted by most economies of the region was the setting of a numerical limit on the public debt (60% of GDP) and on government deficits (3% of GDP). (Ibrahim & Alagidede, 2018). However, not minding the attractive, predictable, and transparent nature of numerical rules, Sub Saharan African experience shows that taking the economies individually, the numerical criteria has not been very effective in providing fiscal discipline considering the weak financial performance of the major economies in the region. For instance in Nigeria the biggest economy in the region, an aggregate deficit, which was N3.4 billion in 1983, rose noticeably and gradually to N285.84B in 1999 and further to N 810B by 2007, and then phenomenally to N 1557.8B by 2015 (CBN, 2016) even with the adoption of the treaty in Nigeria since the promulgation of the Fiscal Responsibility Act of 2010. Nigeria's increasing debt description, of which the outside component has been substantial, is undoubtedly a result of the country's ongoing deficit financing. External debt was minimal and of little public concern prior to

1980. A noticeable and growing trend ensued thereafter, such that From N430 billion in 2007 to N2 trillion in 2015, the global debt stock (CBN,2016) with consequential high debt service payments. Bello and Obasaki (2009) claim that the nation's \$354 million in repayments for debt service in 2016 kept it from making more domestic investments, which would have boosted growth and development.

Fiscal discipline and government size are critical determinants of macroeconomic stability and economic growth, particularly in developing economies such as Nigeria. Over the past two decades, fiscal deficits and public debt in Sub-Saharan Africa (SSA) have been rising at an alarming rate, raising concerns about long-term sustainability. The region's heavy reliance on external borrowing, coupled with high interest rates and weak revenue collection, has created an economic environment vulnerable to fiscal crises. The Nigerian economy, the largest in SSA, has faced recurring fiscal deficits despite various policy interventions. This persistent fiscal imbalance raises key questions about the effects of fiscal discipline and government size on economic growth, employment, and public finance sustainability.

Existing literature provides extensive discussions on fiscal discipline and government size, but several gaps remain. Studies such as Gollwitzer (2010) and Lledo & Poplawski-Ribeiro (2013) have examined fiscal performance in SSA but often lack quantitative macroeconomic simulations that capture real-world fiscal scenarios. Similarly, research by Funashima and Hiraga (2017) and Mierau and Andreu (2014) has explored the impact of fiscal rules on government size in advanced economies, but limited empirical evidence exists on how fiscal discipline shapes government expansion and economic outcomes in developing nations like Nigeria. This study seeks to fill these gaps by constructing a small macro-model to simulate the effects of different fiscal discipline scenarios on government size, economic growth, and unemployment. This study expands existing knowledge by providing empirical evidence on how fiscal discipline, measured by deficit thresholds and debt levels, influences macroeconomic variables in Nigeria. Specifically, the study examines how changes in fiscal discipline affect government size within a small macroeconomic model assesses the investigate the reaction of economic growth to changes in fiscal (in)discipline scenarios in a small macro model of the Nigerian economy and examine the reaction of unemployment to changes in fiscal (in)discipline scenarios in a small

macro model of the Nigerian economy Unlike previous studies that focus on static fiscal analysis, this research employs dynamic simulations to illustrate how fiscal policy adjustments shape economic outcomes over time.

To address the research objectives, the study adopts an Autoregressive Distributed Lag (ARDL) model and macroeconomic simulations to analyze fiscal (in)discipline effects. The ARDL model is particularly suited for this study as it allows for both short-run and long-run analysis of fiscal variables while accommodating different integration orders of economic data. The simulation approach enables us to quantify the potential impact of fiscal deficit and government spending policies on macroeconomic indicators. By integrating a macro-model simulation with empirical estimation, this research provides actionable insights for policymakers, donor agencies, and researchers seeking strategies to enhance fiscal sustainability in Nigeria and SSA. The following sections further elaborate on the theoretical and empirical literature, detailing the underlying economic mechanisms that drive fiscal discipline, government size, and economic growth.

2. Literature Review

Fiscal discipline, while widely discussed in economic literature, lacks a universally accepted definition. Scholars like Musgrave (1959) view fiscal discipline as avoiding deficit financing of current expenditures, advocating that government should finance current spending from current revenues to ensure intergenerational equity. Mikesell (1999) extends this idea, emphasizing the importance of controlling expenditures to match available revenues and ensuring adherence to established budgets. Axelrod (1988) highlights the legislative perspective, asserting that fiscal discipline requires timely and lawful budget adoption. Furthermore, it demands collaboration among lawmakers and the executive to maintain smooth budgetary processes. These perspectives collectively portray fiscal discipline as a multi-stakeholder effort involving lawmakers, the executive, and citizens, aimed at ensuring sound public finance management.

Government size refers to the extent of public sector activities, measured by spending, employment, or income. Total government expenditure often serves as a proxy for government size. While larger government size

can lead to crowding out of private investment, it is also argued to provide economic stability, infrastructure development, and job creation. Cusack and Fuchs (2002) categorize government spending into interest payments, transfers, subsidies, investment, and consumption, emphasizing that different expenditure types have varying economic impacts. Supporters of smaller government advocate for minimizing taxes and borrowing to avoid stifling private sector activity, whereas proponents of larger government highlight its role in providing essential public services and fostering long-term growth.

While, economic growth is primarily defined as a quantitative increase in an economy's productive capacity, typically measured by real GDP (Haq et al, 2024; Kchikeche & Mafamane, 2023). Kuznets emphasized the role of productivity improvements and capital investments in driving growth (Kuznets, 1952). Broader definitions, such as sustainable or balanced growth, incorporate welfare objectives but are harder to quantify. Growth theories range from classical models like Harrod-Domar and Solow's neoclassical growth model to endogenous growth theories. These models emphasize the roles of savings, technological advancements, and structural transformation in achieving sustained economic growth.

2.1 Theoretical Literature

2.1.1. Public Expenditure Theories

Wagner's Law: Predicts that public expenditure grows as economies develop, driven by urbanization and social needs (Pehlivan et al, 2021; Aresti et al, 2021; Ghazy et al, 2021).

Peacock-Wiseman's Displacement Effect Hypothesis: Posits that government spending increases significantly during crises, establishing new levels of expenditure (Jaén-García, 2021)).

Rostow-Musgrave Model: Suggests that public spending is highest in early development stages as governments invest in infrastructure and social overheads (Rostow, 1960).

2.1.2 Growth Theories

Harrod-Domar Model: Emphasizes the link between savings and economic growth, with capital accumulation driving productivity (Dumo et al, 2023).

Solow Model: Argues that technological progress, rather than capital accumulation, determines long-term growth (Otieno, 2024; Van den Berg, 2013; Keita, 2016).

Endogenous Growth Theory: Highlights the role of knowledge, innovation, and human capital in sustaining growth (Grossman & Helpman, 1994).

2.2 Empirical Literature

2.2.1 Trends in Fiscal Discipline

Studies like Gupta and Singh (2016) and Tran (2018) document fiscal discipline trends in specific countries. They emphasize the importance of reforms in controlling deficits and managing public debt. The global financial crisis underscored the need for fiscal discipline, with countries adopting austerity measures to restore balance. While developed countries often showcase advanced fiscal frameworks, emerging economies have made significant strides in improving fiscal discipline.

2.2.2 Impact of Fiscal Discipline on Macroeconomic Indicators

Fiscal discipline significantly influences macroeconomic stability such as interest rates (Ardagna et al. 2007) who found that fiscal deficits lead to higher long-term interest rates, crowding out private investment. Investment Flows (Schoeman et al. 2000) linked fiscal discipline to increased foreign direct investment in South Africa, demonstrating the confidence it instills in international investors and Debt Sustainability (Bleaney and Halland 2016) highlighted that resource-rich economies with disciplined fiscal policies avoid the "resource curse" and achieve sustainable growth.

3. Data and Methodology

3.1 Theoretical Framework

The theoretical frameworks adopted for this study are the common pool resource (CPR) theory and the AK growth model. The CPR first proposed by Hardin (1968) focuses on efficiency and functionality. It states that funding for a certain category of government spending is frequently distributed among various interest groups. Therefore, there is a motivation

for each interest group to profit from the efforts of the others. Due to this, people tend to overspend. According to Treisman (2008), local administrations can influence the national government to grant their requests. Treisman's approach allows spending units like ministries, departments, agencies, and sub-national governments (MDASs), who are in charge of budget execution, to replace local government.

A nation is split into $n = 1, 2, \dots, N$ MDASs, each of which receives an income (y) and pays a one-time tax (T). Transfers from the central government (CG) to MDASs are indicated by the symbol r_n and are used to pay for each MDAS's public expenditures (g_n). Taxes are used to pay for the central payments in turn. To put it another way, taxes are collected by the CG and transferred to MDASs. Given the budgetary constraints, budgeting entails selecting the expenditure level (i.e., provision of public services) for each MDAS. Think about a budgeting procedure where each MDAS decides on the level of spending based on the decisions of the others and the budget of the central government.

Each MDAS thus maximizes a payoff function:

$$V_n = h(g_n) + y - T \dots \dots \dots (3.1)$$

Where

$$h' > 0, h'' < 0. h(0) = 0, \lim_{g \rightarrow 0} h'(g) = \infty$$

V_n is the payoff value

subject to the CG budget constraint

$$\sum_n g_n = \sum_n r_n = TN \dots \dots \dots (3.2)$$

Equilibrium spending by each MDAs is then given by the first order condition:

$$h'(g_n^*) = 1/N \quad (\text{Marginal cost of spending}) \dots \dots (3.3)$$

The perceived cost of an increase in an MDA's level of spending is $1/N$. The MDAs pick the same level of spending because they are all the same. Instead, there would be no funding allocation and each MDA would be maximizing (3.1) subject to the MDA's budget limitation if it had to pay the whole cost of its spending and finance it with a lump sum tax:

$$g_n = T \dots \dots \dots (3.4)$$

the equilibrium condition given by the first order condition would be
 $hg(gn) = 1$ (marginal cost of spending)
(3.5)

which is more efficient than (3.3) because spending in (3.3) is higher than in (3.5), given $N > 1$.

In the first case excess spending in an MDA results from perceived marginal cost of spending lower than the increase expenditure: each MDA pays only $1/N$ of a dollar spent, while in the second case, each MDA bears the full cost of its expenditure by paying the true price of an increase in the level of expenditure. Marginal cost of spending is lower in (3.3) than in (3.5). The common pool resources problem results from a coordination failure because the decision makers in the process fail to take into account the full cost of their spending.

Central government can also subject to the common pool problem via volatile receipts, like oil revenue, foreign aid and grants as the spending units bear no part of the expenditure. A logical solution to a CPR problem would be to internalizing this externality. This calls for adequate institutions, rules, or both and reducing the vertical fiscal gap (the ratio of central transfers to total revenues in the locality), which means that local expenditure is fully financed by local revenues. This would make the divergence of private (local) and social (national) opportunity costs disappear (Pisauro 2001).

The choice is this framework among other relevance frameworks is based on the objective of the study, the CPR captured the activities of the spending units like the MDA which has not been addressed in literature and the CPR theory focuses on efficiency and functionality in distribution of goods that are non-excludable but rivalrous in consumption to avoid the tragedy of commons.

3.2 Model Construction

To simulate the macroeconomic effect of fiscal policy measures, researchers in literature developed frameworks that are demand and supply oriented. However, this study adopts the Keynesian-type model that focuses on the demand side of the economy. Keynesian aggregate demand framework will be adopted to examine the impacts of fiscal

deficit shocks on government size in Nigeria and seeks to give a guide for macroeconomic policy analysis and as well for tracking the effects of the different policy scenarios on the system.

The model covers the demand side of the Nigerian economy. There are nineteen (19) equations in the macro model, out of which twelve (13) of the equations are behavioural in nature, while, four (4) are identities and three (2) of the equations are just definitions. The model is made up of five (5) key blocks of the economy, which are fiscal block, domestic absorption block, monetary block, external block and employment block. To ensure internal consistency in macroeconomic analysis, these are considered to be minimum requirements for the macroeconomic model (Easterly 1989). The model specifications in this work follow that of Bhat and Kamaiah, (2021), Nkoro and Uko (2018), Khan and Din (2011) and Iyoha (2003) with little modifications to address the current objective of the study.

Domestic Absorption Block

The domestic absorption block of the economy is led by the following identity adopted from Nkoro and Uko (2018),

$$GDP = PCE + GC + PI + GI + (EXP-IMP) \text{ -----(3.10)}$$

GDP is seen as the domestic absorption, PCE is the economy's private consumption expenditure, while GC stands for government consumption expenditure. PI stands for private investment, GI in the equation stands for government expenditure, EXP is export expenditure and IMP is import expenditure.

Consumption Expenditure Function (Private)

According to the Life-cycle hypothesis and permanent income formulation, consumption depends on real interest rate, disposable income and real money balances which capture the effect of wealth (Rankaduwa, et al. 1995). C-1 captures the adaptive expectations effect which will address country specific variables. Thus,

$$CE=f(YD,RINT,M2,C-1);f_1>0,f_2<0,f_3,>0,f_4>0 \text{ -----(3.11)}$$

$$CE = \beta_0 + \beta_1 YD_t + \beta_2 RINT_t + \beta_3 M2_t + \beta_4 C - 1_t + \mu_t$$

However, disposable income is derived by removing taxes from GNP

(Gross National Product) (Iyoha, 2003).

$$YD = (GNP - TX) \text{-----} (3.12)$$

TX is total government tax revenue and NGDP is nominal Gross Domestic Product

Hence, the identity for personal saving identity is defined as disposable income less private consumption expenditure.

$$SP = YD - C \text{-----} (3.13)$$

The identify of GNP is defined as GDP plus net income abroad

Consumption Expenditure (Government)

According to Nkoro and Uko (2018) consumption expenditure of government is defined as the governments' current expenditure on goods and services and it depends on government investment (GI), Gross Domestic Product, government revenue (GR) and fiscal deficit (FD).

$$GE = f(GI, GDP, GR, FD) \text{-----} (3.14)$$

$$GE = \beta_0 + \beta_1 GI_t + \beta_2 GDP_t + \beta_3 GR_t + \beta_4 FD_t + \mu_t$$

From the theoretical and empirical literature review, the GE is used as a proxy to the size of government in this study.

Investment Expenditure (Private)

The private investment expenditure function is framed after the neo-classical approach and adopted from Khan and Din (2011). According to Khan and Din (2011), this approach captures all the cost minimization and profit maximization decisions of the firms. Hence, private investment expenditure is determined by Gross domestic product, User cost of capital, government investment, political stability proxied with a dummy variable and lagged investment(I-1):

$$PI = f(GDP, PI-1, UCC, GI, DM, \dots), f_1, f_2 > 0, f_3, f_4, f_5, < 0 \text{-----} (3.15)$$

$$PI = \beta_0 + \beta_1 GDP_t + \beta_2 PI_{t-1} + \beta_3 UCC_t + \beta_4 GI_t + \beta_5 DM_t + \mu_t$$

The UCC (User cost of capital) is computed as interest rate plus one multiplied by the nominal exchange rate (NEXR).

$$UCC = (1 + INT) * NEXR$$

Investment Expenditure (Government)

We assume in this model that government investment is determined exogenously and it is captured through governments' capital expenditure.

$$GI = \overline{GI} - \frac{\sigma}{\mu} - \frac{\sigma^2}{\mu^2} - \frac{\sigma^3}{\mu^3} - \dots - \frac{\sigma^n}{\mu^n} - \dots \quad (3.16)$$

Fiscal Block

The total revenue of Government (GTR) is assumed to depend on the total economic activities in the economy (GDP)

$$\text{GTR} = f(\text{GDP}), f_1 > 0 - \quad - \quad - \quad - \quad -(3.17)$$

We then compute the Fiscal deficit identity which is government expenditures less government revenues.

$$\text{FD} = \text{GE} - \text{GTR} - \begin{matrix} 1 & 9 \\ - & - & - & - & - & - \end{matrix} \quad (3.18)$$

From the equation 3.18 also, we derive the fiscal discipline simulators using the fiscal rules. That is, the researcher is expected to tinker on the FD variable allowing for fiscal indiscipline to see how other macro variables like output, government and unemployment respond to such simulation.

External Sector Block

This block incorporates the balance of payment conditions of the economies, which include both the capital account, and the current account balances. The current account components include imports, exports and the nominal exchange rate.

Imports Function

Imports of goods and services depend positively on gross domestic product and foreign reserve but depend negatively on relative prices levels/import price deflator.

$$\text{IMP} = f(\text{GDP}, \text{RESEV}, \text{RPM}, \text{EXCH}), f_1, f_2 > 0, f_3 < 0 \quad \text{--(3.19)}$$

$$IMP = \beta_0 + \beta_1 GDP_t + \beta_2 RESEV_t + \beta_3 RPM_t + \beta_4 EXCH_t + \mu_t$$

Exports Function

Exports positively depend on oil prices (for oil exporting nations) and growth rate of Global GDP but depends negatively on relative prices level (the ratio of domestic prices to U.S prices).

$$\text{Exp} = f(\text{OIL}, \text{GWI}, \text{RPM}, \text{EXCH}), f_1, f_2 > 0, f_3, < 0 - \quad -(3.21)$$

$$\text{EXP} = \beta_0 + \beta_1 \text{OIL}_t + \beta_2 \text{GWI}_{t-1} + \beta_3 \text{RPM}_t + \beta_4 \text{EXCH}_t + \mu_t$$

Exchange Rate Function

According to Dornbusch (1980) and the Frankel (1979) nominal exchange rate depends negatively on GDP, but depends positively on foreign reserve, import price deflator and relative money supply .

$$\text{EXCH} = f(\text{GDP}, \text{FRESV}, \text{IMPD}, \text{EXR}+1 \text{ RMS}), f_1, f_4, < 0, f_2, f_3, > 0 - \quad -(3.22)$$

$$\text{EXCH} = \beta_0 + \beta_1 \text{GDP}_t + \beta_2 \text{FRESV}_{t-1} + \beta_3 \text{IMPD}_t + \beta_4 \text{MS}_t + \mu_t$$

Monetary and Price Block

The monetary and price block presents explanations on money demand behavior, behavior of domestic price level and that of short-term interest rate.

Money Demand Function

Every monetary policy's main goal is to maintain price stability and sustainable growth, both of which are dependent on the stability of the money demand function. It is assumed that real money balances are negatively impacted by inflation, short-term interest rates, and real income: Thus:

$$\text{RBMD} = f(\text{INT}, \text{RGDP}, \text{INF}), f_1, > 0, f_2, < 0 - \quad -(3.23)$$

$$\text{RBMD} = \beta_0 + \beta_1 \text{INT}_t + \beta_2 \text{RGDP}_{t-1} + \beta_3 \text{INF}_t + \mu_t$$

Interest Rate Function

Another money policy instrument used by the Central Bank of any economy is Interest rate. There is a negative impact of money supply on short-term interest rate while short-term interest rate depends positively on domestic price level. The Monetary Policy rate incorporates the pass-through impact of changes in monetary policy on the rate of interest in the market.

$$\text{INT} = f(\text{RBMs}, \text{RGDP}, \text{CPI}, \text{GDEBT}), f_1, < 0, f_2, f_3, > 0 - \quad --(3.24)$$

$$\text{INT} = \beta_0 + \beta_1 \text{RBM}_t + \beta_2 \text{RGDP}_{t-1} + \beta_3 \text{CPI}_t + \beta_4 \text{gdebt}_t + \mu_t$$

Prices Equation

Domestic price in this system depends on money supply, interest rate, disposable income, imported price (import index*exchange rate), lagged inflation and total government expenditure positively.

$CPI = f(RBM_s, INT, DY, IMPP.EXR, CPI-1, GEXP,)$, $f_1, f_2, f_3, f_4, f_5, f_6 > 0$ - (3.25)

$$CPI = \beta_0 + \beta_1 RBM_t + \beta_2 INT_{t-1} + \beta_3 DY_t + \beta_4 IMPP.EXCH_t + \beta_5 CPI_{t-1} + \beta_6 GEXP_t + \mu_t$$

GDP Deflator

It is assumed that GDP deflator is a determined by domestic price level. However, GDP deflator, also, does not solely determine domestic price level in an open economy. Interest rate, exchange rate, and import index are among the determinants of domestic price.

$GDPDFL = f(CPI, INT, CPI-1, EXR, IMPD)$, $f_1, f_2, f_3, f_4, f_5, f_6 > 0$ - (3.26)

$$GDPDFL = \beta_0 + \beta_1 CPI_t + \beta_2 INT_t + \beta_3 CPI_{t-1} + \beta_4 EXCH_t + \beta_5 IMP_{t-1} + \mu_t$$

Unemployment Block

Unemployment

From the theoretical point of view and following the Keynesian framework of aggregate demand, Phillips (1958) and Okun (1983), unemployment changes are related to fiscal policy (measured by government capital expenditure), inflation (consumer price index) and real output (measured by real GDP per capita). The model to evaluate the determinants of unemployment. Hence,

$UNMP = f(GCEX, CPI, RGDP)$, $f_1, f_2 < 0$ - (3.27)

$$UNMP = \beta_0 + \beta_1 GCEX + \beta_2 CPI_t + \beta_3 RGDP_t + \mu_t$$

3.3 Estimation Procedure

The Model contains 19 equations (twelve (12) of the equations are behavioural in nature, while, four (4) are identities and three (3) of the equations are just definitions). The model was estimated using annual data for the period 1986 to 2022 for Nigeria. The model was estimated

equation by equation using the Autoregressive Distributive Lag Model (ARDL) approach in conformity with underlying economic theories following the works of Olofin et al, (2020). while Gauss–Seidel algorithm was be used for model simulation purpose. The ARDL lag selection method was used to select the optimum lag length for each of the model. The model estimation result is presented followed by the simulation result.

Post estimation diagnostic tests was carried out to provide proof for validity of estimates.

3.4 Data Sources and Transformation

The study depends whole on secondary data sourced from world recognized database. Most of the needed data for this study were sourced from the World Bank's World development indicators (2022 version), OECD national Account data, Quality of Governance Data base, the IMF data based on other relevance agencies.

The study will make use of annual data series ranging from 1986 to 2022. In estimating the data as sourced from the recognized data bases, the study utilized EVIEWS 9 Econometrics packages in all the estimation. EVIEWS have been adjudged to be efficient and effective in generating quality outputs.

4. EMPIRICAL RESULTS

4.1 Unit Root Test Results

Table 4.1: unit root test result

Variables	Crit valu	Philip p test	I(d)	Variables	Crit valu	Philip p test	I(d)
PCE	-1.951000 ^c	-4.572969 ^c	I(1)	INT	-3.544284 ^b	-4.132409 ^b	I(0)
DY	-1.951000 ^c	-3.972045 ^c	I(1)	INF	-2.951125 ^a	-7.122295 ^a	I(1)
RINTR	-1.950687 ^c	-3.527562 ^c	I(1)	GOVTS	-3.548490 ^c	-8.166477 ^c	I(1)
MS	-1.950687 ^c	-8.976862 ^c	I(1)	DEBTSERV	-1.951000 ^a	-7.397337 ^a	I(1)
GC	-1.951000 ^b	-4.686623 ^b	I(1)	IMP	-3.548490 ^a	-8.440871 ^c	I(0)
GI	-3.548490 ^b	-8.172163 ^b	I(1)	EXRESEV	-1.951000 ^a	-5.585285 ^c	I(1)
GDP	-1.951000 ^a	-3.900912 ^a	I(1)	RP	-1.951000 ^b	-5.625722 ^a	I(1)
GRT	-3.548490 ^b	-6.040991 ^b	I(1)	EXCH	-1.951000 ^b	-3.123791 ^a	I(1)
FD	-1.951000 ^b	-3.900912 ^a	I(1)	Exp01	-1.951000 ^b	-6.784147 ^c	I(0)
PI	-1.951000 ^a	-2.704084 ^a	I(1)	OILP	-1.951000 ^b	-5.610093 ^a	I(1)
UCC	-1.951000 ^a	-5.403748 ^a	I(1)	GW1	-2.948404 ^a	-6.456575 ^b	I(0)
GDEBT	-1.951000 ^a	-3.900912 ^a	I(1)	IMPD	-1.951000 ^b	-6.051114 ^c	I(1)
RBM	-1.951000 ^c	-2.068374 ^c	I(1)	RGDP	-2.951125 ^a	-3.070049 ^b	I(1)
CPI	-3.548490 ^b	4.349481 ^b	I(1)	TGEXP	-1.951000 ^a	-2.134095 ^b	I(1)
GDPDF	-1.950687 ^b	12.05540 ^b	I(0)	UNEM	-3.548490 ^b	-5.131886 ^c	I(1)
GCEX	-3.548490 ^c	-8.172163 ^c	I(1)				

Source: Author's compilation, 2024

Since the absolute value of the Philip Peron test statistic only surpassed the threshold value at the first difference, the unit root test findings above show that the majority of the variables were non-stationary. Additionally, table 4.1's results show that the majority of the variables became stable at first difference, allowing the autoregressive framework to employ the error correction model. The outcome further supported the use of the ARDL model for the investigation by demonstrating that none of the variables are I(2).

4.2 Autoregressive Distributed Lag (Ardl) Bounds Test Approach To Cointegration

The ARDL Bounds Test approach to cointegration is used to conduct the cointegration test subsequent to the outcome of the unit root test. This approach was chosen because the Engle-Granger and Johansen Cointegration test approaches cannot be used because our variables are not integrated of the same order. The ARDL cointegration approach was developed by Pesaran and Shin (1999) and Pesaran et al. (2001) and has three main advantages over other conventional cointegration approaches. First off, ARDL can be applied to series that are $I(0)$, $I(1)$, or both, without requiring that all of the variables under study have the same order of integration. Second, when small sample sizes are used, it is comparatively more efficient. Thirdly, the ARDL method yields objective estimates of the long-run model (Harris and Sollis, 2003). To ascertain whether the dependent and explanatory variables have a long-term relationship, the cointegration test is used. The null hypothesis should be accepted if the computed F-statistic is less than the lower bounds value and rejected if it is greater than the upper bounds value, according to the ARDL Bounds test of cointegration rule. If the calculated F-statistic lies between the lower and upper bound, the ARDL cointegration test will be deemed inconclusive.

Table 4.2 displays the ARDL bound test result. Given that the computed F-statistic for each model is greater than the upper bound critical value at both the 1 percent and 10 percent significance levels, the result indicates that the null hypothesis for each model should be rejected. This implies that there is a long-run relationship among the endogenous variables and their respective explanatory variables. We will proceed to estimating the ARDL long run models for each of the models.

Table 4.2: ARDL bound test result

Endogenous variables/ dependent variables (Equations)	Significance	Lower bound	Upper bound	Computed F-statistic	Cointegration status
Eqn 1 (Dep Var: PCE)	10%	2.72	3.77	7.775354	cointegrated
	5%	3.23	4.35		
	1%	3.69	4.89		
Eqn 2 (Dep Var: GC)	10%	2.45	3.52	19.60755	Cointegrated
	5%	2.86	4.01		
	1%	3.25	4.49		
Eqn 3(Dep Var: PI)	10%	2.45	3.52	6.319068	Cointegrated
	5%	2.86	4.01		
	1%	3.25	4.49		
Eqn 4 (Dep Var: GRT)	10%	3.17	4.14	5.210112	Cointegrated
	5%	3.79	4.85		
	1%	4.41	5.52		
Eqn 5(Dep Var: GDEBT)	10%	2.26	3.35	6.299244	Cointegrated
	5%	2.62	3.79		
	1%	2.96	4.18		
Eqn 6 (Dep Var: IMP)	10%	2.45	3.52	8.659296	Cointegrated
	5%	2.86	4.01		
	1%	3.25	4.49		
Eqn 7 (Dep Var: EXP)	10%	2.45	3.52	15.89555	Cointegrated
	5%	2.86	4.01		
	1%	3.25	4.49		
Eqn 8: (Dep Var: EXCH)	10%	2.45	3.52	7.675597	Cointegrated
	5%	2.86	4.01		
	1%	3.25	4.49		
Eqn 9(Dep Var: RBM)	10%	2.72	3.77	5.362699	cointegrated
	5%	3.23	4.35		
	1%	3.69	4.89		
Eqn 10 (Dep Var: INT)	10%	2.45	3.52	8.989592	Cointegrated
	5%	2.86	4.01		
	1%	3.25	4.49		
Eqn 11 (Dep Var: CPI)	10%	2.26	3.35	13.32190	Cointegrated
	5%	2.62	3.79		
	1%	2.96	4.18		
Eqn 12 (Dep Var: GDPDF)	10%	2.45	3.52	4.485574	Cointegrated
	5%	2.86	4.01		
	1%	3.25	4.49		
Eqn 13 (Dep Var: UNEM)	10%	2.72	3.77	19.05963	Cointegrated
	5%	3.23	4.35		
	1%	3.69	4.89		

4.3 Estimation Results of Individual Equations

The estimation result for each of the 13 equations on the 5 countries of study are presented below

Table 4.3 Long Run Estimation Results for Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dep Var: PCE				
DY	0.892045	0.076225	11.702864	0.0000
RINTR	120759688.131990	315501326.904674	0.382755	0.7053
MS	-1196382.174450	1690558.067151	-0.707685	0.4860
C	-	-	-	-
C	15900420998.959972	5507263954.317417	-2.887172	0.0081
Dep Var: GC				
GI	-17889150.9819	15050244.957608	-1.188629	0.2733
GDP	0.136135	0.046361	2.936405	0.0218
GRT	-19021464.658667	5936814.180726	-3.203985	0.0150
FD	30207715.732876	12799314.144528	2.360104	0.0503
C	-6912534966.052908	1595111396.492901	-4.333575	0.0034
Dep Var: PI				
GDP	0.000000	0.000000	4.103675	0.0034
UCC	2.608681	1.280820	2.036727	0.0761
GI	2.896174	1.382486	2.094902	0.0695
DM	-6526.747704	2295.316145	-2.843507	0.0217
C	-910.967037	359.441484	-2.534396	0.0350
Dep Var: GRT				
GDP	0.000000	0.000000	0.614042	0.5473
GOVTS	-0.000000	0.000000	-0.512609	0.6148
C	-6349.629099	11501.948723	-0.552048	0.5881
Dep Var: GDEBT				
INT	-311.193180	365.142667	-0.852251	0.4223
GOVTS	0.000000	0.000000	1.715063	0.1300
DEBTSERV	0.000003	0.000001	4.705582	0.0022
DM	14137.853203	8070.694299	1.751752	0.1233
RGDP	-0.000000	0.000000	-1.732437	0.1268
C	21236.124607	16405.136111	1.294480	0.2366
Dep Var: IMP				
GDP	0.096141	0.023636	4.067594	0.0016
EXRESEV	-0.464471	0.103291	-4.496712	0.0007
RP	66587882013.31516031080506110.266308		2.142432	0.0534
EXCH	-9736711.280023	12868475.527882	-0.756633	0.4639
C	-	-	-	-
C	10873460677.116576	4761053949.413867	-2.283835	0.0414

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Dep Var: EXP				
OILP	-4636523828.113421	5508629510.133658	-0.841684	0.4244
	-			
GWI	36623373710.98129734965591984.735720		-1.047412	0.3255
RP	1357764902525.74831274275163284.4428		1.065519	0.3177
EXCH	-383604545.910605	341585131.486504	-1.123013	0.2940
	-			
C	39823841545.99079224564619749.241432		-1.621187	0.1436
Dep Var: EXCH				
RGDP	0.000000	0.000000	0.019809	0.9854
EXRESEV	-0.000004	0.000185	-0.019773	0.9855
TB	-0.000000	0.000023	-0.019816	0.9854
MS	-9.424009	476.065421	-0.019796	0.9854
C	-50291.006890	2539807.584638	-0.019801	0.9854
Dep Var: RBM				
INT	716141583816.950881209367851274.0654		0.592162	0.5593
RGDP	-1.150801	1.201137	-0.958093	0.3476
	-			
INF	51860113656.195544230090733194.51932		-0.225390	0.8236
C	15449387032579.69429030578563476.352		0.532176	0.5995
Dep Var: INT				
RBM	0.000000	0.000000	1.167978	0.2638
RGDP	-0.000000	0.000000	-0.764084	0.4585
CPI	0.194617	0.622664	0.312555	0.7596
GDEBT	0.004041	0.003671	1.100688	0.2910
C	40.145145	31.169464	1.287964	0.2202
Dep Var: CPI				
RBM	-0.000000	0.000000	-0.063915	0.9515
INT	-41.104801	625.367105	-0.065729	0.9501
DY	0.000000	0.000000	0.065741	0.9501
IMPD	23.470614	372.694099	0.062976	0.9522
TGEXP	-1.359727	21.111016	-0.064408	0.9511
C	-1863.507474	29531.822700	-0.063102	0.9521
Dep Var: GDPDF				
CPI	0.777500	0.154670	5.026845	0.0001
INT	2.761801	2.120203	1.302612	0.2101
EXCH	0.602315	0.217208	2.772983	0.0130
IMPD	0.792586	0.187187	4.234203	0.0006
C	-81.955532	38.378412	-2.135459	0.0476
Dep Var: UNEM				
GCEX	-0.002549	0.001113	-2.289811	0.0330
CPI	0.028214	0.010186	2.769896	0.0118
RGDP	-0.000000	0.000000	-0.092894	0.9269
C	4.019441	0.273290	14.707608	0.0000

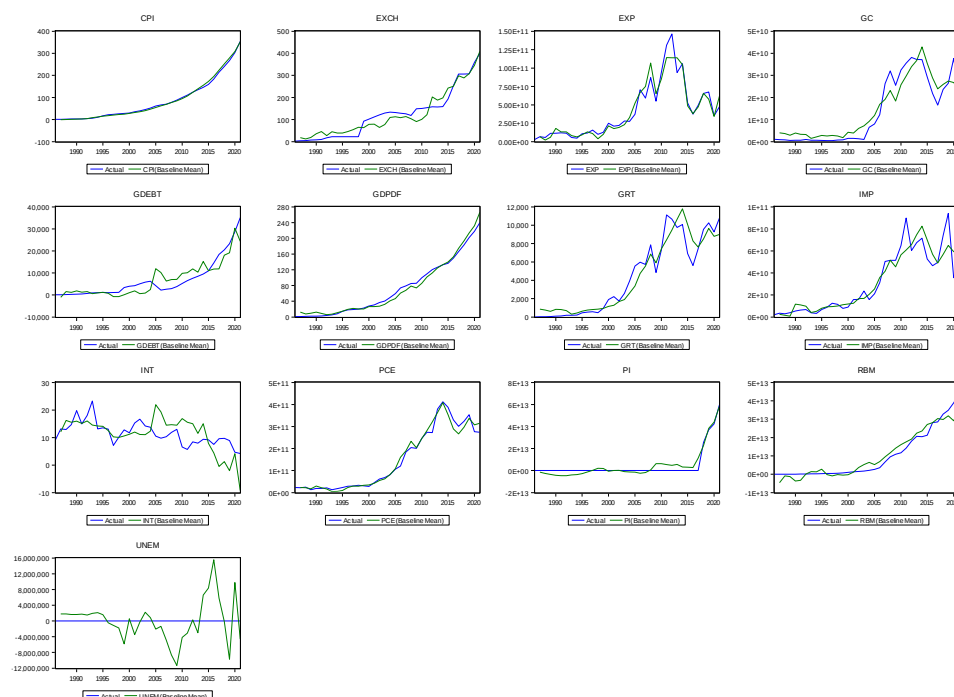
The results on table 4.3 are outputs from a regression analysis for 13 dependent variables (Dep Var) showing the models that make up Nigeria' macro model, each with its corresponding independent variables,

coefficients, standard errors, t-statistics, and probabilities (p-values). From the results DY (Disposable Income) Coefficient of 0.892, p-value = 0.0000 shows that Disposable income significantly and positively influences private consumption expenditure, while real interest rate and money supply does not have significant effect on PCE in Nigeria. From the result of equation 2 (Dep Var: GC) there is a significant effect of GDP, fiscal deficit and government tax revenue on government consumption expenditure. The result also shows there is a significant impact of GDP, external reserve and relative prices on import in Nigeria as found on table 4.11, while unemployment is significantly affected by government capital expenditure and consumer price index in Nigeria while there is a significant effect of CPI and import deflator on Nigeria's GDP deflator. In general, key variables like DY, GDP, and CPI consistently show significant impacts across various dependent variables, reflecting their central roles in macroeconomic dynamics, while, several variables, such as RINTR and MS, appear statistically insignificant in their respective models, suggesting their limited influence in the Nigerian economy.

4.4 Model Appraisal and Simulation

To evaluate how well the model predicted the movement of the endogenous variables, within-sample simulations were run. The evaluation of the statistical characteristics in individual equations did not always indicate that the model was operating well. Instead, the model's tracking efficacy and forecasting precision were also assessed. In order to assess the models' accuracy from 1986 to 2021, the real and simulated values of endogenous variables were compared. A quick glance at the graphs in figures 4.1 showed that the model did a fair job of tracking the endogenous variables' time paths and turning points. This demonstrated the model's strong performance. Once the model's within-sample and out-of-sample prediction performance is sufficient, we investigated how changes in exogenous factors affect the model's endogenous variables.

Fig 4.1



4.5 Policy Simulation Experiments and Impact Analysis

We present simulations on potential effects of changes in selected variables (policy variables) on the current values of endogenous variables, based on the level of satisfactory performance seen in many of the variables in the Ex-Post Simulations. Given the relationships in the model, the procedure involved introducing shocks in a subset of policy variables and tracking their effects on the current values of a subset of endogenous variables. Examining the impact of altering a specific policy tool on a subset of macroeconomic variables was the goal. We used the ex-post simulation in doing this. The effects of government size and fiscal (in)discipline are taken into account. The tests are designed in a way that consistently modifies each shock variable over the course of all the years. On the other hand, Table 4.4 presents the experiments conducted in 2021 and 2022. This is because the years 2021 and 2022 are recent. The effects of altering a few chosen endogenous variables, referred to as targets, on policy variables, known as instruments, are displayed as a normal figure but are discussed in terms of percentage change.

4.6 Policy Instrument Alteration: Simulation Scenarios

The effects of fiscal (in) discipline and government size are simulated as follows:

Scenario 1:- Fiscal Deficit Stimulus of 5% of GDP.

Scenario 2:- Government Debt Stimulus of 65% of GDP

Scenario 3: Government size stimulus of 20% of GDP

4.7 Justification of the Simulation Scenarios

To justify the chosen percentages for the simulation scenarios in your thesis on fiscal discipline, government size, and economic growth, each percentage reflects realistic policy interventions tailored to the Nigerian economy. A fiscal deficit at 5% of GDP is widely considered moderate and manageable, even though it remains fiscal indiscipline using the IMF numerical rule, particularly in Nigeria, where government spending plays a critical role in stimulating growth. Nigeria already exhibit fiscal deficits less than 5%, reflecting their reliance on external and domestic borrowing for infrastructure and social programs (IMF, 2020). Setting the simulation at 5% provides a benchmark that aligns with both practical policy standards and theoretical thresholds. Moreover, excessive deficits often lead to inflation and reduced private sector investment due to crowding-out effects, thus a 5% stimulus provides a balanced approach between fiscal expansion and caution (Keynes, 1936; Blanchard & Leigh, 2013). Also, for emerging and low-income economies like Nigeria, maintaining government debt levels below 60% of GDP is generally recommended to prevent unsustainable debt dynamics (World Bank, 2021). The choice of 65% as a simulation level aligns with empirical studies on debt thresholds for growth sustainability in developing regions. For instance, Reinhart and Rogoff (2010) identify that for developing countries, debt exceeding 60-70% of GDP begins to slow growth by increasing debt servicing costs and decreasing investment. In Sub-Saharan Africa, where debt often funds growth initiatives, a 65% threshold provides a realistic scenario to explore debt-financed stimulus impacts on economic expansion without crossing into high-risk territory. Finally, government size, measured by public expenditure as a percentage of GDP, is essential in determining a country's economic flexibility and welfare investment. A 20% benchmark represents a reasonable government size for Nigeria, where limited resources necessitate efficient but impactful public spending. Studies

have shown that for lower-income economies, maintaining government size around 20% of GDP supports both fiscal discipline and developmental goals (Afonso & Jalles, 2014). Furthermore, this level is consistent with optimal government size thresholds that maximize growth without overwhelming the private sector or distorting resource allocation (Barro, 1990).

Table 4.4: Simulation Result

Macroeconomic Variables	Baseline							
	2021	2022	Fiscal deficit Stimulus of 5% of GDP		Government Debt Stimulus of 65% of GDP		Government size stimulus of 20% of GDP	
			2021	2022	2021	2022	2021	2022
Government Size	5040000000	4910000000	5070000000 (0.5%)	5010000000 (2.0%)	4980000000	5430000000 (10%)	4860000000	4550000000 (-100%)
Fiscal Discipline	21609946800	220416791996					-955.6	-1408.7
Output Growth	972.33	914.7296	896.0671 (-7.5%)	872.8587 (-4.5%)	921.2 (-5.2%)	906.3 (-0.9%)	839.59	913.7771
Unemployment	5028626	4877194	5072236 (0.8%)	5147504 (5.5%)	5142538 (2.2%)	4925487 (0.9%)	4868441	5298558

From the result on table 4.4 which shows the simulation result for Nigeria, the result indicates that a fiscal deficit of 5 percent of GDP of Nigeria will cause a 0.5 and 2.0 increase in government size for the periods of 2021 and 2022 respectively. While output growth will shrink by 7.5 and 4.5 for 2021 and 2022 respectively and unemployment will increase by 0.8 and 5.5 percent for 2021 and 2022 respectively.

Also from the result, government debt stimulus of 65% of the GDP for Nigeria, increase government size by about 10% in 2022, decreases output growth by 5.2 and 0.9 percent in 2021 and 2022 respectively, while it increases unemployment rate by 2.2 and 0.9 percent in 2021 and 2022 respectively. Finally, a government size stimulus of 20% of GDP increases the level of fiscal indiscipline by over 100 percent in Nigeria. The results shows that a fiscal indiscipline of above 5% of GDP in Nigeria raises the size of government in Nigeria, reduces output growth and increases the level of unemployment indicating that fiscal indiscipline does no good to the economy. This finding of this study is in line with similar studies carried out using different methodologies, for instance, in their influential work within the public choice literature, Brennan and Buchanan (1980) depict government as a monolithic Leviathan, which seeks to increase its weight in the economy. They argue that “total government intrusion into the economy should be smaller, *ceteris paribus*, the greater the extent to which taxes and expenditures are decentralised” (Brennan and Buchanan, 1980). This implies that fiscal discipline are effective in curbing excessive government sizes. Interesting arguments that go in the direction of unveiling these additional mechanisms are given by Wyplosz (2005, 2011) and Debortoli and Nunes (2013). The first argues that politicians tend to look for escape clauses that allow them to circumvent previously established fiscal discipline rules, while the second points at the reinforcement between lack of commitment and lack of credibility. The findings of this study also can be likened to that of Funashima and Hiraga (2017) who investigated whether fiscal discipline restrain government from increasing its budget size in the USA and Germany for the period of 1977 to 2010. Examine the Wagner’s law using Panel cointegration analysis and found that the characteristics of fiscal discipline are prime determinants of the channel and degree of growth in government size. Also the findings conforms with that Mierau and Andreu (2014) who studied the impact of national fiscal rules on government size as measured by the ratio of government expenditures to gross domestic product in 27 European Union member

countries using a panel studies technique. The result indicates that fiscal rules have a negative impact on government size which is in line with the findings of this study. Hence, it is recommended that government should implement and strengthen fiscal rules and frameworks that encourage responsible budgeting and spending. This may include mechanisms to limit deficits, control public debt, and ensure transparency in fiscal management.

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Are Islamic Windows of Conventional Banks Still Relevant in the Landscape of Islamic Banking?

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ABSTRACT

This study explores the factors contributing to the rise of Islamic windows and their consequences on the Islamic banking sector by utilizing the literature on Islamic windows. The study identifies four main factors viz. legal, economic, strategic and organizational capability that motivate conventional banks to operate Islamic windows. The growth of Islamic windows has driven competition, encouraging both Islamic banks and Islamic windows to innovate and improve service offerings that led to the development of hybrid financial products and new investment solutions.

ملخص

تستكشف هذه الدراسة العوامل التي ساهمت في ظهور النوافذ الإسلامية وتداعياتها على قطاع الصيرفة الإسلامية، باستخدام الأدبيات المتعلقة بالنوافذ الإسلامية. وتحدد الدراسة أربعة عوامل رئيسة تحفز البنوك التقليدية إلى تشغيل نوافذ إسلامية، وهي: العوامل القانونية والاقتصادية والاستراتيجية والقدرات المؤسسية. ودفع نمو النوافذ الإسلامية المنافسة، مما شجع كلا من البنوك الإسلامية والنوافذ الإسلامية على الابتكار وتحسين جودة الخدمات المقدمة، الأمر الذي أسفر عن تطوير منتجات مالية هجينة وحلول استثمارية جديدة.

RESUME

Cette étude explore les facteurs contribuant à l'essor des guichets islamiques et leurs conséquences sur le secteur bancaire islamique en s'appuyant sur la littérature relative aux guichets islamiques. L'étude identifie quatre facteurs principaux, à savoir les capacités juridiques, économiques, stratégiques et organisationnelles, qui motivent les banques conventionnelles à exploiter des guichets islamiques. La croissance des guichets islamiques a stimulé la

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concurrence, encourageant à la fois les banques islamiques et les guichets islamiques à innover et à améliorer leurs offres de services, ce qui a conduit au développement de produits financiers hybrides et de nouvelles solutions d'investissement.

Keywords: Islamic windows, full-fledged Islamic banks, Islamic subsidiaries of conventional banks, *riba*, usury.

JEL Classification: F39; G1; G2; G20; G21

1. Introduction

Islamic banking industry has experienced tremendous growth over the years, expanding not only in nations with majority Muslim populations, but also in countries where Muslims are a minority. According to the ICD-LSEG Islamic Finance Development Report 2023, the assets of the world's Islamic banks expanded rapidly from USD 1.3 trillion in 2012 to reach USD 3.24 trillion by end of 2022, and the number of full-fledged Islamic banks rose by 36% to 336 in 2022 while conventional banks with Islamic windows or services increased by 84% to 274 in 2022 (ICD-LSEG, 2023). Ironically, despite some concerns being raised on the permissibility and legitimacy of Islamic windows from the shariah perspective, the above data suggests a significant increase in the number of Islamic windows compared to full-fledged Islamic banks within the last decade. This raises the question as to what triggers the significant surge in Islamic banks.

Although there has been a considerable deal of scholarly attention on Islamic windows as evidenced by the sharp rise in publications, they tend to focus on whether Islamic windows set up by conventional banks are permissible from the shariah perspective (Mustafa, 2022; Salh, 2019) and the performance of Islamic windows in terms of efficiency, profitability and customers' perception compared to their full-fledged Islamic bank counterparts (see e.g. Ghroubi and Khalifa, 2025; Al-Asmi et al., 2024; Ali and Hailu, 2022; Shabbir, et al., 2020; Al-Ismaili, 2018). However, there is a gap in the literature discussing the possible reasons for the increased popularity of Islamic windows and their impact on the sector.

Hence, the aim of this paper is to contribute to the extant literature on Islamic windows of conventional banks by exploring on the possible factors contributing to the significant growth in the number of Islamic

windows and their consequence on the Islamic banking industry. It will specifically focus in answering the following questions, *viz.* what are the options available in establishing Islamic banking and the views of shariah scholars on the operation of Islamic windows; what motivates conventional banks in setting up Islamic windows; and what are the consequences of growth in Islamic windows on the Islamic banking industry.

The rest of the paper is organized as follows. Section 2 introduces the conversion process to Islamic banking, followed by discussion on the differences in opinions on the permissibility of Islamic windows among shariah scholars in section 3. Section 4 presents the motivations of conventional banks in setting up Islamic windows while section 5 highlights the consequences of Islamic windows for the Islamic banking sector. Section 6 concludes the paper.

2. Islamic banking - conversion options and features

2.1 The rise of Islamic financial institutions

Commercial activities are highly regarded in Islam, and Muslims, besides fulfilling their religious duties, are encouraged to propagate Islamic economic activities worldwide as stated in the *Qur'an* (Al-Jumu'ah 62: 9-10).² Management and disposal of resources truthfully help believers to fulfill their covenant with God which is to act as His *khalifah*³ (vicegerent) including as temporary trustee of all His resources on this earth⁴. Hence, in the post-independent states of the Muslim world in the 1960s, developing economic activities that conform to Islamic teachings was on top of the agenda. Given the important role of financial institutions in the

² "O believers! When the call to prayer is made on Friday, then proceed 'diligently' to the remembrance of Allah and leave off 'your' business. That is best for you, if only you knew (9). Once the prayer is over, disperse throughout the land and seek the bounty of Allah. And remember Allah often so you may be successful (10)".

³ The *Qur'an* states: "Behold, thy Lord said to the angels: 'I will create a vicegerent on earth.' They said: 'Wilt thou place therein one who will make Mischief therein and shed blood?' Whilst we do celebrate Thy praises and glorify Thy holy (name)?" He said: "I know what ye know not" (Al-Baqarah 2:30).

⁴ The *Qur'an* states: "Believe in Allah and His Messenger, And spend (in charity) out of the (substance) whereof He has made you Heirs. For, those of you who believe and spend (in charity) – for them is a great reward" (Al-Hadid 57:7).

economic system, efforts were made in the 1970s to align the financial sector with Islamic teachings that led to the emergence of Islamic financial institutions (IFIs) that integrates religious principles with economic activities (Napier and Haniffa, 2011).

IFIs obtain their legitimacy by distinguishing themselves from their conventional counterparts based on their underlying principles of complying with *shariah* (Islam rulings), which makes it attractive to Muslims (Gambling et al., 1993). *Shariah* prohibits undertaking activities that involve interest (*riba*)⁵, gambling (*maysir*), speculative transactions where the subject matter and outcome of which are unknown or uncertain (*gharar*), as well as dealing in prohibited (*non-halal*) and unethical activities and financial transactions. However, the emergence and evolution of IFIs are to a large extent influenced by the dynamics of political and socio-economic circumstances within as well as beyond Muslim countries. Consequently, over time, the implicit and explicit intentions and goals changed and affected the nature and structure of IFIs that exist today.

2.2 Structure of IFIs

The financial sector is a highly regulated sector and financial institutions have to abide to the country's legal system and regulations related to banking and supervision. The establishment of a new IFI or conversion of a conventional bank may require changes to the country's existing banking and tax law to accommodate the *shariah* requirements. There are three conversion options process available to existing conventional banks for consideration in entering the Islamic banking sector. This section discusses each of those options including the main features and potential challenges of each option.

a) Full conversion (Full-fledged Islamic banks)

The first option is a full conversion to an Islamic bank or also known as a full-fledged Islamic bank. This is a standalone Islamic bank offering a full range of products and services and may include Islamic investment banking activities, such as underwriting sukuk issuances or managing Shariah-compliant investment and hedge funds, or to manage its own

⁵ There are four verses in the Qur'an condemning *riba*. The other three verses beside the above are Al-Imran 3:130, An-Nisa 4:161 and Ar-Rum 30:39.

treasury and money market operations (Sole, 2007). The products and services offered must all be approved by the shariah supervisory committee/board and the accounting system are set up to capture the unique Islamic contract transactions⁶ according to the accounting standard adopted⁷.

A full conversion signals the bank's firm commitment to operate under Shariah principles, thus enhancing its credibility. However, some of the key challenges of such conversion include: (i) regulation of the country may not license the operation of full-fledged Islamic banks; (ii) high operating costs as this may involve changing the internal structure and system, training of employees and also volatility in income stream due to the nature of transactions being based on participation, profit-sharing and speculation; and (iii) exposure to competition in the niche market with other full-fledged Islamic banks as well as Islamic subsidiary of conventional banks and Islamic windows.

b) Islamic subsidiaries of conventional banks

The second option is to open an Islamic subsidiary of the conventional bank. As a separate entity, it has autonomous decision making and can offer the full-range of core banking products and services similar to its conventional parent but are shariah-compliant with the terminologies changed, and also the range of products typically offered by full-fledged Islamic banks. All the products offered must be approved by the shariah supervisory committee/board and the treasury is separate from the parent and is managed independently. The accounting system is built to capture all the transactions for preparation of the subsidiary's financial statements and feed into the parent's accounting system for preparation of Group Consolidated Financial Statements.

⁶ This includes financial products such as trade with margin (*Murābahah*), forward sales and manufacturing contracts (*Salam and Istisnā*), profit and loss sharing partnerships (*Mudhārabah/Musyārahah*), rent with rental charges (*Ijārah*), and fee-based services (*Wakālah*), each of which requires specific accounting treatment.

⁷ IFIs may adopt either the International Financial Reporting Standards (IFRS) by the International Accounting Standards Board (IASB) or the Islamic Accounting and Reporting Standards issued by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI).

The advantage of opening a subsidiary is that the parent bank may continue servicing its conventional customers, while the subsidiary expands its Islamic activities in clear separation from the conventional business. Some of the key challenges of such conversion include: (i) higher set-up cost compared to Islamic windows as it is a separate entity; (ii) it needs to align with the parent its share of profit and loss; and (iii) higher credibility risk compared to full-fledged since one of the main concern that arises is that the subsidiary's initial capital may be Islamically unacceptable as the funds provided by the parent bank is not guaranteed to originate from Islamic compliant sources as it involves interest taking and giving (see Abd Rahman, 2006, and Yaquby, 2005). However, a possible solution to this is for the subsidiary to commit to making future charitable donations as a way to purify the original funds (Sole, 2007). This option is popular in countries where regulation does not permit for operation of full-fledged Islamic banks or when conventional banks are confident in meeting the diverse needs of clientele with varying Islamic and ethical commitments as well as socioeconomic backgrounds (Delle Foglie et al., 2023).

c) Islamic windows

The third option is to operate an Islamic window. Definitions of Islamic windows vary with some referring to branches of conventional banks with their operations following the requirements of Islamic law and specializing in Islamic financial transactions (Al-Murtan, 2005; Shehata, 2001) while others refer to independent units or branches dedicated to selling Islamic products and services under the supervision of specialized Shariah authority responsible for ensuring compliance with Islamic principles (Sebaa and Khan, 2021; Salh, 2019; Hani-Mohamed, 2017). The Islamic banking regulator, IFSB (2007, p.12), defined Islamic window as:

“...part of a conventional financial institution (which may be a branch or dedicated unit of that institution) that provides both fund management (investment accounts) and financing and investment that are Shari'ah-compliant. In principle, these windows are potentially self-contained in terms of Shari'ah-compliant financial intermediation, as the funds managed will be invested in Shari'ah compliant assets...”.

In some jurisdictions, Islamic windows refer to an operation whereby an institution invests funds in shariah-compliant assets without such funds being mobilised specifically for shariah-compliant investment purposes and the operations may be carried out through either branches that offer current account facilities or other units of the institution. However, IFSB does not recognize such operation as an Islamic window. Given the popularity of Islamic windows in many jurisdictions, IFSB require institutions offering Islamic windows to have their internal systems, procedures and controls providing reasonable assurance that: (a) the transactions and dealings of the windows are in compliance with shariah rules and principles; and (b) appropriate risk management policies and practices are followed.

Islamic windows do not have independent structure as final decisions are made by the conventional management team and the accounting system will capture the transactions to feed into the preparation of the Financial Statements of the conventional bank. The financial performance of Islamic window is normally shown separately in the Notes to the Account. This option may be suitable for conventional banks interested in probing the potential of this market by taking advantage of its existing branch network to reach potential new clientele. Some key challenges for Islamic windows include deciding on the range of products to offer, and since it operates under the umbrella of its host, its credibility risk is higher than Islamic subsidiary as there is bound to be comingling of *halal* and *haram* sources of funds.

Table 1 presents a summary of the key features of the three options of conversion available to conventional or traditional banks to consider if they wish to enter the Islamic banking sector.

Table 1:Comparative summary of the three Islamic banking business models

Features	Full-fledged Islamic banks	Islamic subsidiaries of conventional banks	Islamic windows of conventional banks
Banking structure	Islamic management team.	- Separate Islamic management team. - Autonomous decision making as an independent identity.	- Conventional management team where business decisions are made. - Head of Islamic Banking Windows reports directly to the conventional bank's CEO.
System	Islamic core banking.	Conventional core banking with terminologies changed and enhancement.	Conventional core banking with terminologies changed and enhancement.
Document	Based on shariah content.	Based on shariah content.	Enhancement to shariah content.
Process	Shariah based.	Identify shariah touch-points to enhance process (leverage) – shariah-compliant.	Identify shariah touch-points to enhance process (leverage) – shariah-compliant.
<i>Aqad</i>	Design based on Islamic contracts.	Design based on Islamic contracts.	Design based on Islamic contracts.
Treasury	Islamic treasury structure.	Separate structure and managed independently.	Separate structure and managed independently.
Accounting	General ledger for Islamic transactions	- Separate ledgers built and flow through different books. - Separate Financial Statements by subsidiary. - Consolidation of financial statements only in banking group	- Separate ledgers built and flow through different books. - Statement of Financial Position discloses Islamic Banking Window performance as part of the Notes to the Account.
Key challenge(s)	- High operating cost - Competition - Regulations	- Alignment with parent. - Higher set-up cost. - Credibility risk	- Range of products and services to offer. - Credibility risk.

Source: Adapted from Islamic banking windows | Islamic Bankers Resource Centre

3. Legitimacy of Islamic windows

Shariah scholars and Islamic bankers are split regarding the issue of permissibility and legitimacy of Islamic windows. They can be categorised into three groups (Shahzad & Hameed, 2018): those who totally opposed, those who support under conditional circumstances, and those who are totally supportive of Islamic windows.

a) Opponents of Islamic windows

Those who oppose Islamic windows have questioned the strategic motive of conventional banks and viewed their involvement in Islamic windows being just another way to deceive Muslims and drain their money without a real conviction to *maqasid al-shariah* (Mustafa, 2022; Al-Rabiaa, 1989; Al-Shreef, 2005). Islamic windows are perceived as facade by conventional banks in attracting capital that are then used to support usury projects to gain market opportunities (Abbas, 2024). Moreover, according to the jurisprudential rule of "*al-Tābi'tābi*", Islamic windows are considered subordinate to conventional banks, thus are not independent in their decision making. Another concern regarding its legitimacy is also due to possible comingling between permissible and impermissible (*al-halāl waal-haram*) funds as profits gained from Islamic windows will be transferred to its conventional host to be used for its overall operations including that of the Islamic window to cover the overhead costs incurred for operating the window. Furthermore, when there is a liquidity surplus in Islamic branches, it is transferred to interest-based banks for investment and then returned to Islamic branches to cover operating costs.

The opponents of Islamic windows supported their views based on the verses in *Sura Al-Baqara*:

O you who have believed, fear Allah and give up what remains [due to you] of interest, if you should be believers. And if you do not, then be informed of a war [against you] from Allah and His Messenger. But if you repent, you may have your principal -[thus] you do no wrong, nor are you wronged (Quran 2:278).

Then do you believe in part of the Scripture and reject the rest? Then what is the recompense for those who do that

among you except disgrace in worldly life; and on the Day of Resurrection they will be sent back to the severest of punishment. And God is not unaware of what you do (Quran 2:85).

b) Proponents of Islamic window based on Islamic maxim of darurat (necessity)

This group is in agreement with the arguments put forward by opponents of Islamic windows regarding its legitimacy. However, using the maxim of *darurat* (necessity), they argue that Islamic windows is permissible only if there is no other alternative (Abbas, 2024). In non-Islamic economy countries where Muslims are minority, Islamic windows operated by conventional banks are useful in serving the religious needs of Muslims. As such, choosing to bank with Islamic windows is better than interest-based conventional banks. This group relied on the following verse in *Al-Baqara* as evidence to support their argument (Mustafa, 2022):

So whoever is forced by necessity, neither desiring it nor exceeding limits, there is no sin upon him (Quran 2:173).

Furthermore, they argued that dealing with an Islamic window is better than dealing with conventional banks (Al-Shreef, 2005) but they urged conventional banks with Islamic windows to quickly move to a full conversion to become full-fledged Islamic banks (Al-Murtan, 1999).

c) Proponents of Islamic windows

Proponents of Islamic windows put forward a number of arguments for supporting Islamic windows. First, there is nothing wrong for Muslims to deal with Islamic windows as long as there is full commitment on the part of the host conventional bank to the provisions of shariah in all their dealings (Al-Murtan, 2005). The requirement to engage shariah scholars in endorsing the products and carrying out shariah audit would ensure adherence to shariah principles.

Second, they view Islamic windows as an indirect way of propagating ethical banking. When more conventional banks set up Islamic windows, this will help to combat usury practices in the country (Al-Murtan, 2005). Third, the proliferation of Islamic banks may encourage other

conventional banks to possibly resort to full conversion into full-fledged Islamic banks or consider Islamic banks as a transition stage (Al-Shreef, 2005). Furthermore, the success of Islamic windows can help in dispelling Western claims on the shortcomings of the Islamic economic approach (Abbas, 2024).

Fourth, due to difficulty in some countries to obtain permission to establish Islamic banks, Islamic windows serve as the sole alternative in meeting the demands for Islamic banking. Fifth, Islamic windows can contribute to healthy competition in the Islamic banking market as the competition to innovate Islamic financial instruments that are economically efficient, shariah-compliant, and meet customer preferences, can lead to a reduction in the cost of Islamic financial products (Hani -Mohamed, 2017).

Finally, Islamic windows can benefit from the accumulated experience of conventional banks to support and develop Islamic banking and increase their effectiveness, especially in countries where there is low demand for Islamic banking services, as well as contribute in enhancing financial inclusion (Sari et al., 2021).

4. Motivations for conventional banks' conversion to Islamic windows

Informed by strategic management as well as economic theories, we argue that there are multiple reasons for conventional banks to choose to operate Islamic windows. They can be broadly classified into legal constraint, economic motive, strategic motive, and organizational capability.

a) Legal constraint

As discussed earlier, conventional banks interested in entering the Islamic banking sector have three options to do so but this depends on each country's circumstances and banking regulations (Sole, 2007; Mostufa, 2006). In Western countries where Muslims are minority, such as in the EU, UK, USA and Australia, conventional banks are only allowed by law and central bank to operate Islamic windows to fulfill the banking needs according to the standards of shariah for Muslim customers. Similarly, in Oman and some parts of Africa, such as Ethiopia, despite demands for Islamic banking, their central banks only allow licensing of Islamic

windows. Hence, the operation of Islamic windows in these countries meet the local compliance requirements.

Operation of Islamic windows can also be found in countries with dual banking system like Bahrain, Malaysia and Indonesia. In these countries, full-fledged Islamic banks, Islamic subsidiary of conventional banks as well as Islamic windows are legally allowed to operate. Hence, conventional banks in these countries may choose to convert in phases starting with Islamic window operation as the legal procedure is less troublesome compared to setting-up a new Islamic subsidiary or converting to a full-fledged Islamic bank (Abbas, 2024). Regulators in these countries are supportive of Islamic finance and offers incentives to banks that provide Islamic services. Therefore, conventional banks may operate Islamic windows as a first step to support the industry and taking advantage of potential incentives available.

In contrast, in countries like Iran, Sudan and Pakistan, only full-fledged Islamic banks are allowed to operate. Hence, in such countries, conventional banks have no options other than to remain as they are or convert into full-fledged Islamic banks. Besides the legal and banking regulations, the difference in jurisprudential views of some shariah scholars on legitimacy of Islamic windows, as discussed earlier, may deter conventional banks' consideration to convert to Islamic windows to avoid any controversies with potential and existing customers on their shariah credibility. However, in jurisdictions where shariah scholars are more pragmatic in legitimizing Islamic windows, conventional banks may opt to operate Islamic windows as it is less costly but still able to meet potential demands for ethical financial products.

b) Economic motive

Conventional banks make profits mainly from credit creation and the global financial crisis in 2008 shows their vulnerability on relying heavily on such a concentrated source of revenue. Therefore, they need to diversify their revenue streams and find ways to reduce default risk and enhance stability. Islamic windows may serve this purpose. The introduction of new profit-generating products like *murabaha* (cost-plus financing), *ijarah* (leasing), and *sukuk* (Islamic bonds) reduce reliance of conventional banks on interest-based income. Furthermore, since Islamic finance is based on risk-sharing principles, it is less prone to speculative crises and ensure stability.

According to the economies of scale theory (Sirri and Tufano, 1995), revenue diversification may help banks to maximise their profits through improvement in the productive efficiency (Elyasiani and Wang, 2012) as a result of economies of scale generated by cross-selling, reuse of inputs, as well as the consolidation of back-office functions such as information technology, settlement activities, registration, maintenance and allocation of fixed costs and management overheads over a wider product range. Hence, by adding some shariah-compliant products in its offering through its Islamic window, the conventional bank may increase its profit maximization motive (Al-Atyat, 2007). Similarly, it can probe the potential of this market by launching Islamic window using its existing branch network to add to its new potential customer base instead of embarking on full conversion which is more costly to set up (Islam and Hassan, 2024). To convert fully from conventional to Islamic bank would be challenging as a sudden transformation could have negative effects on financial performance due to personnel who lacked knowledge and experience to handle Islamic products and handling of risks that may arise. Hence, Islamic windows is a low-risk strategy in penetrating the Islamic finance sector (Abbas, 2024). Using Islamic windows as a take-off platform to access the Islamic financial sector is in fact a more common practice in southeast Asia (Nagimova, 2023) and in western countries (Selva, 2023) compared to the Middle East, where the tendency has been to establish autonomous Islamic banks such as in Kuwait and Dubai (Aljughaiman et al., 2023).

So, has revenue diversification strategy through Islamic windows enhanced the profitability and market share of the conventional banks? some studies related to Islamic windows in terms of various performance measures and risk management are highlighted here. Al-Asmi et al. (2024) investigate the efficiency of conventional banks and those with Islamic windows in Oman in terms of costs and profits during the third quarter of 2022. The results reveal that, overall, banks in Oman are more efficient at generating profits than controlling costs and that conventional banks, on average, demonstrate higher efficiency in both cost and profit metrics compared to Islamic windows. This implies the need for banks with Islamic windows to enhance their cost management strategies without compromising profit generation, and leveraging the benefits derived from their association with parent conventional banks. Ali and Hailu (2022) examines the cost and technical efficiency of selected

Islamic banking windows of conventional banks in Ethiopia during the period of 2016-2020. Based on stochastic frontier approach (SFA), they found Islamic windows to have fairly better 'technical efficiency' individually and collectively; however, the 'cost efficiency scores' indicate that the banks are not efficient enough in terms of minimizing costs for a given scale and mix of outputs. Hasan and Risfandy (2021) compared bank stability between 14 full-fledged and 19 Islamic windows in Indonesia for the period 2013-2018 and came to the conclusion that full-fledged Islamic banks were less stable than their Islamic windows counterparts. This implies that Islamic windows could enjoy their market position to maintain stability without converting themselves into full-fledged Islamic banks as the Islamic banking niche market is highly competitive.

Based on a sample of 950 banks (Islamic bank, conventional and Islamic windows) from 55 countries for the period 2006-2015, Al-Ismaili (2018) analyze their performance in relation to credit risk, liquidity risk, operating risk and insolvency risk. Results reveal that Islamic bank's credit risk is not sensitive to diversification ratio compared to conventional and Islamic window banks. Conventional and Islamic window banks are found to be in a better position compared to Islamic banks in terms of liquidity risk. Furthermore, Islamic banks are relatively less profitable and efficient than conventional banks and significantly less so than Islamic windows which is probably due to the conservative operations of Islamic banks. The empirical findings also suggest that, when compared with conventional and Islamic windows, Islamic banks face increased insolvency risk.

From the above studies, it can be deduced that financial performance and stability of conventional banks with Islamic windows is much better than full-fledged Islamic banks in jurisdictions that have just introduced Islamic banking such as in Oman and Ethiopia. In terms of risk, Islamic windows have higher credit risk but lower liquidity, operational and insolvency risks.

c) Strategic motive

To remain competitive and be able to withstand the increased competition, banks must be aware on how to create competitive advantage over other market players. The entrance of Islamic banks does not only increase the size of the financial sector but also the number of banks in the country,

resulting in higher competition in the overall market. On the contrary, operations of Islamic windows increase the size of the financial sector without changing the number of banks in the country. As suggested by segmentation theory (Smith, 1956), conventional banks with windows can create competitive advantage with their presence in both market segments with tailored products serving the needs of different customer groups. This helps conventional banks to strengthen their market position by catering to diverse financial needs.

Furthermore, given the uncertainty in the market outcomes, opting for Islamic windows is a safer option as it may potentially help in gaining new customers interested in the Islamic financial products without losing customers interested in their conventional financial products (Abbas, 2024), as suggested by the prospect theory (Kahneman and Tversky, 1979). In others words, Islamic windows provide conventional banks with the avenue to tap into the growing Islamic finance industry with less risk and lower cost.

Conventional banks with Islamic windows may not only attract existing and potential Muslim customers who seek interest-free banking but also appeal to non-Muslim customers who are looking for ethical financial solutions and risk-sharing financial models. As explained by consistency theory (Adamson et. al., 2003), through Islamic windows operations, conventional banks can gain more trust by communicating and signaling on the consistency of their products and services with the values and beliefs of their target market. Similarly, for conventional banks that have strong brand name and relationship with their customers, opting for Islamic windows can further enhanced their reputation by positioning themselves as inclusive and socially responsible through offers of ethical and interest-free financial solutions and also strengthened trust among customers who prefer shariah-compliant banking. This is in line with the consumer-brand relationship theory (Fournier, 1998) whereby banks can foster positive brand-customer relationship through positive interactions, trust, and commitment as an ethical bank.

d) Organisational capability

Within the complex banking sector, organizational capabilities play a vital role in enhancing banks' competitiveness, performance and effectiveness. Consequently, as suggested by the resource-based theory (Penrose, 1995),

banks must ensure that they have distinctive capabilities in terms of relevant knowledge, skills and attributes to enable banks to achieve competitive advantage that competitors cannot match. Conventional banks may opt for Islamic windows because they may not have enough staff trained to handle the full-range of shariah-based products that are expected to be offered by full-fledged Islamic banks that give the latter competitive advantage. Hence, at the inception of the Islamic window, the products typically being offered are safekeeping deposits (on the liability side of the bank) and Islamic trade-finance products for small and medium companies (on the asset side of the bank) which would be easier for bank personnel to understand and deal with any customer queries (Sole, 2007). However, conventional banks may capitalize on their other capabilities, such as superior customer responsiveness and technological capabilities in their Islamic window operations.

5. Consequences of increase in Islamic windows on Islamic banking financial sector

The rise in the number of Islamic windows have both positive and negative consequences. On the positive side, Islamic windows contribute to the Islamic banking industry by expanding access to sharia-compliant financial products and services to customers who may not otherwise have the opportunity to fulfill their religious commitment, especially in Muslim minority countries that only allow Islamic windows to operate but not full-fledged Islamic banks and also in Muslim majority countries where standalone Islamic banks are limited. The success of the Islamic windows will encourage more conventional banks in the countries to participate in the growing Islamic finance sector, thus providing customers with more choices of financial services to choose from.

Islamic windows also contribute to the growth of Islamic banking. Unlike full-fledged or subsidiaries which are costly ventures for conventional banks, Islamic windows serve as a gateway for conventional banks to later transition into full-fledged Islamic banks if market demand increases. Since setting up an Islamic window is less expensive than establishing a full-fledged Islamic bank, this will enable more financial institutions to enter the market with lower risk and prevent monopoly of the industry. Large conventional banks with Islamic windows further help Islamic finance to integrate with global financial markets and facilitate cross-border transactions. Furthermore, they can leverage on existing

infrastructure and capability to reduce operational costs for their Islamic windows and in turn, allow them to offer Islamic financial products to customer at competitive prices. The entrance of Islamic windows in the Islamic banking sector, drive competition, encouraging both Islamic banks and Islamic windows to innovate and improve service offerings. These innovative shariah-compliant products do not only help banks expand their customer base and foster trust in the Muslim community but also play a crucial role in promoting the overall growth and stability of the Islamic finance industry (Shahid et al., 2020).

The downside on the increase in the number of Islamic windows is that it adds more competitive pressure on full-fledged Islamic banks. Without Islamic windows, full-fledged Islamic banks have only to compete within their niche market but with the entrance of Islamic windows, they will now have to compete with more banks that have different structure but offering similar products. While increased in competition have caused the Islamic banking industry to develop more innovative shariah-compliant products that enable Islamic investors to gain access to the risk/return profiles of previously untapped areas (Dar, 2003), but they were unfortunately largely driven by the need to imitate the economic effects of conventional financial products. Haniffa and Hudaib (2010) express their concern on such activities as this may lead to moving from the sacred intentions to overcome problems with *riba* to get distorted with secular goals as a result of imitating the conventional sector. Consequently, there is now a wide range of Islamic financial products available, which offer the economic benefits of conventional products but in a shariah compliant way, a process which some industry experts termed as ‘conventionalisation’ of Islamic banking.

The diverse and complex nature of these innovative products require a high level of comprehension on the part of clients and also well-trained bank employees able to explain the different products (Faizi, 2024). Clients of Islamic banking product market can be categorized as idealist, pragmatist and opportunist. The idealist only considers products offered by full-fledged Islamic banks to be ‘*halal*’ and is willing to pay credit premium as long as the product adheres strictly to shariah while the pragmatist considers all shariah-compliant products, regardless of the supplier, to be acceptable as the main concern is only to avoid any interest-based products. The opportunist, on the other hand, is sensitive to the cost

of the product on offer and is willing to forsake it for interest bearing product which is cheaper. In other words, the opportunists are willing to switch to shariah-compliant products if they will benefit them and using conventional products if they offer better deals. Therefore, effective communication and education strategies are imperative to empower target clients with comprehensive insights into the distinctive features and benefits of Islamic banking products, enabling them to make informed choices aligned with their values and beliefs.

6. Conclusion

Islamic windows are one of the three legal forms available in establishing Islamic banking in some countries. Despite some concerns on their legitimacy from the shariah perspective, especially on the comingling between interest-based resources with non-interest-based resources, the number of Islamic windows has significantly rise in the last decade compared to the early years of Islamic finance development. The paper explores the possible reasons for their popularity and classified them into four: legal constraint, economic motive, strategic motive and organizational capability. The positive consequences of Islamic windows on Islamic banking industry include contributing to Islamic banking growth, facilitating market expansion and financial inclusion, helping to attract customers who prefer interest-free banking in places and regions where they are unavailable. While the increase in competition led to greater efforts in developing more innovative products, they have been criticized by observers as they tend to mimic conventional financial products and overlooked the responsibility in serving the wider objectives of *al-maqasid shariah*.

A number of implications can be drawn based on the findings. Islamic windows have played a crucial role in the expansion of Islamic banking, offering customers more choices of financial services providers, promoting financial inclusion and competition. However, concerns about regulatory compliance and Sharia authenticity remain, and so do concerns on the products offered in the market. Nonetheless, they are a vital part of the industry's growth, bridging the gap between conventional and Islamic finance to serve wider society interested in ethical banking.

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The Future of Islamic Finance Education

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ABSTRACT

For Islamic finance institutions to combat the recent stagnation in growth within the industry, they must adhere to their fundamental purpose of maintaining ethical objectives and adhering to Shariah principles. These institutions must transform many institutional mechanics such as product portfolio offering and competitive pricing, financial digitalization and data analysis, application accessibility and utility, information transparency and proprietary protections, marketing and management expenditures, entrepreneurship capital and assistance, and sustainable development goals. These measures require extensive planning, which is discussed in this paper. The next generation (Generation Alpha), with its innovative thinking and technological savvy, can potentially drive transformative change in the Islamic finance industry. Ultimately, this new generation can be a catalyst for change through education adjustments and initiatives to network with entrepreneurs. This paper also discusses industry, global, and ethical linkages that would organically fit into the plan and shape the future of Islamic finance.

ملخص

حتى تتمكن مؤسسات التمويل الإسلامي من التصدي لحالة الركود الأخيرة في نمو هذا القطاع، ينبغي لها أن تلتزم بهدفها الأساسي المتمثل في الحفاظ على المبادئ الأخلاقية والالتزام بأحكام الشريعة الإسلامية. ويتطلب ذلك من هذه المؤسسات تحويل العديد من الآليات المؤسسية، مثل تقديم محفظة المنتجات والتسعير التنافسي، والرقمنة المالية والتحليل البياني، وإمكانية الوصول إلى التطبيقات واستخدامها، وشفافية المعلومات وحماية الحقوق الفكرية، ونفقات التسويق

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والإدارة، ورأس مال ريادة الأعمال والدعم اللازم، وأهداف التنمية المستدامة. وتتطلب هذه التدابير تخطيطاً مكثفاً، وهو ما تناقشه هذه الورقة. وإن الجيل القادم (جيل ألفا)، بما يتميز به من تفكير ابتكاري وذكاء تكنولوجي، من المحتمل أن يدفع التغيير التحويلي في قطاع التمويل الإسلامي. وفي نهاية المطاف، يمكن لهذا الجيل الجديد أن يكون حافزاً للتغيير من خلال التعديلات التعليمية ومبادرات التواصل مع رواد الأعمال. كما تناقش هذه الورقة الروابط الصناعية والعلمية والأخلاقية، باعتبارها تتكامل بطبيعتها ضمن هذه الخطة، وتسهم في رسم ملامح مستقبل التمويل الإسلامي.

RESUME

Pour que les institutions financières islamiques puissent lutter contre la récente stagnation de la croissance au sein de l'industrie, elles doivent adhérer à leur objectif fondamental qui est de maintenir des objectifs éthiques et d'adhérer aux principes de la charia. Ces institutions doivent transformer de nombreux mécanismes institutionnels tels que l'offre d'un portefeuille de produits et une tarification compétitive, la numérisation financière et l'analyse des données, l'accessibilité et l'utilité des applications, la transparence de l'information et la protection des droits de propriété, les dépenses de marketing et de gestion, le capital et l'aide à l'entrepreneuriat, et les objectifs de développement durable. Ces mesures nécessitent une planification approfondie, qui est examinée dans le présent document. La prochaine génération (génération Alpha), avec sa pensée innovante et son savoir-faire technologique, peut potentiellement conduire à un changement transformateur dans l'industrie de la finance islamique. En fin de compte, cette nouvelle génération peut être un catalyseur de changement grâce à des ajustements de l'éducation et à des initiatives de mise en réseau avec des entrepreneurs. Cet article aborde également les liens sectoriels, mondiaux et éthiques qui s'intégreraient organiquement dans le plan et façonneraient l'avenir de la finance islamique.

Keywords: Curriculum, Education, Fintech, Gen Z, Islamic Finance.

Introduction

The year 2025 marks fifty years since the modern inception of the Islamic finance industry. The roots extend back over a millennium, based on principles that form a rich tapestry of financial ethics and guidelines. While the industry continues to encourage growth globally across various institutions and consumers, it also stands at the crossroads of balancing

its age-old wisdom with the potential and complexity of contemporary financial markets and economic decisions.

Islamic finance, often regarded as an ethical and equitable alternative to conventional finance, originates from the fundamental teachings of Islam as found within the Quran and the Hadith [the sayings and actions of the Prophet Muhammad, peace be upon him]. Its essential values emphasize fairness, justice, and ethical conduct in economic and financial matters. Islamic finance staunchly opposes Riba [interest, usury, or compounding interest] as exploitative and unjust. Instead, it champions profit-and-loss sharing, risk-sharing, and asset-backed financing, guided by the principles of Shariah [Islamic law and jurisprudence]. Its application requires continuous and diligent scholarship and adaptation.

The modern journey of Islamic finance began in the mid-20th century when Muslim scholars and financial experts sought to create a banking system and relevant financial products aligned with these ethical principles. In 1975, Dubai Islamic Bank was established as the first of its kind, which followed the Mit Ghamr Savings Bank of Egypt's 1963 efforts to institutionalize Islamic finance principles into consumer spending. The industry has since grown significantly, with Islamic banks, takaful (Islamic insurance), and Islamic investment funds operating globally. Despite its impressive growth, the Islamic finance industry has encountered significant challenges, particularly in the realm of education and awareness.

The varied stakeholders of Islamic finance – be they students, faculty, researchers, regulators, practitioners, or consumers – all seek to align with fundamental Shariah-compliant values in the realm of investments, commerce, and corporate governance. Islamic finance's adherents now have access to over 1,400 Islamic financial institutions that are spread across 80 countries with a vast and diverse offering portfolio of products to properly allocate their wealth in ways that align with their values.

The current growth of Islamic finance cannot be discussed without mentioning the obstacles it has faced in the past, present, and future. In their infancy and developmental stages, which also saw the massive transformation and growth of global conventional banking and financial market capitalization, Islamic financial institutions faced critics who questioned how ethics interfered with risk and return potential as well as

the constraint that an interest-free model would face in terms of value creation. While contemporary Islamic finance institutions have demonstrated that they can persist in the modern environment, these initial questions still leave such institutions lacking when compared to their significantly larger conventional counterparts, often resulting in stagnant growth trends.

However, in recent times the market has changed so that investors are increasingly emphasizing factors – such as credit risk mitigation, environmental-social-governance metrics, corporate social and ethical responsibility expenditures, and financial transparency within domestic and global markets – that ironically reflect a trend of longing to become more “Islamic”. Investment return is captured beyond its implicit computations; it is holistic of growth potential, risk reduction/sharing, ethical standing, and transparent pricing. In essence, these traits are exactly what Islamic finance principles seek to systemize within a market.

The current and major obstacle that Islamic finance faces is truly one that lies within itself, as much of the market share is dictated by conventional institutions. The “Islamic” label before “finance” thus appeals primarily to Muslims and caters to restrictions bestowed upon only Muslims. With Islamic financial institutions facing an uphill battle as they compete for consumers with conventional institutions, especially in the West, the sad reality is that many Muslims join non-Muslims in their lack of understanding how Islamic finance can enhance wealth creation across all individuals and the overarching society.

A substantial obstacle to the growth of Islamic finance is the limited understanding and awareness among both Muslims and people of other faiths and beliefs. Many remain unaware of the fundamental principles underpinning Islamic finance, let alone the complexities of Shariah-compliant financial instruments. This lack of understanding not only narrows the potential customer base but also perpetuates misconceptions about the complexity of Islamic finance. Primarily, many perceive Islamic finance to be confined to Muslims and Muslim-majority nations only. As such, they simply do not perceive how the fundamental values align with their own conception of ethics. Secondly, the widespread endorsement of Riba and leveraging wealth has many overlooking the pitfalls of debt and assuming that there are constraints in alternative

modes of financing. Consequently, the broader financial community remains largely uninformed about the opportunities and ethical framework offered by Islamic finance.

Islamic finance has the potential to resonate with individuals of all faiths and belief systems. However, historically, its outreach has predominantly targeted the Muslim community. This limited scope neglects a vast potential market of individuals who value ethical and sustainable financial practices. The Islamic finance industry must find effective ways to communicate its ethical principles and benefits to a global audience, regardless of religious affiliations. This paper affirms that rebranding Islamic Finance within education, marketing, and conventional competition can highlight its promises and fruitfulness to people of all faiths and beliefs.

Another challenge arises from the inclination to mirror conventional financial products and closely adhere to existing regulatory frameworks. In doing so, some Islamic financial institutions inadvertently dilute the distinctive ethical attributes of their offerings. This conformity restricts the industry's capacity to provide innovative and distinct financial solutions that more closely align with its ethical foundations.

Amid obscure coverage, there are a few positive signs that show the sustainability and resilience of the Islamic finance industry. During the Global Financial Crisis in 2008/9, the industry held onto stable growth during volatile times and proceeded to grow exceptionally by the end of 2020: the total valuation of the industry increased from 800 - 1,000 billion USD to 2,000 - 3,000 billion USD during this time. The industry showed hardiness through the Covid pandemic and has continued this trend into the more recent high-inflationary conditions. Growth has slowed, however, when compared to the ideal goal of ten-fold growth or more over the next decade. The industry has hit a point where it must start expanding its target market across countries and varying demographics as well as offering larger and more diverse investment products.

The recent crises highlight two major opportunities for the Islamic finance industry: the next generation and small business entrepreneurship. First, the next generation has proven that they can effectively use technology to learn about current economic, political, and

social issues and then convey formidable opinions. They can parse through vast online readings, use summarization tools, and then engage in public discourse on the web or in-person very well. While this can be attributed to modern technology access, this is still an impressive trait that advances them far ahead of previous generations in the 21st century's digital age. Second, the crises have hurt many small business entrepreneurs who struggled to overcome credit risk as well as other financial economic risks. Entrepreneurship is a notable driver of innovation, and there is particular significance of small-scale businesses who have very tightened and often overlooked ethical initiatives. Islamic finance should welcome these two target markets to lead the industry towards its brighter future.

The underlying requirement to induce transformative change for Islamic finance institutions is to revamp their promotion and outreach. The strategy must be to work in unison, but individually as well. Institutions need to partner with universities and schools to instill fundamental values into the curriculum while also exposing students to more practical assessments and projects with ethical implications. Data sharing can allow faculty to develop research scopes that can bring more exposure to the overall industry. Institutions must also partner with local companies and entrepreneurs to assist them with capital constraints as well as business advising. Islamic financial institutions should engage in *Takaful*, *Mudaraba*, and *Musharaka* to offer entrepreneurs coverage during economic downturns and capital constraints. In mediation, institutions should also offer consulting services to ensure responsible spending and prevent fraying away from targeted ethical goals. Institutions should also network significantly with regulating bodies and take initiatives to set the bar for future regulation on transparent reporting and ethical impact metrics. Lastly, Islamic financial institutions should link all their partners with one another through networking events to encapsulate a mutually beneficial system. Successful promotion and programming, from now through the next decade, will find the next generation of Islamic finance leaders expanding financing opportunities and fostering structural change across universities, non-profits, entrepreneurship, technology, regulation, and the overall financial market.

By equipping the next generation – henceforth referred to as Next Gen Alpha - with a profound understanding of Islamic finance ethics, digital

literacy, and a broader vision for ethical entrepreneurship, this paper aims to chart a transformative path for the industry. Since September 2023, the ‘Islamic Banking as a Duty’ IBaaD initiative [www.IBaaD.academy] and subsequent projects seek to empower Next Gen Alpha with Islamic finance literacy, educating them on how Islamic finance aligns with modern sustainability and development goals as well as motivating them to shape their future careers accordingly - to give them the basics and fundamentals of Islamic finance while they are in school, giving them enough time to chart their future career path in Islamic Finance.

In the forthcoming sections, this paper delves into how Islamic finance education can serve as a catalyst for addressing the aforementioned challenges and opportunities. Section 2 discusses more about Next Gen Alpha. Section 3 examines necessary adaptations to education and curricula. Section 4 explores the industry network and transformational capabilities. Section 5 states the importance of process and engagement metrics. Section 6 concludes the study.

1. Next Gen Alpha Leading the Future

The Next Gen Alpha stands out for their commitment to ethical finance, their drive to address global issues, and their ability to use digital skills to achieve their goals. The young, tech-savvy individuals are contemporaneously reshaping or will reshape the Islamic finance industry. They do not see their careers as mere jobs; they are motivated by a profound sense of purpose that rises above personal gain to benefit society. Growing up in a digital age, they are comfortable with digital tools and platforms. This fluency goes beyond social media and gaming; they use digital literacy as a force for change. They understand how technology can make financial systems more accessible, transparent, and efficient. As such, they represent a significant change in how the Islamic finance industry envisions its future. To summarize a few positive outlooks for **Next Gen Alpha**:

1. **Digital Fluency:** Growing up in a digital age, the Next Gen Alpha has an innate familiarity with technology. They are proficient in navigating the digital landscape and understand its potential for transforming Islamic finance.
2. **Ethical Commitment:** Ethical principles drive their ambitions as Next Gen Alpha finds alignment with Islamic ethics on equity, ensuring every transaction is Shariah-compliant.

3. **Visionary Thinking:** Next Gen Alpha looks beyond traditional career paths and envisions a future where Islamic finance plays a pivotal role in addressing global challenges. They aspire to create innovative, ethical, and technology-driven solutions that benefit society.
4. **Entrepreneurial Spirit:** Next Gen Alpha establishes ethical fintech startups and ventures that prioritize ethical finance and financial inclusion.
5. **Global Ambassadors:** Next Gen Alpha sees Islamic finance as a global phenomenon, advocating for its principles and practices on the international stage.

The generation's unique blend of skills, values, and vision position them as catalysts for positive change, while also ensuring that Islamic finance remains relevant, accessible, and ethical in an increasingly interconnected world.

The Aspirations and Vision of the Next Gen Alpha

A key aspiration of modern Islamic finance is to bridge the gap between itself and the wider global audience. With Next Gen Alpha recognizing and showcasing the universality and practicability of Islamic finance, the world can benefit from ethical financial solutions rooted in Islamic values. Their vision extends to creating innovative financial products and services. They see opportunities in financial technology, blockchain, and artificial intelligence to develop Shariah-compliant solutions that are not only efficient but also align with ethical principles. They aim to launch ethical fintech startups that positively disrupt the industry.

Ultimately, Next Gen Alpha's vision is for a more inclusive, ethical, and tech-savvy Islamic finance industry that serves as a model for responsible finance worldwide. This calls back to the vision of the IBaaD initiative - to inculcate both Islamic finance and digital literacy through the digital platform already gaining traction. An established documentation of the vision incorporates:

1. **Ethical Finance:** Next Gen Alpha envision a future where ethical finance is the standard, ensuring that every financial transaction aligns with Shariah compliance and ethical values.
2. **Sustainability:** Next Gen Alpha highlight that environmental, social, and governance (ESG) principles and Sustainable Development Goals (SDGs) are

already an integral part of Islamic finance, promoting investments and practices that contribute to a more sustainable and equitable world.

3. Innovation: Next Gen Alpha leverage technological advancements to create innovative financial solutions. They envision a world where fintech startups rooted in Islamic finance principles play a pivotal role in reshaping the industry.
4. Financial Inclusion: Next Gen Alpha expand the reach of Islamic finance to individuals and communities regardless of their faith or background. They empower marginalized demographics and create opportunities for financial inclusion, entrepreneurship, and economic growth. Unfortunately, these goals are low priority in the current Islamic finance stakeholders' agendas.
5. Global Impact: Next Gen Alpha see Islamic finance as a global force for good, with principles that positively influence the global financial landscape.
6. Educational Initiatives: Next Gen Alpha recognize the importance of education and envision comprehensive educational initiatives that equip individuals with the knowledge and skills to participate in Islamic finance and contribute to its evolution.

The Intersection of Islamic Finance and Digital Literacy

The fusion of Islamic finance principles with digital literacy offers a distinctive opportunity to envision and craft innovative financial solutions that seamlessly align with Shariah compliance. It is crucial to embrace advancements in blockchain and artificial intelligence and encourage them to comply with fundamental ethics and foster growth in Islamic finance. This convergence signals a profound shift in how financial services will be conceived, delivered, and experienced.

In a world where trust is increasingly scarce, Islamic finance and digital literacy can intersect in various ways to bolster that trust through technology. Blockchain technology, for example, provides a transparent and tamper-proof ledger for financial transactions, aligning well with the transparency and accountability required in Islamic finance. Artificial intelligence has the potential to revolutionize financial decision-making, ensuring that investments and transactions conform to ethical guidelines.

Furthermore, the digital era brings forth opportunities for financial inclusion. Mobile banking, digital wallets, and online investment

platforms can extend the reach of Islamic finance products to a broader audience, including those in underserved regions.

For Next Gen Alpha, this intersection represents the core of their mission. They view it as a realm where they can innovate, create, and lead, ensuring that Islamic finance remains pertinent and impactful in the digital age.

Harnessing Technology for Shariah-Compliant Finance

Next Gen Alpha recognize that technology is a potent facilitator for Shariah-compliant finance and that there must be balance between trust and skepticism regarding the influence of technology on human behavior. Blockchain technology ensures transparency and security in financial transactions. It establishes an unalterable ledger where every transaction can be traced and verified, aligning with the Shariah requirement for transparency and avoidance of uncertainty. Artificial intelligence takes on a pivotal role in risk assessment and decision-making. Algorithms can analyze vast volumes of data to ensure that investment opportunities and financial products comply with Shariah guidelines. This not only mitigates the risk of non-compliance but also heightens the efficiency of the screening process.

Moreover, technology fosters the creation of innovative Shariah-compliant financial products. Crowdfunding platforms, peer-to-peer lending, and digital sukuk issuance exemplify how technology can pave the way for ethical finance to flourish. For Next Gen Alpha, harnessing technology for Shariah-compliant finance is not just an opportunity, it is a duty. They realize that by embracing technology, they can guarantee that Islamic finance remains competitive, accessible, and true to its ethical principles in the digital age. Otherwise, the industry will remain stagnant and its growth will be as it is currently, tapping into 1% of global wealth, without any major measurable impact.

2. Direction of Education and Respective Curricula

Education stands as the foundation of Next Gen Alpha's journey to reshape the Islamic finance industry. The current educational framework, though valuable, often falls short in providing the skills and knowledge needed for the modern era. A progressive curriculum must strike a balance between Islamic finance ethics and digital literacy. Graduates

should not only gain a profound understanding of Islamic financial principles, but also practice critical reasoning and intern with academic partners. The diligence to enable innovation and ethical entrepreneurship with practical experience will groom Next Gen Alpha for the challenging corporate world.

The Urgency for Educational Reform

Traditional Islamic finance education typically focuses on theoretical aspects, offering limited exposure to practical applications and digital literacy. This gap prevents graduates from fully leveraging the opportunities presented by the digital revolution in finance. Educational reform involves reimagining the curriculum to mirror the evolving needs of industry. It entails merging Islamic finance ethics with digital literacy, ensuring that graduates grasp principles and possess the practical skills to innovate within the digital financial landscape. This transformation necessitates collaboration between educational institutions, industry experts, and regulatory bodies. It calls for the development of forward-looking curricula that prepare students for careers in ethical entrepreneurship, fintech innovation, and Shariah-compliant digital finance.

Ultimately, educational reform serves as the linchpin of Next Gen Alpha's mission. It revolves around ensuring that the next generation of Islamic finance professionals is equipped to lead the industry into a future where ethical principles and digital literacy are the foundations of financial innovation.

Designing a Curriculum for Ethical Entrepreneurs

Creating a curriculum for ethical entrepreneurs represents a fundamental step in preparing Next Gen Alpha for success in the Islamic finance industry. This paper's guidelines for such are below:

1. Islamic Finance Ethics: In-depth comprehension of Islamic finance principles will emphasize ethical behavior, adhere to Shariah guidelines, and instill values of integrity, transparency, and social responsibility.
2. Digital Literacy: Proficiency in using technology will enhance financial services.

3. **Fintech and Innovation:** A scientific environment fosters learning and technological innovation in accordance with contemporary developmental and financial literacy research.
4. **Risk Management:** Risk and return comprehension can drive decision-making across economic business cycles and financial fluctuations.
5. **Global Perspective:** International exposure to economic and political interlinkages as well as global trends in Islamic finance, development, and banking can illuminate solutions to 21st century obstacles.
6. **Entrepreneurship Skills:** Foundational courses on operations and research, marketing and management, and financial accounting can produce increased entrepreneurship and organic competition.

The curriculum could then incorporate more teamwork, research agendas, and formal presentations. Regardless, the goal constitutes a pivotal element in Next Gen Alpha's vision for Islamic finance education. It is vital that any future-focused curricula should cointegrate Islamic financial ethics as well as digital tool applications. Graduates should understand transparency concepts within blockchain and open-source models. Models must also bridge large-language modernization and financial economic theory. The eventual goal is for the industry to transform and empower fintech startups and robust artificial intelligence tools to drive future financial and economic decisions.

Key Components of a Future-Oriented Curriculum

A future-oriented curriculum for Islamic finance is designed to equip Next Gen Alpha with the skills and knowledge needed to excel in the industry's evolving landscape. It encompasses several key components that reflect the industry's demands and the aspirations of ethical entrepreneurs:

1. **Islamic Finance Ethics:** Deep understanding of Islamic finance principles, emphasizing ethical conduct and compliance with Shariah guidelines.
2. **Digital Literacy:** Proficiency in digital tools and platforms, ensuring graduates can navigate the digital financial landscape.

3. Fintech and Innovation: Environment that fosters innovation and teaches students how to leverage fintech tools into the creation of ethical and sustainable solutions.
4. Risk Management: Deep analysis to drive future trends in the ratio between risk and return metrics as well as sustainable mitigation strategies for varying scaled investors.
5. Global Perspective: Exposure to international best practices and global trends in Islamic finance.
6. Entrepreneurship Skills: Fundamental theory and contemporary study of the skills and methodology to launch ethical fintech startups that can cater to focused target markets and survive across business cycles.
7. Ethical Leadership: Recognition of the value and significance of requiring and disclosing with intentions of integrity, transparency, and social responsibility.

By integrating these components, the curriculum ensures that graduates are not just knowledgeable about Islamic finance, but also capable of applying existing and new knowledge into real-world contexts. Thus, future-oriented curricula represent a pivotal element in Next Gen Alpha's vision for Islamic finance education and professional practices thereafter.

Transformative Impact on Graduates

A future-oriented curriculum has a transformative impact on graduates, shaping them into leaders and change-makers in the Islamic finance industry. It equips them with the tools and mindset needed to excel in a dynamic and evolving financial landscape. The transformative impact includes several key dimensions:

1. Ethical Leadership: Graduates emerge with a strong commitment to challenge existing cultural practices and continuously evaluate ethical performance.
2. Digital Proficiency: Graduates can develop new digital tools and platforms, enabling them to leverage vast data and technological resources to create value for stakeholders.
3. Innovation Mindset: Graduates cultivate an innovative mindset, constantly seeking opportunities to create ethical financial solutions that address societal challenges.

4. **Global Perspective:** Graduates seek to engage in ethical and dynamic partnerships through all directions of the global supply chain as they expand target audiences beyond domestic borders.
5. **Entrepreneurial Spirit:** Graduates realize their entrepreneurial spirit, so that the overall market structure and its participants can see benefits of organic competition and aggregate growth.
6. **Social Impact:** Graduates openly convey their sense of purpose within a firm and diligently maintain open reflection regarding the social impact of the firm.

The transformative impact of the curriculum extends beyond individual graduates to benefit industry and society at large. As these graduates enter the workforce, they bring fresh perspectives, innovative ideas, and a commitment to ethical finance, contributing to the industry's growth and evolution.

Successful Case Studies

Successful case studies from around the world showcase how individuals and organizations have seamlessly merged Islamic finance principles with digital literacy to create innovative and impactful solutions. These real-world examples serve as beacons of hope and provide practical insights for those looking to embark on their own journeys in Islamic finance and digital entrepreneurship.

Inspiring Examples of Ethical Entrepreneurship

Next Gen Alpha draw inspiration from real-world examples of ethical entrepreneurship in Islamic finance. These success stories serve as beacons of innovation and impact, showcasing how individuals and organizations have seamlessly merged Islamic finance principles with digital literacy to create groundbreaking solutions.

In one example, the emergence of ethical crowdfunding platforms connects investors with socially responsible ventures. Many of the resultant partnerships do adhere to Islamic finance ethics in their promotion of transparency, profit-sharing, and ethical screening. Funding has gone towards projects developing renewable clean energy, healthcare access, and microfinance. The increasing capital flows in ethical financing create higher return potential in the market as a whole.

Another inspiring example is the rise of digital Islamic banking services. These services leverage technology to provide Shariah-compliant banking solutions, making it convenient for customers to manage their finances in accordance with their values. By offering digital banking apps and online investment platforms, organizations are expanding access to ethical financial services. The vast expansion can be attributed to the universality of smartphones and increasing technological literacy across all socioeconomic demographics.

Recently, ethical robo-advisors with AI-powered platforms can offer investment guidance that aligns with Shariah principles. In the process of helping individuals make ethical investment decisions, the platform benefits from learning automation and data-driven insights.

Learning from Real-World Success Stories

Learning from real-world success stories is a valuable part of Next Gen Alpha's journey. These stories provide practical insights into overcoming challenges, building successful ventures, and making a positive impact in Islamic finance. These success stories need to be brought into the limelight and showcased for others to get inspiration to venture on their own initiatives.

Some notable similarities among these success stories are the beneficial influence of digitalization, collaboration, customer-centric focus, and adaptability. For instance, successful ethical fintech startups have thrived by partnering with established financial institutions and then leveraging knowledge and resources. With a customer-centric approach, partnering firms can share a common focus which ultimately enhances user experience, fostering trust and loyalty. With institutional adaptability, individuals can accelerate their own literacy and adaptability, as well seen in the current digital revolution in the financial industry. These insights from real-world success stories serve to assist in the evolution and expansion of the Islamic finance industry, behind Next Gen Alpha and future leaders to come.

3. Industry's Alignment to Development Goals

As the Islamic finance industry reflects on its 50-year journey, it must confront the challenges that have impeded its growth. Resistance to technological adaptation and a fear of disrupting traditional norms have

often acted as barriers. Nevertheless, embracing innovation is not merely a choice; it has become an imperative. The most effective method to do so is behind the leadership of Next Gen Alpha. Next Gen Alpha comprehend that technology is reshaping the financial landscape and adaptation is vital to staying relevant. Advancements in technology manifest in various forms:

1. **Fintech Innovation:** Fintech startups, digital platforms, and mobile applications are revolutionizing financial services and spreading financial inclusion; all of this further creates an opportunity and necessity for Shariah-compliant fintech solutions.
2. **Blockchain Technology:** Blockchain offers transparent and secure transaction ledgers, aligning with Islamic finance principles, and can reduce information opacity within and across markets.
3. **Artificial Intelligence:** Tools to timely and effectively summarize data and forecast trends will enhance decision-making processes.
4. **Cybersecurity:** As technology advances, cybersecurity becomes crucial to protect financial systems from threats. Islamic financial institutions cannot downplay these challenges.

For Next Gen Alpha, embracing these advancements entails actively seeking ways to leverage technology while ensuring that ethical principles remain at the forefront. This involves staying informed about emerging technologies, engaging with fintech communities, and collaborating with tech-savvy experts.

Overcoming Resistance to Change

Change often faces resistance, particularly in an industry deeply rooted in tradition like Islamic finance. Resistance to change can manifest in various ways:

1. **Cultural Resistance:** Traditional values and practices may resist the adoption of new technologies or approaches.
2. **Regulatory Challenges:** Existing regulations may not accommodate fintech innovations, necessitating regulatory reforms.

3. **Educational Paradigm:** Educational institutions may resist altering traditional curricula to include digital literacy and entrepreneurship, due to funding and research constraints.
4. **Institutional Inertia:** Established financial institutions may be hesitant to embrace digital transformations, exhibiting a don't-rock-the-boat, sail safe attitude, whilst others are growing and facing competition.

Next Gen Alpha acknowledge these challenges and are prepared to address them with strategic insights and unwavering determination. To get a glimpse of how to measure success, see the section titled “Metrics for Gauging Education and Innovation” before the Conclusion of this paper, to build an Action Plan towards empowering as many Islamic Finance Literates from all walks of life, faiths, and beliefs, to benefit from the enormous opportunities in the Islamic finance industry.

1. **Engaging Stakeholders:** Building bridges with industry stakeholders, scholars, regulators, and educational institutions will foster sustainable growth, collaboration, and understanding.
2. **Advocacy:** Advocating for regulatory reforms that accommodate ethical fintech innovations and align with Shariah principles is needed to inform people of the global enrichment the Islamic finance industry can provide.
3. **Education:** Raising awareness about the benefits of Islamic finance literacy, digital literacy and ethical entrepreneurship among students and faculty while allocating more projects toward Islamic finance.
4. **Innovation:** Recognition of successful innovations that have enhanced efficiency, transparency, and financial inclusion in rural and disenfranchised regions and demographics as well as those that are still in development or have failed to contrast the effectiveness of projects.
5. **Persistence:** Maintenance of a long-term perspective and a commitment to driving sustainable change, even in the face of resistance, will simply garner its own attraction across global financial consumers.

The Role of Stakeholders in Nurturing Innovation

Industry stakeholders play a pivotal role in nurturing and supporting Next Gen Alpha as well as transforming modern Islamic finance. Collaborative efforts, including mentorship programs, startup incubators, and research initiatives, can help harness potential across all

stakeholders. Next Gen Alpha recognize that collaboration between banks, scholars, regulators, and educational institutions is essential to build an environment conducive to innovation. Stakeholders play distinct roles in nurturing innovation:

1. Banks: Islamic banks and financial institutions must provide funding and resources for fintech and developmental entrepreneurship and initiatives.
2. Scholars: Scholars must provide guidance on the Shariah-compatibility of products and services.
3. Regulators: Governing and auditing bodies ensure and enforce consumer data protection, information transparency, ethical compliance, and tax policy to promote market growth, increasing competition with friendlier breaks for small and middle-sized businesses.
4. Educational Institutions: Universities and schools fundraise future projects on Islamic finance and develop coursework supplemented with primary sources from the industry.
5. Entrepreneurship Ecosystems: Collaborative ecosystems, such as incubators and accelerators, provide platforms for aspiring entrepreneurs to develop and launch innovative ideas.

Next Gen Alpha seek to engage with these stakeholders to create an ecosystem that nurtures innovation. They understand that by working together, the industry can overcome challenges, accelerate the adoption of ethical fintech solutions, and drive positive change.

Building Collaborative Ecosystems

Building collaborative ecosystems is central to Next Gen Alpha's vision for Islamic finance. This can offer several benefits:

1. Innovation Incubation: Ecosystems provide a supportive environment for fintech startups and entrepreneurs to develop and test innovative solutions.
2. Networking Opportunities: Ecosystems facilitate scholarship, networking, and partnerships, thus enabling the sharing of data, ideas, and resources.
3. Access to Expertise: Entrepreneurs can tap into the knowledge of scholars, industry experts, and mentors during workshops and seminars.

4. **Regulatory Guidance:** Regulatory bodies can collaborate with ecosystems to create regulatory sandboxes that allow innovative solutions to be tested within a controlled environment.
5. **Research and Development:** Ecosystems encourage research and development in ethical finance, furthering the industry's growth. This is still rarely an expenditure of Islamic banks to encourage new product development and offerings.

Next Gen Alpha view collaborative ecosystems as catalysts for innovation and transformation. Already, at such young ages, many have shown the capability to actively engage in discourse digitally or physically, along with transparent sources.

4. Process and Engagement Metrics Support

While the fruit of education is knowledge, the key contribution is engagement. Next Gen Alpha individuals want to begin their careers earlier; research and collaborative projects should be closely tied to and connected with contemporary industry activity. With active teaching and exploration, Next Gen Alpha can merge personal and professional pursuits and ethics early on. It is important that educational institutions nurture dedication, enthusiasm, and practice so students can go on to shape the future of Islamic finance. Active involvement includes:

1. **Building the Foundation:** The establishment of Islamic finance literacy metrics and assessments to continually test student comprehension in financial economic theory and sustainability ethics.
2. **Practical Projects:** Rubrics to assess projects and assignments in the classroom and evaluation of how they test skills such as research ability, collaboration, periodic updating, executive-style writing, data analysis, presentation, problem mitigation, and transparent feedback.
3. **Internships:** Facilitation of internships and industry placements that introduce students to the practical aspects of Islamic finance and ethical entrepreneurship.
4. **Mentorship Programs:** Establishing mentorship programs where students relate to older graduates and industry experts in the form of interactive workshops and seminars.

Active involvement ensures that education extends beyond the classroom and students graduate with higher levels of professional aptitude, relevant

skills, and more focused aspirations. Such a transition will empower students to gain practical experience, build networks, and develop the skills needed to drive innovation in Islamic finance.

Nurturing Dedication to Shaping the Future

Nurturing dedication among Next Gen Alpha through mentorship, collaborative projects, and commitment to ethical values is paramount. This dedication to shaping the future involves several key elements:

1. **Organic Employment Pipelines:** The guidance of experienced industry professionals and mentors helps students persevere through small and large obstacles within the curriculum and then channel their passion and experience into a more efficient industry network for the future.
2. **Teamwork:** With a strict focus on collective learning on top of individual comprehension, Next Gen Alpha will see the multiplicative factor that group collaboration can have on goal setting, production capabilities, and developing a positive work culture in all environments.
3. **Sustainability and Ethics:** Next Gen Alpha will drive operations and innovation to rapidly overcome current bottlenecks and consequences within the industry. Their commitment is aligned to sustainable and ethical firm and societal goals; they will expand future goals to unprecedented levels.
4. **Global Curiosity:** Next Gen Alpha's skeptic traits are driven by the heightened importance of understanding diverse cultural norms, challenging the status quo, and engaging in dynamic learning activities. They want to maintain this mindset as they shape the future.

By actively involving Next Gen Alpha in the industry, nurturing their dedication, and encouraging their sense of ownership, they will be empowered to become the driving force behind the positive transformation of Islamic finance.

Measuring Success and Impact

It is vital to stress that the collective analysis and recommendations provided in this paper so far are neither simple nor quick in terms of seeing everything come to fruition. As such, there is a need to develop multifaceted, measurable, attainable, amendable, and comprehensive metrics that measure success and impact across various horizons.

Some of the goals highlighted here will require time, debugging, and adaptations; these goals include the emergence of ethical fintech startups, the widespread adoption of Shariah-compliant digital solutions, and the industry's ability to address pressing societal challenges while delivering shareholder value. This final chapter delves into the metrics and indicators that will assist current generations and Next Gen Alpha to continually gauge success and impact.

Defining Success in Ethical Entrepreneurship

For Next Gen Alpha, success in ethical entrepreneurship extends beyond financial gains. It is a multifaceted concept that encompasses several dimensions:

1. **Ethical Impact:** Ventures must be measured by their ethical impact, whether they entail adherence to Islamic finance principles, and whether they allow amendable properties.
2. **Financial Viability:** Ventures must also be financially viable. Accounting data must disclose and pass strict audits, financial goals must be explicitly stated and externally verified of practicability, and shareholder value creation processes must show sustainable and resilient abilities.
3. **Innovation:** A venture's home environment must foster collaboration, healthy conflicts, reasonable skepticism, and tolerance of diverse knowledge and skills. These necessary obstacles objectively challenge participants to continuously adapt and innovate production and portfolio offerings.
4. **Customer Trust:** Marketing and front-facing operations must do the necessary due diligence to provide products and services that meet the utility standards of customers. The goal is to make the economic forces of supply and demand in favor of target markets. Ultimately, transparency is the fundamental requirement.
5. **Social Responsibility:** External and internal disclosure of responsibility measures and goals must become the standard to protect employees and stakeholders across the supply chain. Complimentary responsibilities coincide with ethical values as they emphasize environmentalism, social concerns, and sound governance.
6. **Long-Term Sustainability:** Success extends to the long-term sustainability of ventures. It involves strategies for growth, adaptability to changing market conditions, and resilience in the face of challenges.

The dimensions outlined can holistically drive sustainable growth across ventures. Next Gen Alpha recognize the importance of properly allocating energy and resources across all dimensions, while also continually adjusting individual weighting.

Metrics for Gauging Education and Innovation.

Gauging the progress of educational and innovative initiatives is essential to drive sustainable improvement. Next Gen Alpha and current industry practitioners can utilize the following key metrics in this regard:

1. Graduate Success: Track the career paths and achievements of graduates to ensure they are making a meaningful impact within the Islamic finance industry. Proactively gather and disclose feedback from current students and alumni that informs them of the efficacy of educational and professional initiatives.
2. Startup Growth: Measure the inauguration and cyclical growth of fintech startups of alumni as well as those within a geographic radius. Factors to examine include ethical, social, and governance scoring as well as accounting performance, customer engagement, and equity valuation.
3. Adoption of Ethical Solutions: Evaluate the adoption and practices of Shariah-compliance in operations, product portfolio, governance, and public relations. Quantify the positive ethical impact of initiatives, such as contributions to financial inclusion, poverty alleviation, and environmental sustainability.
4. Industry Collaboration: Network between educational institutions, research ventures, and small and large businesses. Design assessment rubrics to evaluate performance across multiple criteria. Organize dynamic workshop events and internship opportunities.
5. Trends Recognition: Monitor the implementation of regulatory reforms that accommodate ethical fintech innovations while safeguarding compliance. Measure the recognition and influence of Islamic finance education and innovation on a global scale. Delve into case studies that highlight business interactions with cultural differences across countries and demographics. Observe macro and micro economic indicators and how they are derived as well as the outlook they espouse. Lastly, trends should continue to adapt contemporary education and networking frameworks.

These metrics serve as benchmarks to ensure that educational and innovative initiatives are on track and align with Next Gen Alpha's vision for Islamic finance. They also provide valuable data for continuous

improvement and adaptation to changing industry dynamics. Lastly, these metrics serve to highlight the accessibility and opportunity of Islamic finance beyond Muslim populations and Muslim-majority countries.

5. Conclusion

While the Islamic finance industry has seen noticeable growth over its half-century tenure, the growth levels remain low or stagnant at times when compared to its conventional counterpart. Further, Islamic finance has only provided a marginal contribution to global wealth during this time frame. Thus, the motivation of this research is to rapidly shift the trajectory of Islamic finance. This paper thoroughly delves into the transformational change required in the Islamic finance industry and how it aligns with the necessary trajectory of society itself. It outlines current constituents in education and industry, drafts potential evaluation metrics, and highlights structural adaptations required to empower Next Gen Alpha to establish its imprint on the future.

The IBaaD initiative was inaugurated to invite Next Gen Alpha to help ensure that Islamic finance education and practice be comprehensive and forward-thinking. The lasting vision encompasses a dynamic curriculum, active learning, entrepreneurial mindedness, and an overarching commitment to ethics, innovation, and positive societal impact. Through dedication, collaboration, and process transparency, this transformation can persevere through obstacles and organically generate new ideas and growth factors.

This transformation within the Islamic finance industry can be a true catalyst to enable individuals, corporations, industries, and governments to successfully navigate an ever-evolving world. As aligned with the Islamic duty to be a steward of earth while in this life, people must individually and jointly improve the standard of living while keeping fundamental ethical principles as the foundation. This realization should inspire current and future generations to build one legacy together as a collection of individual aspirations and efforts.

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