Investigating the Interplay of Financial Inclusion with Bank Performance and Risk

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Abstract

The existing body of literature offers ample evidence supporting the positive correlation between financial inclusion and the enhancement of household well-being and economic growth. Insufficient focus has been given to exploring the potential social consequences of this developmental objective on the performance and risk of banks. This paper seeks to address this gap in the literature and examine how financial inclusiveness influences the performance and risk of large banks at both the supply and micro levels. The data on financial inclusion is extracted from the EIRIS and ESG Rating database, while financial data is collected from the Bloomberg database. Due to the financial inclusion data limitation, a total of 123 large banks are identified from the publicly traded bank institutions in the FTSE All World Index and the list of Global Systemically Important Banks (G-SIBs) designated by the Financial Stability Board (FSB) from 2011 to 2018. Utilising Ordinary Least Squares (OLS) estimation and OLS two-way clustering methods, the empirical results affirm the null hypothesis that heightened financial inclusiveness has a positive impact on the performance and mitigates the risk for financial service providers. This finding concurs with prior research, indicating that large banks with increased financial inclusivity typically exhibit elevated net interest margins alongside weakened efficiency. Although financial inclusion isn't a one-size-fits-all solution for boosting performance or mitigating risk, its degree of implementation carries substantial importance. Increased levels often correspond to improved outcomes. This research bridges the gap between theory and practical steps in promoting financial inclusion in banking.

Keywords: Financial inclusion, Financial services accessibility, Bank performance, Bank risk, G-SIBs

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1. Introduction

The World Bank has lately shown a strong interest in evolving mainstream financial services and promoting financial inclusion. Extensive evidence supports the idea that financial inclusion contributes to economic growth and poverty reduction. An important shift for banks involves leveraging their ethical dimension to prioritise human well-being and social capital, thereby offering environmentally friendly and socially inclusive financial services to the public.

In 2011, the World Bank initiated the Global Financial Inclusion (Findex) database. The 2017 Findex database presents comparable indicators illustrating how individuals worldwide save, borrow, make payments, and manage risk. Between 2014 and 2017, 515 million adults opened accounts with regulated financial institutions or mobile money providers (microfinance institutions), resulting in 69% of adults globally having an account by the end of 2017 (Demirgüç-Kunt et al., 2018).

Momentously, as of the end of 2017, 94% of adults in high-income economies held an account, whereas the proportion in developing economies was 63%. Despite this progress, approximately 1.7 billion adults, primarily residing in developing economies, still lack access to banking services. Notably, there is significant variation in financial inclusion and account ownership across different countries (Demirgüç-Kunt et al., 2018).

The aforementioned evidence highlights the imperative of providing access to financial services for marginalised individuals, encompassing activities such as opening bank accounts, utilizing digital payment services, engaging with credit card services, adopting mobile money services, or utilising other financial technology (FINTECH) applications. Instead of relying on traditional cash transactions, which can be unsafe and challenging to manage, there is an unrelenting need for these individuals to embrace modern financial tools. Moreover, the 2016 report from the Global Partnership for Financial Inclusion (GPFI) proposes that the concept of financial inclusion extends beyond mere accessibility to mainstream financial services. It can be conceptualised across three dimensions: the utilisation of financial services, accessibility to financial services, and the quality of products and service delivery.

Promoting financial inclusion has emerged as a crucial priority in public policy. Over the past decades, central banks in both emerging and developed countries, in collaboration with multifaceted interventions, have initiated efforts to address financial inclusion. These agencies encompass initiatives such as the HM Treasury-led Policy Action Team 14 (launched in 1999), Financial Inclusion Taskforce (established in 2005), Financial Inclusion Commission (FIC) (established in 2015), International Monetary Fund (IMF), the Alliance for Financial Inclusion (AFI), G20, and the Consultative Group to Assist the Poor (CGAP), all contributing to advancing the inclusive banking agenda. Recent studies highlight the manifold social and economic benefits associated with increased access to finance. Notably, expanded access has been linked to higher savings (e.g., Allen et al., 2016), reduced income inequality and poverty (e.g., Bruhn and Love, 2014), increased employment (e.g., Prasad, 2010), improved mental well-being (e.g., Angelucci et al., 2013), favourable impacts on education (e.g., Flug et al., 1998), better decision-making abilities (e.g., Mani et al., 2013), and heightened prospects for new firm creation (e.g., Banerjee et al., 2013). According to Ahamed and Mallick (2019), ensuring an inclusive financial system is not just a developmental goal but also a matter that banks should prioritise, as such a policy drive is favourable to their stability.

While the literature provides sufficient evidence on the positive connection of financial inclusion in promoting the wellbeing of households and economic growth, little consideration has been devoted to investigating whether such a development goal has social ramifications on the risk and performance of banks. Nevertheless, very little of how it impacts the return and risk of financial services providers is unknown. Hence, there is a pressing need for evidence that will encourage banks to enhance financial inclusion. According to the study of Shihadeh and Liu (2019), banks investing in more branching for banking penetration strategy could help banks enhance their return and minimise their risks. They suggest that policymakers can encourage banks to implement growth expansion by building up more branches network, and governments can encourage more development on the laws and procedures to enhance the banking penetration, especially for deprived people. Ahamed and Mallick (2019) affirm the impacts of applying financial inclusion on the soundness of the providers of financial services, which used a sample of 2635 banks in 86 countries from 2004 to 2012. They find that banks with high financial inclusivity contribute to more excellent bank stability. In particular, the positive association is for banks with higher customer depositing funding share, lower marginal costs of providing banking services, and operating in countries with more robust institutional quality.

This paper seeks to investigate the influence of financial inclusivity on the performance and risk of major banks, examining this impact from both the supply and micro perspectives. Unlike delving into the mechanisms through which financial inclusion shapes bank performance and risk, the primary inquiry here is whether large banks or financial institutions exhibiting substantial financial inclusivity demonstrate superior performance compared to those with lower inclusivity. The examination specifically focuses on the inclusivity of the financial sector through the lens of the supply side, emphasising the financial services offered by major financial institutions, rather than examining the demand side factors such as information gathered by the World Bank's global financial inclusion index (Global Findex).

The null hypothesis posits a positive relationship between high financial inclusivity in large banks or financial institutions and their performance, with an aim to minimise risk and maximise returns. This study employs the EIRIS financial inclusion ethical indicator to assess the effects of high financial inclusivity on both performance and risk. The EIRIS inquiry focuses on evaluating the company's approach to financial inclusion through the question, '*How does EIRIS rate the Company's approach to Financial Inclusion?*'. The EIRIS financial inclusion rating operates on a five-level scale comprising Good, Intermediate, Lower Intermediate, Limited, and No Evidence. The levels of Good, Intermediate, and Lower Intermediate denote high financial inclusivity, assigned a value of one, while Limited and No Evidence signify low financial inclusivity, assigned a value of zero. To analyse the relationship between large banks' performance and financial inclusiveness, Ordinary Least Squares (OLS) estimation and OLS two-way clustering approaches are employed.

This paper extends the existing body of literature, building upon works such as Shihadeh and Liu (2019) and Ahamed and Mallick (2019), by offering a supply-side perspective on financial inclusion. It complements the literature on finance, economic growth, and poverty alleviation by asserting a positive correlation between heightened levels of financial inclusion and the financial risk and performance of banks. The empirical findings of this study provide valuable insights for policymakers and practitioners, offering a comprehensive understanding of the current landscape. This knowledge can guide efforts to address the specific needs of groups susceptible to financial exclusion. The primary objective of this research is to establish a new benchmark from the supply-side standpoint, bridging the gap between financial service practitioners, particularly large banks, and policymakers in the quest to tackle poverty, foster

economic development, and enhance financial well-being. By emphasising factors such as usage, access, and the quality of financial services for disadvantaged populations, this study underscores the necessity of an inclusive financial system in economies. It underscores the urgency of encouraging banks to prioritise the integration of financial inclusion into their business strategies, considering the positive associations observed with performance and risk. This research advocates for a holistic approach to financial inclusion, recognising its pivotal role in addressing broader societal and economic challenges.

2. Review of Existing Studies and Formulation of Hypotheses

For a thorough exploration of financial inclusion, this section will be divided into two main sub-sections. The first part will extensively review concepts surrounding financial inclusion, such as financial exclusion and its associated policies and practices. The existing empirical studies on financial inclusion will be analysed in the second part, leading to the construction of the null hypotheses.

2.1 Exploration of Policies and Practices in Financial Inclusion

Numerous impoverished individuals worldwide still reply on cash as a primary means of financial transactions in their daily lives, which poses safety and management challenges. This group of people typically lacks access to essential financial services, such as opening bank accounts, using digital payment methods, accessing credit cards, utilizing mobile money services, or employing other financial technology (FINTECH) applications that could meet their financial transaction needs. Financial exclusion, in a narrow context, correlates closely with poverty, as individuals with lower incomes often find themselves at the periphery of financial services and tend to underutilise them. It primarily affects those residing in highly deprived areas.

The primary purpose of the financial inclusion policy is to tackle financial exclusion. According to McKillop and Wilson (2007), financial exclusion has been described as the inability, difficulty, or reluctance of people to access mainstream financial services. There are vastly policy debates on whether and how people have access to mainstream financial services. The major causes of financial exclusion from banking or savings accounts worldwide are geographical exclusion, condition exclusion, price exclusion, marketing exclusion, and self-exclusion (McKillop and Wilson, 2007). In addition, Collard et al. (2001) stated that exclusion from financial services is a dynamic process. People have the capacity to transition in and out of financial exclusion, whether for short-term or long-term. More interestingly, people could have over-borrowing or lack of financial capability.

While the World Bank has recently demonstrated a pronounced interest in advocating for mainstream financial services and advancing greater financial inclusion, it is essential to note

that practical actions and policies in this direction commenced decades ago. The initial national financial inclusion policy was launched in 1999 by the *'HM Treasury-led policy action team 14'* on access to financial services. Subsequently, the *Financial Inclusion Taskforce* was established in 2005 with the objective of monitoring advancements and providing guidance to government ministers on various banking facets. These included the evolution of credit unions, community developments, and debt advisory services tailored for individuals with restricted access to financial services (Kempson and Collard, 2012).

Over the past decades, financial inclusion has made substantial developments in its policy and practice, emphasising the shift from addressing financial exclusion towards promoting financial inclusion. There is a significant debate on how financial inclusion should be defined and whether the current methods and indicators can capture the social effects. In specific, the pre-2007 studies have vastly criticised the lack of accessibility of financial products (e.g., Collard et al., 2001). Mitton (2008) reviewed the financial inclusion policy and practice in 2008 with a detailed description of the concept of financial exclusion and financial inclusion. Mitton (2008) believed that financial inclusion can be conceptualised with financial decision making, involving financial literacy, financial capability or the need for financial education, and financial accessibility. Additionally, the 2016 report by the Global Partnership for Financial Inclusion (GPFI) indicated that the concept of financial inclusion expands beyond mere access to mainstream financial services. It encompasses three dimensions: the utilization of financial services, accessibility to these services, and the quality of products and service delivery (GPFI, 2016). Specifically, the metrics for the utilization of financial services include the percentage of adults having a bank account and adults having outstanding loans. The indicators of access to financial services include the number of branches and ATMs per 100,000 adults. The quality benchmarks are the use of savings for emergency funding and the percentage of small to medium-sized enterprises (SMEs) required to provide collateral on their bank loans.

The World Bank's *Global Financial Inclusion (Findex)* database, launched in 2011, provides comparable indicators showing how people worldwide save, borrow, make payments and manage risk (Demirgüç-Kunt et al., 2018). According to their findings, 69% of adults (about 515 million adults worldwide) have opened an account at a regulated financial institution or a microfinance institution by the end of 2017. The adults who have an account in high-income economies is in the proportion of 94%, while adults who have an account in developing economies are 63%. Statistically, there are about 1.7 billion adults remain unbanked.

Demirgüç-Kunt et al. (2018) identified substantial cross-country disparities in account ownership, emphasising the diverse circumstances within individual economies.

In 2015, the *Financial Inclusion Commission (FIC)* was created to improve the United Kingdom nation's financial health. It was stated in the 2015 report with "We want financial services that are accessible, easy to use and meet people's needs over their lifetime. We want people to have the skills and motivation to use financial services and to benefit meaningfully from them" (FIC, 2015, pp.2). Several substantial issues were discussed by the FIC, including financial capability, leadership in financial inclusion, credit and debt services, savings and pensions, banking payments and insurance services.

Overall, financial inclusion has garnered global attention, yet significant gaps persist. The social ramifications of not holding a bank account are ever more exclusionary to account holders. There is a pressing demand for financial inclusion policymakers to continue to engage with the mainstream financial service providers or microfinance institutions to bring meaningful changes for disadvantaged groups.

2.2 Recent Empirical Investigations on Financial Inclusion: Overview and Hypothesis Formulation

A recent empirical review in the realm of financial inclusion was investigated and aimed to comprehend the advancements made in promoting the access and use of financial services both on a global scale and within specific economies. Most research on financial inclusion has explored diverse facets, including examining the influence of financial inclusion on economically disadvantaged regions and identifying the determinants of financial inclusion across a significant group of economies like emerging or developing economies. Among the observations in this research, 15 studies focused on a global perspective (e.g., Kempson and Collard, 2012; Cull and Demirgüç-Kunt, 2012; Demirgüç-Kunt et al., 2015, 2017, 2018; Ahamed and Mallick, 2019; Shihadeh and Liu, 2019; Peterson, 2020; Sha'ban et al., 2020; Feghali et al., 2021; Van et al., 2021; Kanungo and Gupta, 2021), while 19 studies concentrated on specific countries (e.g., India, Pakistan, Kenya, Jordan, Bangladesh, UK, US) to analyse the individual economic impacts of financial inclusivity (e.g., Mohan, 2006; Mitton, 2008;

Appleyard, 2011; Rachana, 2011; Aduda, 2012; Kim, 2016; Kim et al., 2018; Nuzzo and Piermattei, 2019; Menyelim et al., 2021).

While most of these studies focus on the demand side, only a few have investigated the role of the supply side in how bolstering financial inclusion benefits banks. Shihadeh and Liu (2019) discovered a positive correlation between financial inclusiveness and banks' risk and return, suggesting a need for global banks to invest in expanded branching and penetration from a global perspective. Additionally, Ahamed and Mallick (2019) concluded that higher level of financial inclusion contributes to enhanced bank stability, particularly for banks with specific characteristics.

This study found that common indicators used to measure financial inclusion include the number of bank accounts, branches, ATMs, and various credit and deposit metrics. However, there is a call for a standardised method to assess the social and economic impacts of financial inclusion strategies, as emphasised in the study by Nuzzo and Piermattei (2019). Additionally, the emergence of financial technology (FINTECH) within mainstream financial services introduces new dynamics, creating opportunities for banks to broaden their customer base and lower operational costs (Demirgüç-Kunt et al., 2008).

In light of the changing landscape and established literature, this study aims to test the null hypothesis that enhancing financial inclusion strategies, particularly from the supply side, positively influences banks' performance and risk. The shifting dynamics, including the impact of technology and micro-finance operations, underscore the need for a comprehensive understanding of how financial inclusion affects banks.

Null Hypothesis: High financial inclusivity in large banks or financial institutions is positively associated with both their performance and risk management, with an emphasis on risk minimisation and return maximisation.

3. Methodology and Data Sample

3.1 Data Sample Selection

This paper relies on EIRIS ESG Rating data, specifically the 'Financial Inclusion Ethical Indicator', to assess the null hypothesis, investigating whether a positive relationship exists between high financial inclusivity in large banks or financial institutions and their performance and risk. EIRIS, a company with over 30 years of experience in responsible investment research, provides sustainability ratings for around 3000 global companies. EIRIS, which stands for Ethical Investment Research Services, is a global leader in the field of environmental, social, and governance (ESG) research for responsible investment. EIRIS provides independent assessments of companies' ethical and sustainability practices, helping investors make informed decisions based on a company's environmental impact, social responsibility, and corporate governance. The dataset encompasses approximately 80 ESG and ethical issues, including board practices, codes of ethics, bribery and corruption, environmental and climate change management, and human rights. It also examines company involvement in other ethical considerations such as animal testing, controversial weapons, gambling, pornography, and tobacco production. The EIRIS & ESG Rating data consists of survey questions and corresponding answers related to ESG issues. These questions are curated by professional EIRIS researchers in collaboration with global network partners, adhering to a transparent framework with clear structured indicators. The EIRIS team employs diverse sources for their investigations, including NGO reports, media coverage, trade and other journals, and publicly available data from regulators. The recipients of EIRIS data include asset owners, managers, investors, pension fund managers, charities, and companies. Compared to other rating data sets, such as KLD rating data in the U.S. and Jantzi Research Inc. in Canada, the EIRIS ESG rating approach is more advanced, featuring with sub-rating groups. Unlike the binary KLD rating (zero/one), EIRIS offers a nuanced evaluation with multiple scoring levels. Significant aspects of EIRIS include its specialism in monitoring financial activities through a social lens, its nonprofit and independent status as a data provider for ESG and ethical company performance research, and its commitment as a signatory to the UN Principles for Responsible Investment (UNPRI).

EIRIS employs multiple criteria to evaluate banking companies, and for the purpose of assessing financial inclusion in this paper, the focus is on the financial inclusion indicator identified by the question, 'How does EIRIS rate the company's approach to financial inclusion?'. The EIRIS rating comprises five levels: Good, Intermediate, Lower Intermediate, Limited, and No Evidence. The levels of 'good', 'intermediate', and 'lower intermediate' represent high financial inclusivity, assigned a value of one, while the levels of 'limited' and 'no evidence' signify low financial inclusivity, assigned a value of zero. In summary, a financial inclusion dummy variable is created, taking a value of one for firms with high financial inclusivity and zero for firms with low financial inclusivity. The data sample for this paper consists of 1332 banking institutions, sourced from the list of large, publicly traded bank institutions in the FTSE All World Index and the list of G-SIBs published by FSB spanning from 2011 to 2018. This data is then matched with the financial inclusion indicator from the EIRIS database. After excluding observations lacking financial inclusion data, a total of 123 bank institutions are used as the weekly data sample for this paper, covering the period from December 4, 2015, to April 28, 2017. The limited number of observations is due to the recent introduction of the financial inclusion ethical indicator by EIRIS at the end of 2015. Table 1 delineates the variables' definitions, calculation formulas, and data sources, while Table 2 provides descriptive statistics, including mean, median, standard deviation, minimum, maximum, skewness, kurtosis, and the number of observations. Additionally, Table 3 displays the correlation among the variables analysed.

Table 1: Variables Definitions and Sources

Table 1 provides definitions and calculation formulas of the independent and dependent variables used in Model (1), (2), (3) and their data source. Data frequency is weekly.

Variable	Definition	Source					
Total Average Value-At-Risk (VAR)	Sum of the individual value-at-risk risk component amounts less the diversification benefit. Formula: Total Average Value-At-Risk = VAR Interest Rate Risk + VAR Equity Risk + VAR Currency Risk + VAR Commodities Risk + VAR Other Risks - Diversification Benefit.	Bloomberg					
Financial Inclusion (FI)	Treatment dummy is a dummy variable for financial inclusion. If Financial Inclusion=1, with high financial inclusivity; otherwise =0, with low financial inclusivity. This paper use EIRIS Financial Inclusion Ethical Indicator to testify the impacts of high financial inclusive firms on its profitability and risk. The indicator is labelled with the question of 'How does EIRIS rate the Company's approach to Financial Inclusion?'. The EIRIS rating has a scale in five levels of Good, Intermediate, Lower Intermediate, Limited and No Evidence. The levels of Good, Intermediate and Lower Intermediate represents to high financial inclusivity with a value of one while the levels of Limited and No Evidence represents to low financial inclusivity with a value of one while the levels of Limited and No Evidence represents to low financial inclusivity with a value of one while the levels of Limited and No Evidence represents to low financial inclusivity with a value of one while the levels of Limited and No Evidence represents to low financial inclusivity with a value of one while the levels of Limited and No Evidence represents to low financial inclusivity with a value of one while the levels of Limited and No Evidence represents to low financial inclusivity with a value of zero.						
Total Assets (TA)	The total of all short and long-term assets as reported on the Balance Sheet.	Bloomberg Bloomberg					
Assets Annual Growth (AG)	A percentage increase or decrease of total assets by comparing current period with same period prior year. Formula: Annual Growth = (Total Assets - Total Assets Same Period Prior Year) * 100 / Total Assets from Same Period Prior Year	Bloomberg					
Deposits to Funding (DF)	Total deposits as a percentage of total deposits, short- and long-term borrowings, and repurchase agreements. Formula: Deposits to Funding = [Customer Deposits / (Customer Deposits + Short & Long-Term Debt)] * 100	Bloomberg					
(TLTA)	Total Loans to Total Assets = (Total Loans/Total Assets) * 100						
Non-performance Assets to Total Assets (NPA)	Ratio of nonperforming assets to total assets = (Non-Performing Assets / Total Assets) * 100	Bloomberg					
Tier 1 Capital Ratio (Tier1Capital)	Tier 1 is used for commercial banks and core capital is used for savings and loans in the United States (U.S.). The ratio of Tier 1 capital to risk-weighted assets.	Bloomberg					
Efficiency Ratio (EFF)	Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. Unit: Actual. Formula: Efficiency Ratio = (Operating Expenses / ((Net Interest Income + Commissions & Fees Earned + Other Operating Income (Losses) + Trading Account Profits (Losses) + Gain/Loss on Investments/Loans + Other Income (Loss) - Commissions & Fees Paid) + Taxable Equivalent Adjustment or Net Revenue - Net of Commissions Paid) * 100	Bloomberg					
Net Interest Margin (NIM)	Net interest margin in percentage is a performance metric that examines how successful a firm's investment decisions are compared to its debt situations. A negative value denotes that the firm did not make an optimal decision, because interest expenses were greater than the amount of returns generated by investments. Unit: Actual. Formula: Net Interest Margin = ((Trailing 12M Net Interest Income + Trailing 12M Taxable Equivalent Adjustment) / (Earning Assets + Prior Year Earning Assets) / 2) * 100	Bloomberg					
Return on Assets (ROA)	Indicator of how profitable a company is relative to its total assets, in percentage. Return on assets gives an idea as to how efficient management is at using its assets to generate earnings. Formula: Return on Assets = (Trailing 12M Net Income / Average Total Assets) * 100	Bloomberg					

Average VAR - Other Risks (VAROR)	The risk component of the value-at-risk model for potential losses due to portfolio holdings other than equities, currencies, commodities and interest rate-related securities.	Bloomberg
Average VAR - Interest Rate Risk (VARIRR)	The risk component of the value-at-risk model for potential portfolio losses due to interest rate fluctuations.	Bloomberg
Average VAR - Equity Risk (VARER)	The risk component of the value-at-risk model for potential losses due to changes in equity prices.	Bloomberg
Average VAR - Currency Risk (VARCR)	The risk component of the value-at-risk model for potential losses due to changes in currency exchange rates.	Bloomberg
Average VAR - Commodities Risk (VARCOMMOR)	The risk component of the value-at-risk model for potential losses due to changes in commodities prices.	Bloomberg
Diversification Benefit (DB)	The reduction in the individual value-at-risk risk component amounts due to the benefit of diversification among the risks.	Bloomberg

Table 2: Descriptive Statistics Table

This table provides the descriptive statistics of the variables for the 123 financial institutions from 2015-Dec-04 to 2017-April-28, including mean, median, standard deviation, minimum, maximum, skewness, kurtosis, and no. of observations (N).

Variable	mean	median	standard deviation	minimum	maximum	skewness	kurtosis	Ν
Total Average Value-At-Risk	2.98	3.18	1.50	-0.83	5.94	-0.53	3.71	1376
Financial Inclusion	0.11	0.00	0.32	0.00	1.00	2.46	7.03	8328
Total Assets	12.25	12.18	1.36	8.93	14.88	0.17	1.98	7929
Assets Annual Growth	3.40	2.81	10.53	-22.42	164.07	7.89	113.45	7872
Deposits to Funding	76.58	78.72	16.27	17.40	99.97	-0.80	3.18	7929
Total Loans to Total Assets	57.86	59.49	14.41	1.53	88.62	-0.78	4.21	7899
Non-performance Assets to Total Assets	2.38	0.91	4.16	0.00	25.34	3.54	16.84	7676
Tier 1 Capital Ratio	13.51	12.60	3.17	7.80	28.70	1.91	7.77	6852
Return on Assets	0.58	0.54	0.53	-2.40	2.79	-0.19	8.70	7872
Efficiency Ratio	63.71	62.32	17.93	0.08	215.25	2.88	21.97	7899
Net Interest Margin	1.90	1.78	0.84	0.56	6.86	1.61	9.03	7620

Table 3: Correlation Table

This table provides correlations for the performance variables from 2015-Dec-04 to 2017-April-28.

	Total Assets	Assets Annual Growth	Deposits to Funding	Total Loans to Total Assets	Non- performance Assets to Total Assets	Tier 1 Capital Ratio	Efficiency Ratio	Net Interest Margin
Total Assets	1							
Assets Annual Growth	-0.1119* 0	1						
Deposits to Funding	-0.4228*	0.2178*	1					
Total Loans to Total Assets	-0.4517*	0.1143*	0.1900*	1				
Non-performance Assets to Total								
Assets	-0.1434*	-0.1432*	-0.2754*	0.3080*	1			
	0	0	0	0				
Tier 1 Capital Ratio	0.2095*	-0.2355*	-0.3771*	-0.2728*	0.0277	1		
	0	0	0	0	0.794			
	0	0	0	0	0	0.0135		
Efficiency Ratio	0.1315*	-0.0682*	0.0705*	-0.2449*	0.0492*	0.0058	1	
	0	0	0	0	0.0006	1		
Net Interest Margin	-0.1083*	0.1141*	0.0948*	0.1968*	-0.0327	-0.3515*	-0.1310*	1
	0	0	0	0	0.1725	0	0	

(Robust t-statistics in parentheses. * p<0.05 which indicates correlation coefficients are significant at the 5% level.)

3.2 Research Methodology

The convergence of deregulation, technological advancements, and globalisation in financial markets has strengthened the diversification and competition among banks, prompting a shift towards a market-oriented system. This paper underscores the significance of scrutinising banks' performance and risk management, especially within the complexities of the contemporary market landscape. Performance analysis serves as a crucial tool for various stakeholders, including internal and external agents such as shareholders, bondholders, competitors, regulators, depositors, financial markets, and credit-rating agencies. It provides insights into the current standing and future prospects of banking institutions. Risk analysis, on the other hand, is instrumental in helping banks mitigate risks and avert potential losses. The choice of the appropriate measure for assessments depends on the specific purpose and prevailing conditions. For example, when a well-diversified investor contemplates adding a bank stock to their portfolio, a market measure like beta may be applied. Conversely, if a bank regulator is evaluating the soundness of a bank, a CAMEL accounting rating is often preferred. Both market and accounting-based measures can be employed to gauge the performance and risk of banks. Numerous studies adopt a combination of accounting and stock market information to estimate bank performance and risk, as evidenced by works like Boyd and Runkle (1993), Samolyk (1994), and Iannotta et al. (2007). This research entails a thorough analysis, considering various dimensions, which aligns with the multifaceted challenges and opportunities encountered by modern banks in navigating dynamic financial markets.

3.2.1 Bank Performance Measures

Several studies in the literature employ accounting information to gauge bank performance, utilising various measures such as Tobin's Q (Shepherd, 1986; Goudreau, 1992), concentration ratio (Berger and Hannan, 1989), and profitability ratios (e.g., See, Berger et al., 2000; Iannotta et al., 2007; Liu and Wilson, 2010). For instance, Iannotta et al. (2007) explore different ownership structures' impact on bank profitability and cost-efficiency, using ratios like operating profit to total earning assets, operating income to total earning assets, and operating costs to total earning assets. Liu and Wilson (2010) focus on Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM) to assess the profitability of Japanese banks with varying ownership structures. The literature presents a mixed perspective on the choice

of performance measures. This paper, based on data availability, initially selects the NIM as the proxy for bank performance. Net Interest Margin (NIM) is considered an essential accounting measure reflecting income, profitability, and efficiency. Demirgüç-Kunt and Huizinga (1999) suggest that bank interest spreads, encompassing ex-ante and ex-post spreads, capture the efficiency of bank intermediation. The ex-ante spread represents the difference between contractual rates on loans and rates paid on deposits, while the ex-post spread considers actual interest incomes and expenses, accounting for loan defaults. A high NIM signifies efficient operation, as interest earned on assets surpasses interest expenses, boosting overall profitability.

Despite its usefulness, NIM has drawbacks, such as the exclusion of bank size and criticism regarding comparability. Hence, the study by Casu et al. (2006) was chosen for review due to its emphasis on distinguishing profitability measures specifically tailored for investment banks and commercial banks. This paper focuses on large banks as its sample, prompting the adoption of the efficiency ratio (cost-to-income ratio) as an alternative performance measure to gauge the overall operational efficiency of these institutions. Notably, Table 3 demonstrates a statistically significant negative correlation (0.13) between the efficiency ratio and Net Interest Margin (NIM) at a 5% level of significance. This justifies the selection of both NIM and the efficiency ratio as key performance indicators for this study.

3.2.2 Bank Risk Measures

Given the intricate nature of risks confronting large banks and the utilisation of Value at Risk (VAR), this study employs the Total Average Value at Risk measure to comprehensively capture the risk exposure of major financial institutions. Drawing on the definition provided by the Bloomberg database, the analysis focuses on five distinct risk components within the Total Average Value at Risk framework. These components include the interest risk component, equity risk component, currency risk component, commodities risk component, and the other risk component. This granular examination aims to deepen the understanding of the diverse and nuanced nature of the risk exposures encountered by the selected large financial institutions.

3.2.3 The OLS Estimation and the OLS Estimation with Two Way Clustering

Over three decades ago, researchers developed robust one-way clustering for linear estimators, such as the study of Liang and Zeger (1986) and Arellano (1987). The current empirical studies have already evident the importance of cluster robust standard errors. Researchers favour a realistic error structure and abandon the assumption of independent and identically distributed (IID) errors from the linear regression, a relaxing assumption. The three estimation models below are applied in the analysis to test the null hypothesis.

 $NIM_{i,t} = \beta_0 + \beta_1 Financial Inclusion_{i,t} + \beta_2 Total Assets_{i,t}$

+
$$\beta_3$$
Assets Annual Growth_{i,t} + β_4 Deposits to Funding_{i,t}
+ β_5 Total Loans to Total Assets_{i,t}
+ β_6 Non Performing Assets to Total Assets_{i,t}
+ β_7 Tier 1 Capital Ratio_{i,t} + β_8 VAR_{i,t} + FE + YE
+ ε_{it} (1)

Efficiency Ratio_{i,t}

 $= \beta_{0} + \beta_{1} \text{Financial Inclusion}_{i,t} + \beta_{2} \text{Total Assets}_{i,t}$ $+ \beta_{3} \text{Assets Annual Growth}_{i,t} + \beta_{4} \text{Deposits to Funding}_{i,t}$ $+ \beta_{5} \text{Total Loans to Total Assets}_{i,t}$ $+ \beta_{6} \text{Non Performing Assets to Total Assets}_{i,t}$ $+ \beta_{7} \text{Tier 1 Capital Ratio}_{i,t} + \beta_{8} \text{VAR}_{i,t} + \text{FE} + \text{YE}$ $+ \varepsilon_{it} \qquad (2)$

 $VAR_{i,t} = \beta_0 + \beta_1 Financial Inclusion_{i,t} + \beta_2 Total Assets_{i,t}$

+ β_3 Assets Annual Growth_{i,t} + β_4 Deposits to Funding_{i,t}

 $+ \beta_5$ Total Loans to Total Assets_{i,t}

 $+ \beta_6 Non Performing Assets to Total Assets_{i,t}$

+ β_7 Tier 1 Capital Ratio_{i,t} + β_8 Efficiency Ratio_{i,t}

 $+ \beta_9$ Net Interest Margins_{i,t} $+ \beta_{10}$ Return on Assets_{i,t} + FE + YE

 $+ \varepsilon_{it}$ (3)

where NIM_{it} indicates the net interest margins of bank *i* at time *t*. *Efficiency Ratio_{it}* indicates the cost to income ratio. VAR_{it} is the total average value-at-risk, the sum of each individual value-at-risk component amounts less the diversification benefits. Control variables include a list of time-varying bank-level characteristics related variables known as essential determinants for bank performance and risk. The control variables used in this paper are the return on assets ratio (ROA), the net interest margin ratio (NIM), the efficiency ratio (EFF), the Tier 1 capital ratio (Tier1Capital), the non-performing assets to total assets ratio (NPA), the total loans to total assets ratio (TLTA), the deposits to funding ratio (DF), the logarithm of total assets (TA), the asset annual growth ratio (AG). The inclusion of controls ensures that a contemporaneous shock does not impact the estimated results to one of these bank-level characteristics. Both bank firm-level fixed effect (FE) and year fixed effect (YE) are considered in the empirical model for omitted effects. Table 1 provides the overall picture of the definitions and sources of variables.

4. Results and Discourse

Following the proclamation of Demirgüç-Kunt and Huizinga (1999), bank intermediation efficiency can be effectively gauged by examining bank interest spreads, specifically net interest margins (NIM). NIM provides insight into how adeptly a firm navigates its investment decisions relative to its debt obligations. A positive value indicates optimal decision-making, where interest expenses are outweighed by returns generated from investments, and vice versa. The empirical findings, presented in Table 4 through regression models, consistently demonstrate that large banks exhibit enhanced efficiency and performance when actively engaged in financial inclusion. Across the three models, accounting for year fixed effects and incorporating a risk variable, a significant and positive relationship is observed between financial inclusion and NIM (coefficient: 0.455). This implies that a one-unit increase in financial inclusivity significantly enhances the efficiency of large banks by 0.455. Moreover, the addition of the risk variable as an explanatory variable significantly increases efficiency by 0.758. These results affirm that when large banks incorporate financial inclusivity, the interest earned on assets rises relative to interest expenses, leading to increased profitability. This positive association underscores that offering financial inclusion generates more interest revenues than the interest expenses incurred in investments, theoretically boosting net income, return on assets (ROA), and return on equity (ROE). Importantly, the inclusion of year fixed effects does not significantly alter the observed relationship. Model (3) in Table 4, incorporating the risk variable, demonstrates a substantial increase in explanatory power, from 25% to 60.2%.

Acknowledging the criticism of the NIM approach, particularly the exclusion of bank size, the paper employs the cost-to-income ratio as an alternative efficiency measure in Table 5. The regression findings reveal a negative relationship (-1.698) between financial inclusion and the cost-to-income ratio at a 10% significance level. Notably, there is a discernible year effect in 2017, and control variables exhibit significance at a 1% level. Besides, the risk control variable exacerbates the adverse effect with a coefficient of -3.929 at a 1% significance level. Model (3) in Table 5, incorporating the risk control variable, demonstrates an enhanced explanatory power, increasing from 15% to 22.1%. In summary, the empirical evidence suggests that while financial inclusion strengthens a bank's net interest margins, it simultaneously weakens the overall operating efficiency in the short run. Consequently, the null hypothesis that large banks

with high financial inclusivity enhance net interest margin performance cannot be rejected, but the null hypothesis that they enhance overall operating efficiency is rejected.

Table 6 reveals that banks with the highest level of financial inclusivity can significantly minimise risk (coefficient: -1.631 at 1% significance level), whereas banks at the second and third levels of financial inclusivity show no impact on their risk levels. The explanatory power of the three regression models at different levels of financial inclusivity is approximately 29%. Overall, the null hypothesis cannot be rejected, indicating that large banks possess a risk-minimising advantage through active engagement in financial inclusion. Particularly, financial inclusivity, encompassing the utilisation and accessibility of financial services and the quality of products and service delivery, emerges as an encouraging avenue for large banks to offer high-quality financial products and services to the general public.

Table 4: Empirical Result: Financial Inclusion and Net Interest Margins

This table presents the empirical findings of the null hypothesis test on whether large banks or financial institutions with high financial inclusivity is positively related to their performance indicator 'net interest margin' from 2015-Dec-04 to 2017-April-28, which is used as the dependent variable in the three empirical models used below. Model (1) OLS-Robust indicates an ordinary least squares (OLS) regression estimation with one way clustering and the year fixed effect; Model (2) OLS-Robust is consistent with Model (1) but excluding the year fixed effect; Model (3) OLS-Robust adds on the risk variable – total average value-at-risk (VAR) as the independent variable in the test. The significant fall in the Model (3)'s observations is due to the limited data in the VAR variable.

	(1)	(2)	(3)
Model	OLS-Robust	OLS-Robust	OLS-Robust
Financial Inclusion	0.455***	0.455***	0.758***
	(20.44)	(20.47)	(28.45)
Total Assets	-0.036***	-0.036***	0.159***
	(-3.93)	(-3.91)	(8.78)
Assets Annual Growth	0.010***	0.010***	-0.005**
	(8.41)	(8.46)	(-2.39)
Deposits to Funding	0.007***	0.007***	0.010***
	(10.98)	(11.02)	(7.85)
Total Loans to Total Assets	0.014***	0.014***	0.018***
	(17.89)	(17.95)	(9.08)
Non-performance Assets to Total Assets	-0.008***	-0.008***	-0.054***
	(-4.06)	(-4.05)	(-9.81)
Tier 1 Capital Ratio	-0.044***	-0.044***	-0.160***
	(-18.26)	(-18.23)	(-21.52)
2016.year	0.009		
	(0.27)		
2017.year	0.020		
	(0.57)		
Total Average Value-At-Risk			-0.186***
			(-18.31)
Constant	1.623***	1.626***	0.801**
	(9.58)	(9.64)	(2.03)
Observations	6,600	6,600	1,167
R-squared	0.250	0.250	0.602

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Empirical Result: Financial Inclusion and Efficiency Ratio

This table presents the empirical findings of the null hypothesis test on whether large banks or financial institutions with high financial inclusivity is positively related to their performance indicator 'cost-to-income ratio', the efficiency ratio from 2015-Dec-04 to 2017-April-28, which is used as the dependent variable in the three empirical models used below. Model (1) OLS-Robust indicates an ordinary least squares (OLS) regression estimation with one way clustering and the year fixed effect; Model (2) OLS-Robust is consistent with Model (1) but excluding the year fixed effect; Model (3) OLS-Robust adds on the risk variable – total average value-at-risk (VAR) as the independent variable in the test. The significant fall in the Model (3)'s observations is due to the limited data in the VAR variable.

	(1)	(2)	(3)
Model	OLS-Robust	OLS-Robust	OLS-Robust
Financial Inclusion	-1.698*	-1.574	-3.929***
	(-1.72)	(-1.57)	(-3.16)
Total Assets	1.076***	1.105***	-0.005
	(6.07)	(6.23)	(-0.01)
Assets Annual Growth	-0.239***	-0.225***	-0.633***
	(-5.42)	(-5.04)	(-7.65)
Deposits to Funding	0.189***	0.194***	0.119**
	(11.17)	(11.41)	(2.31)
Total Loans to Total Assets	-0.463***	-0.461***	-0.315***
	(-25.17)	(-24.96)	(-6.67)
Non-performance Assets to Total Assets	0.863***	0.869***	1.684***
	(12.23)	(12.18)	(4.94)
Tier 1 Capital Ratio	-0.423***	-0.380***	-0.901***
	(-5.71)	(-5.04)	(-2.70)
2016.year	-0.117		
	(-0.15)		
2017.year	3.146***		
	(3.41)		
Total Average Value-At-Risk			3.561***
			(9.09)
	(())(***	(5.221***	70 705***
Constant	66.206***	65.321***	/3./35***
	(17.66)	(17.61)	(6.90)
Observations	6.822	6.822	1.315
R-squared	0.150	0.144	0.221

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Empirical Result: Financial Inclusion and Risk

The total average value-at-risk (VAR) is used as the dependent variable to test the null hypothesis that whether large banks or financial institutions with high financial inclusivity is positively related to their risk (risk reduction). The findings are presented below with three different models. Model (1) financial inclusion at level 1 indicates the highest level of the financial inclusivity at 'good' with a value of one, while the rest of the financial inclusivity levels with a value of zero; Model (2) financial inclusion at level 2 indicates the middle level of the financial inclusivity at 'intermediate' with a value of one, while the rest of the financial inclusivity levels with a value of zero; Model (3) financial inclusivity at level 3 indicates the lowest level of the financial inclusivity at 'lower intermediate' with a value of one, while the rest of the financial inclusivity levels with a value of one, while the rest of the financial inclusivity levels with a value of one, while the rest of the financial inclusivity levels with a value of zero; Model (3) financial inclusivity at level 3 indicates the lowest level of the financial inclusivity at 'lower intermediate' with a value of one, while the rest of the financial inclusivity levels with a value of zero. The findings indicate that the large banks with the highest level of financial inclusivity reduce the risk significantly, but not with the middle level and the lowest level of financial inclusivity.

			(3) Financial Inclusion at
Model	(1) Financial Inclusion at Level 1	(2) Financial Inclusion at Level 2	Level 3
Total Assets	-0.284	-0.282	-0.282
	(-0.93)	(-0.93)	(-0.93)
Assets Annual Growth	-0.004	-0.003	-0.004
	(-0.23)	(-0.20)	(-0.21)
Deposits to Funding	-0.002	-0.002	-0.002
	(-0.21)	(-0.21)	(-0.22)
Total Loans to Total Assets	-0.013	-0.014	-0.013
	(-0.98)	(-1.04)	(-1.01)
Non-performance Assets to Total Assets	-0.231**	-0.230**	-0.231**
•	(-2.72)	(-2.71)	(-2.70)
Tier 1 Capital Ratio	-0.097	-0.101	-0.102
*	(-0.91)	(-0.92)	(-0.95)
Efficiency Ratio	0.000	0.001	0.001
	(0.06)	(0.09)	(0.10)
Net Interest Margin	0.184	0.179	0.175
-	(0.83)	(0.80)	(0.78)
Return on Assets	-0.494	-0.488	-0.487
	(-1.58)	(-1.57)	(-1.57)
Financial Inclusion Level 1	-1.631***		
	(-4.62)		
Financial Inclusion Level 2		0.485	
		(1.82)	
Financial Inclusion Level 3			-0.391
			(-1.68)
Constant	9.050**	9.089**	9.091**
	(2.62)	(2.63)	(2.64)
Observations	6,006	6,006	6,006
R-squared	0.294	0.292	0.293
Firm FE	NO	NO	NO
Year FE	YES	YES	YES

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

5. Validation Tests and Results

While one-way clustering robust standard errors are commonly used in empirical literature, neglecting clustering control in the estimation of variance-covariance matrices (VCE) can introduce bias in statistical significance. Classical linear regression (IID) VCE, without accounting for clustering, may yield imprecise estimates due to the absence of assumptions on independent errors. In panel data, error correlations within groups or clusters are essential considerations. To address this, this paper adopts the two-way clustering estimator in regression analysis for the robustness check, recognising the hierarchical relationship among firms grouped by industries within a panel dataset. This approach, following Cameron et al. (2012), allows for robust inference in the presence of non-nested two-way or multiway clustering. The robustness test for Net Interest Margins (NIM) and Efficiency Ratio, conducted using two-way clustering OLS regression estimation, reveals consistent and significant coefficient estimates (0.455) with and without year fixed effects, as presented in Table 7. This suggests that the relationship between financial inclusion and risk remains unaffected by time, reinforcing the initial findings in Table 4. The inclusion of an additional risk factor as a control variable amplifies the effects, indicating a trade-off between NIM (or the efficiency ratio) and risk. The results for the efficiency ratio in Table 7 align with those obtained from Table 4.

A further robustness test is conducted to ascertain if the estimation of the average VAR component aligns with the results from the total average Value at Risk (VAR). The total average VAR comprises individual VAR components, including commodities risk, interest rate risk, equity risk, currency risk, and other VAR risk. Findings in Table 8 indicate that large banks with the highest level of financial inclusivity significantly minimise equity market risk at 1.021 (at a 5% significance level) while increasing exposure to commodity price volatility by 0.692 significantly. This suggests that while financial inclusion can reduce equity market risk, it simultaneously exposes banks to heightened volatility in commodity prices. Consequently, banks are urged to prudently manage their exposure to commodity risk in their products and services offerings.

Table 7: Robustness Check: Financial Inclusion and Bank Performance

This table presents the robustness check findings with the two way clustering OLS regression for the dependant variables: the net interest margin (NIM) and the efficiency ratio. Model (1) 2wREG indicates an ordinary least squares (OLS) regression estimation with two way clustering and the year fixed effect; Model (2) 2wREG is consistent with Model (1) but excluding the year fixed effect; Model (3) 2wREG adds on the risk variable – total average value-at-risk (VAR) as the independent variable in the test. The twoway clustering variance estimator ensures cluster robust inference when there is two way or multiway clustering that is non-nested.

		NIM			Efficiency Ratio	
	(1)	(2)	(3)	(1)	(2)	(3)
Model	2wREG	2wREG	2wREG	2wREG	2wREG	2wREG
Financial Inclusion	0.455*	0.455*	0.758**	-1.698	-1.574	-3.929
	-3.43	-3.44	-5.57	(-0.34)	(-0.31)	(-0.94)
Total Assets	-0.036	-0.036	0.159	1.076	1.105	-0.005
	(-0.72)	(-0.72)	-1.76	-1.46	-1.55	(-0.00)
Assets Annual Growth	0.01	0.01	-0.005	-0.239	-0.225	-0.633
	-1.7	-1.72	(-1.05)	(-0.96)	(-0.99)	(-1.89)
Deposits to Funding	0.007	0.007	0.01	0.189	0.194	0.119
	-2.26	-2.37	-1.63	-2.86	-2.9	-0.43
Total Loans to Total Assets	0.014*	0.014*	0.018	-0.463**	-0.461**	-0.315
	-2.98	-3	-1.98	(-4.51)	(-4.70)	(-1.58)
Non-performance Assets to Total Assets	-0.008	-0.008	-0.054*	0.863*	0.869*	1.684
	(-0.77)	(-0.77)	(-3.28)	-3.04	-3.1	-1.13
Tier 1 Capital Ratio	-0.044*	-0.044*	-0.160**	-0.423	-0.38	-0.901
	(-4.26)	(-4.28)	(-4.81)	(-1.49)	(-1.30)	(-0.58)
2016.year	0.009			-0.117		
	-0.48			(-1.76)		
2017.year	0.02			3.146**		
	-1.3			-9.91		
Total Average Value-At-Risk			-0.186*			3.561
			(-3.84)			-1.34
Constant	1.623	1.626	0.801	66.206**	65.321**	73.735
	-1.92	-1.89	-0.41	-4.55	-4.59	-1.39
Observations	6,600	6,600	1,167	6,822	6,822	1,315
R-squared	0.25	0.25	0.602	0.15	0.144	0.221
Firm FE	NO	NO	NO	NO	NO	NO
Year FE	YES	NO	NO	YES	NO	NO

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 8: Robustness Check: Financial Inclusion and Bank Risk

This table presents the OLS regression results with two-way clustering for the risk components of the total average value-at-risk (VAR). The risk components are average VARcommodities risk, average VAR-interest rate risk, average VAR-equity risk, average VAR-currency risk and average VAR-other risks. Model (Level 1), (Level 2), and (Level 3) show the findings respectively at each level of the financial inclusion variable, as described in Table 6.

		Average VAR-Other Risks		А	verage VAR-Interest Rate	Risk
Model	(Level 1)	(Level 2)	(Level 3)	(Level 1)	(Level 2)	(Level 3)
Financial Inclusion	-0.501	-0.494	-0.495	0.132	0.138	0.135
	(-1.01)	(-0.99)	(-0.99)	(0.34)	(0.35)	(0.34)
Total Assets	1.088**	1.086**	1.086**	0.519**	0.517**	0.517**
	(3.38)	(3.37)	(3.38)	(2.97)	(2.96)	(2.95)
Assets Annual Growth	0.035**	0.035**	0.035**	0.043**	0.043**	0.043***
	(3.40)	(3.32)	(3.42)	(3.61)	(3.66)	(3.84)
Deposits to Funding	-0.014	-0.014	-0.014	-0.044***	-0.044***	-0.044***
	(-1.06)	(-1.05)	(-1.08)	(-4.06)	(-4.06)	(-4.14)
Total Loans to Total Assets	0.011	0.010	0.010	0.010	0.010	0.010
No	(0.52)	(0.51)	(0.50)	(0.59)	(0.59)	(0.60)
Assets	-0.052	-0.050	-0.051	0.041	0.042	0.042
	(-0.36)	(-0.35)	(-0.36)	(0.41)	(0.42)	(0.42)
Tier 1 Capital Ratio	0.046	0.047	0.047	0.153	0.154	0.153
	(0.33)	(0.33)	(0.33)	(1.71)	(1.71)	(1.74)
Efficiency Ratio	0.006	0.006	0.006	-0.003	-0.003	-0.003
	(1.20)	(1.19)	(1.19)	(-0.44)	(-0.45)	(-0.48)
Net Interest Margin	0.234	0.234	0.236	0.333*	0.333*	0.332
	(1.09)	(1.09)	(1.10)	(1.95)	(1.95)	(1.94)
Return on Assets	-0.598	-0.594	-0.598	-0.233	-0.232	-0.231
	(-1.19)	(-1.19)	(-1.20)	(-1.10)	(-1.09)	(-1.09)

dum1411L1	-0.498*			-0.368		
	(-2.18)			(-1.10)		
dum1411L2		-0.098			-0.051	
		(-0.46)			(-0.35)	
dum1411L3			0.172			-0.056
			(1.07)			(-0.38)
2012.year	0.152	0.152	0.151	-0.022	-0.022	-0.022
	(0.94)	(0.94)	(0.94)	(-0.28)	(-0.27)	(-0.28)
2013.year	0.233*	0.232*	0.233*	-0.195*	-0.195*	-0.195*
	(2.21)	(2.23)	(2.18)	(-2.03)	(-2.11)	(-2.13)
2014.year	0.114	0.112	0.112*	-0.163	-0.164	-0.164
	(1.94)	(1.91)	(1.98)	(-1.31)	(-1.31)	(-1.31)
2015.year	-0.009	-0.012	-0.013	-0.182*	-0.183*	-0.182*
	(-0.10)	(-0.14)	(-0.15)	(-2.00)	(-2.06)	(-2.07)
2016.year	-0.178	-0.186	-0.197	-0.180	-0.183	-0.181
	(-0.73)	(-0.77)	(-0.84)	(-1.23)	(-1.25)	(-1.23)
2017.year	-0.100	-0.109	-0.120	-0.080	-0.084	-0.081
	(-0.66)	(-0.71)	(-0.80)	(-0.47)	(-0.49)	(-0.47)
Constant	-13.174**	-13.159**	-13.160**	-4.231	-4.214	-4.212
	(-2.76)	(-2.75)	(-2.76)	(-1.78)	(-1.77)	(-1.77)
Observations	6,901	6,901	6,901	10,758	10,758	10,758
R-squared	0.408	0.408	0.408	0.346	0.346	0.346
Firm FE	NO	NO	NO	NO	NO	NO
Year FE	YES	YES	YES	YES	YES	YES

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 8 Continue:

	Avera	age VAR-Equity l	Risk	Average Currency Risk			Average Commodit		
Model	(Level 1)	(Level 2)	(Level 3)	(Level 1)	(Level 2)	(Level 3)	(Level 1)	(Level 2)	(Level 3)
Total Assets	0.498	0.492	0.492	0.388	0.392	0.393	0.809**	0.813**	0.814**
	(1.37)	(1.36)	(1.36)	(1.83)	(1.84)	(1.85)	(2.95)	(2.96)	(2.96)
Assets Annual Growth	0.048***	0.048***	0.048***	0.048**	0.048**	0.048**	-0.013	-0.013	-0.013
	(4.31)	(4.25)	(4.37)	(2.49)	(2.50)	(2.56)	(-1.10)	(-1.28)	(-1.10)
Deposits to Funding	-0.019	-0.019	-0.019	0.005	0.005	0.005	-0.019	-0.019	-0.019
	(-0.90)	(-0.89)	(-0.89)	(0.38)	(0.37)	(0.38)	(-1.39)	(-1.44)	(-1.42)
Total Loans to Total									-
Assets	0.001	0.001	0.001	-0.038*	-0.038*	-0.038*	-0.038**	-0.038**	0.038**
N C	(0.07)	(0.07)	(0.05)	(-2.26)	(-2.24)	(-2.27)	(-2.70)	(-2.71)	(-2.69)
Non-performance	0.105	0.106	0.107	-0.039	-0.041	-0.039	-0.151	-0 154	-0.154
Assets to Total Assets	(1.18)	(1.18)	(1.20)	(-0.54)	(-0.56)	(-0.54)	(-1.67)	(-1.69)	(-1.69)
Tier 1 Capital Ratio	0 142	0 143	0.142	0 131	0.131	0.130	-0.081	-0.081	-0.082
The T Capital Ratio	(1.34)	(1.34)	(1, 33)	(1.83)	(1.83)	(1.81)	(-1, 13)	(-1.14)	(-1.14)
Efficiency Ratio	0.003	0.003	0.003	-0.014**	-0.014**	-0.014**	-0.000	-0.001	-0.001
Efficiency Ratio	(0.36)	(0.36)	(0.38)	(-2 53)	(-2 50)	(-2.56)	(-0.06)	(-0.12)	(-0.10)
Net Interest Margin	0.059	0.061	0.057	0.217	0.217	0.214	0.068	0.070	0.068
Net interest Margin	(0.32)	(0.34)	(0.32)	(1.22)	(1, 22)	(1.20)	(0.43)	(0.44)	(0.43)
Return on Assets	-0.128	-0.130	-0.126	-0 591	-0.595	-0.590	(0.43)	(0.44)	(0.43)
Return on Assets	(0.53)	-0.130	(0.52)	(1.66)	(1.67)	-0.550	(1.68)	(1.66)	(1.67)
Financial Inclusion –	(-0.55)	(-0.54)	(-0.52)	(-1.00)	(-1.07)	(-1.07)	(1.00)	(1.00)	(1.07)
Level 1	-1.021**			0.665*			0.692***		
	(-2.52)			(2.08)			(4.10)		
Financial Inclusion –									
Level 2		-0.514**			-0.128			-0.138	
E 11 1 .		(-3.10)			(-0.77)			(-0.51)	
Financial Inclusion –			-0.108			-0.217			-0.097
Level 5			(0.65)			-0.217			(0.99)
Constant	6 571	6 5 2 5	(-0.03)	2 004	2.040	(-1.00)	6 120	6 160	(-0.99)
Constant	(1.38)	(1.37)	(1.36)	-2.904	-2.940	-2.934	-0.130	-0.100	-0.102
Observations	0.408	0.408	0.408	(-0.98)	(-0.99)	(-0.99)	(-1.04)	(-1.04)	(-1.05)
D squared	2,420 0.278	2,420 0.278	2, 4 20	0.202	0.202	0.202	0,704	0,704	0,704
K-squared	0.278 NO	0.278 NO	0.277 NO	0.295 NO	0.292 NO	0.292 NO	0.551 NO	0.550 NO	0.330 NO
	NU	NU	NU	NU	NU	NU	NU	NU	NU
	IES	TES	TES	1ES	I ES	1 E S	1ES	1ES	1ES

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

6. Concluding Remarks

In conclusion, while prevailing literature has established a positive link between financial inclusion, household well-being, and economic growth, there has been limited investigation of the social effects of this development goal on banks' risk and performance levels. This study specifically examines the impact of financial inclusiveness on large banks' performance and risk from both supply and micro perspectives. The central question addressed is whether large banks with high financial inclusiveness outperform those with low financial inclusiveness and whether such involvement has positive economic and social implications. The study utilises the EIRIS financial inclusion ethical indicator to assess the impacts of high financial inclusivity on banks' performance and risk. The findings of this study align with previous literature, indicating that large banks with high financial inclusivity are positively associated with their performance, particularly in terms of net interest margins. However, a contrasting negative relationship is observed between large banks offering high financial inclusion and overall operational efficiency. The analysis extends to the broader performance indicator of return on assets.

Furthermore, large banks with the highest level of financial inclusivity significantly reduce average risk (VAR), but this effect is not observed for banks at middle or low levels of financial inclusivity. Thus, the degree of financial inclusion is not a one-size-fits-all solution for risk diminution or performance improvement. Significant outcomes are evident primarily for large banks rated as Good, Intermediate, or Low Intermediate on the EIRIS scale, while limited or no evidence of financial inclusion in company approaches shows no consistent evidence. It is crucial to note that the empirical evidence indicates association rather than causality. This study contributes to the current literature on financial inclusion from the supply side, complementing existing works on finance, economic growth, and poverty alleviation. By emphasising the positive relationship between higher levels of financial inclusion and banks' risk and performance, this study serves as a milestone in addressing barriers between financial service practitioners, such as large banks, and policymakers in efforts to tackle poverty, foster economic development, and enhance financial health. The importance of an inclusive financial system and the need to prioritise the implementation of financial inclusion in banks' business strategies are highlighted in light of the positive associations observed with performance and risk.

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