The Interplay between Interest Income and Non-Interest Income: *Do Bank-Specific and Macroeconomic Factors Matter?*[1]

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ABSTRACT

The purpose of this study is to uncover factors affecting bank-specific and macroeconomic drivers of income and diversification decisions in Egyptian banks using panel data analysis. Using a balanced panel data set of 17 commercial banks operating in Egypt over the period of 2014–2021. The study found that financial intermediation, gross domestic product growth rate, deposit rate, asset growth rate, inflation rate, and risk-adjusted return on equity, respectively, had a positive and significant impact on income diversification decisions in Egyptian banks over the investigated period, while loan-to-assets and loan loss provision had negative and significant impacts. Nevertheless, bank size and market share were insignificant.

Keywords: *Income Diversification, Banks, Egypt, Panel Data analysis, Bank-specific factors, and Macroeconomic factors.*

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1. INTRODUCTION

Over the past few decades, banks have shifted from their traditional intermediation business model to adopting new non-interest banking activities, driven by competitive pressures and financial liberalization and deregulatory changes in the banking industry (Amidu & Wolfe, 2013; Ammar & Boughrara, 2019; Williams & Prather, 2010). Diversifying bank revenue has emerged as a popular hedging tactic to boost the creation of steady profit streams and a potent tool to raise profitability and operational effectiveness (Ammar & Boughrara, 2019; Luu, Nguyen, Vu, & Tuan, 2020; Sharma & Anand, 2018). As a result, banks were encouraged to enter new markets including insurance, securities trading, and off-balance sheet operations (Sharma & Anand, 2018; Uddin, Majumder, Akter, & Zaman, 2022). Opponents of the diversification process contend, however, that it would worsen the information asymmetry that exists between management and investors and lead to banks taking on excessive risk (Mili, Khayati, & Khouaja, 2019). According to Duho, Onumah, and Owodo (2020), the justifications for profitability, efficiency, and risk implications for diversification seem vague and unconvincing.

Due to the crucial role played by banks as catalysts for promoting economic growth and development (Boamah, Boakye-Dankwa, & Opoku, 2022), the researchers were motivated to investigate income diversification, specifically key drivers of the diversification decision, for the following reasons: First, the Egyptian banking sector has been witnessing a process of ongoing financial reforms since its inception in 1991, evolving over major milestones to date (Jreisat, Hassan, & Shankar, 2018). Second, ample studies have investigated the diversification-performance nexus in developed countries, whose implications may not apply to developing countries, while few papers addressed such associations in developing countries (Brahmana, Kontesa, & Gilbert, 2018; Luu et al., 2020; Moudud-Ul-Huq, 2019; Nisar, Peng, Wang, & Ashraf, 2018); nevertheless, in Egypt, where to the best of the researchers' knowledge, none was found, it was only found in Abdelqader (2019). Finally, abundant empirical literature was conducted as cross-sectional country analyses; subsequently, a single-country study is needed to account for heterogeneous country-specific

factors among nations, especially in the fast-changing economic environment in Egypt.

Consequently, this paper addresses the theoretical and empirical gap found in the Egyptian banking literature, where, to the best of the researchers' knowledge, it is the first attempt to shed light on the drivers of the income diversification decisions in the Egyptian banks. Thus, the purpose of this paper is to identify bank-specific and macroeconomic drivers of income diversification decisions in Egyptian banks over the period of 2014–2021. Over the years researchers examined multiple impacts of varying factors affecting the underlying mechanisms of income diversification in banks either bank-specific factors (Abbas & Ali, 2022; Addai, Tang, Gyimah & Twumasi, 2022; Alhassan, 2015; Alkhouri & Arouri, 2019; Ammar & Boughrara, 2019; Boamah et al., 2022; Chiorazzo, Milani, & Salvini, 2008; Elsas, Hackethal, & Holzhauser, 2010; Le, 2017; Lee, Hsieh, & Yang, 2014a; Lee, Yang, & Chang, 2014b; Luu et al., 2020; Mercieca, Schaeck, & Wolfe, 2007; Meslier, Tacneng, & Tarazi, 2014; Moudud-Ul-Huq, Zheng, Gupta, Hossain & Biswas, 2020; Nguyen, 2012; Nguyen & Nghiem, 2016; Ovi, Perera, & Colombage, 2014; Pennathur, Subrahmanyam, & Vishwasrao, 2012; Sawada, 2013; Stiroh & Rumble, 2006; Trujillo-Ponce, 2013) or macroeconomic-specific (AlKhouri & Arouri, 2019; Ammar & Boughrara, 2019; Baek, Lee, Lee, & Mohanty, 2018; Isshaq, Amoah, & Appiah-Gyamerah, 2019; Meng, Cavoli, & Deng, 2017; Nguyen, Skully, & Perera, 2012a, 2012b). However, this research hypothesizes that Egyptian banks income diversification decisions are derived from bank-specific determinants of risk-adjusted profitability, bank size, loans-to-assets ratio, loan loss provision, deposit ratio, market share, and asset growth, in addition to GDP growth rate, inflation rate, and financial intermediation as macroeconomic factors.

2. LITERATURE REVIEW

According to Githaiga (2021), bank income diversification means increasing the number of revenue streams by engaging in non-core activities (non-traditional) that generate non-interest income, such as securities trading, property management, venture capital, and underwriting. Diversification has been widely studied in corporate finance and strategy literature, signifying two complementary views on the effectiveness of diversification. The corporate finance view was built upon Markowitz's (1952) modern portfolio theory, indicating income diversification as a valuable strategy for managing risks and stabilizing income (Githaiga, 2021; Uddin et al., 2022). While the strategy literature revolved around the concepts of relatedness versus unrelatedness, core competencies, functional synergies, and corporate coherences (Sharma & Anand, 2018), The literature highlights that diversification dynamics are based on two competing hypotheses: the strategic focus hypothesis and the conglomeration hypothesis (Sarkar, 2016). According to Alhassan (2015), the "strategic focus" hypothesis argues that diversified banks are more likely to have difficulties with monitoring multiple business units, high agency costs, and high earning variations; however, the "conglomeration" hypothesis argues that diversification of banking activities ensures the maximization of managerial efforts across different aspects of banking operations.

Moreover, mixed research findings were concluded on the relationship between net interest margin "NIM" from traditional banking services and non-interest income "NII" from expanded banking operations such as fees and commissions on brokerage, exchange, and insurance (Duho & Onumah, 2019 Le, 2017; Triverdi, 2015). A negative NII-NIM association was found by Heffernan and Fu (2010), Lepetit, Nys, Rous, and Tarazi (2008), Nguyen (2012), and Tennant & Sutherland (2014). Le (2017) argued that such negativity might be due to the augmenting reductions in NIM by NII to offset the impact of reduced traditional income. A matter that was referred to by Isshaq et al. (2019) as the cross-subsidization hypothesis is that a bank could lower interest rates in order to lend to customers on a long-term basis; thus, over the long term, the bank's relationship with the borrower allows it to offer them NII-related services,

offsetting lending services. Stiroh (2004) and Valverde and Fernandez (2007) found a positive NII-NIM association, which might be attributed to the cross-selling strategies enhancing customers' commitment to their banks, thereby elevating switching costs and leaving no room to jeopardize the bank's earned interest income.

According to Asif and Akhtar (2019), mixed empirical evidences were provided by the existing literature on the possible impact of diversification on financial performance which can be categorized into four groups; benefits of diversification (Calmes & Theoret 2015; Chiorazzo et al., 2008; Doan, Lin, & Doong, 2018; Githaiga, 2021; Landskroner, Ruthenberg, & Zaken, 2005; Mamun, Meier, & Wilson, 2023; Meslier et al., 2014; Paltrinieri, Dreassi, Rossi, & Khan, 2021; Pennathur et al., 2012; Sanya & Wolfe, 2011), negative diversification-performance trade-off (Berger, Hasan, & Zhou,, 2010; Craigwell & Maxwell, 2006; DeYoung & Roland, 2001; Duho et al., 2020; Elyasiani & Wang, 2012; Francis, Hasan, Kullu, & Zhou, 2018; Githaiga, 2020; Kim & Kim, 2020; Lepetit et al., 2008; Moudud-Ul-Huq, 2015; Maudos, 2017; Stiroh, 2004; Stiroh & Rumble, 2006; Williams & Prather 2010; Wu, Chen, Chen, & Jeon, 2020), irrelevance of diversification (Adzobu, Agbloyor, & Aboagye, 2017 Amidu & Wolfe, 2013; Goddard, McKillop, & Wilson, 2008; Li and Zhang, 2013; Mercieca et al., 2007; Trujillo-Ponce, 2013; Zhou, 2014), and U-shaped diversification-performance association (Alhassan, 2015; Chen et al., 2018; Gambacorta, Scatigna, & Yang, 2014; Kim, Batten, & Ryu, 2020; Vidyarthi, 2020). These mixed results might be attributed to the multiple measurement techniques utilized and varying research settings under the influence of different micro (bank-specific) and macro factors (macroeconomic or industry).

Researchers have been intrigued to analyze multiple impacts of varying factors affecting the underlying mechanisms of income diversification in banks either bank-specific factors such as risk-adjusted profitability (Chiorazzo et al., 2008 Mercieca et al., 2007; Stiroh & Rumble, 2006), financial stability (Mercieca et al., 2007; Stiroh & Rumble, 2006), bank size (Mercieca et al., 2007; Meslier et al., 2014), capitalization (Chiorazzo et al., 2008; Lepetit et al., 2008; Meslier et al., 2014), liquidity (Shim, 2013), loan loss provision, (Baele et al., 2007; Pennathur et

al., 2012), non-performing loans ratio (Lee et al., 2014a, 2014b; Nguyen et al., 2012a), cost efficiency (Elsas et al., 2010; Nguyen et al., 2012a, 2012b), deposit ratio (Lee et al.,2014b), net interest margin ratio (Lin, Chung, Hsieh, & Wu, 2012), assets growth (Sanya & Wolfe, 2011), loans-to-assets ratio (Chiorazzo et al., 2008; Meslier et al., 2014; Stiroh & Rumble, 2006), cost of production (Meng et al., 2017), foreign ownership (Berger et al., 2010; Nguyen et al., 2012a; Pennathur et al., 2012), stock market listing (Nguyen et al., 2012a, 2012b), management efficiency (Lin et al., 2012), and market share (Meng et al., 2017). Or macroeconomic-specific, such as financial intermediation (Meng et al., 2017), financial and banking freedom (Nguyen et al., 2012a, 2012b), financial development (Nguyen et al., 2012b), business cycle (Nguyen et al., 2012a), and inflation rate (Meng et al., 2017).

However, due to limited resource funding and since some data were restricted and not able to reach, the current investigation is built on the notion that Egyptian banks income diversification decisions are derived from bank-specific determinants of risk-adjusted profitability, bank size, loans-to-assets, loan loss provision, deposit ratio, market share, and asset growth, in addition to GDP growth rate, inflation rate, and financial intermediation as macroeconomic factors.

According to Lin et al. (2012), banks enjoying higher risk-adjusted profitability (measured by risk-adjusted return on equity, or "RAROE") are motivated to expand the scope of their operations into new business lines. They attempt financial performance smoothing where diverse revenue sources provide shelter, mitigating the influence of sudden financial shocks and thus reducing risk (Lee et al., 2014a, 2014b). Nevertheless, Addai et al. (2022) concluded that the bank's RAROE enhanced income diversification. Bank size (BS), measured by the natural logarithm of total assets, is considered an important determinant of bank diversification (Alkhouri & Arouri, 2019). Large banks are more inclined to diversify their income sources (Nguyen & Nghiem, 2016) since they are characterized by having the best technology investments, advanced risk management tools, and a wider geographic dispersion with a wider range of customers (Mercieca et al., 2007; Meslier et al., 2014). They reap benefits from

reaching economies of scope and operational synergies, thereby decreasing operating costs, and economies of scale through shared human capital, technology, and information, which combined grant them a lower cost of funding (Chiorazzo et al., 2008; Nguyen & Nghiem, 2016; Sawada, 2013).

A loans-to-assets ratio (LTA) indicates a bank's proclivity to pursue non-interest income, where a high ratio refers to an aggressive lending strategy and a low inclination towards non-interest income-generating activities (Meslier et al., 2014; Ovi et al., 2014; Pennathur et al., 2012). According to Alhassan (2015), a higher LTA could either impact efficiency levels positively through effective resource utilization or negatively, where focusing elevates risk-taking. However, Le (2017) claimed that a higher LTA exposes banks to greater risk but offers informative advantages. Consequently, Ammar and Boughrara (2019) stated that LTA is a diversification decision determinant since banks generally widen their scope of operations when faced with a decrease in income and an increase in risk. Loan loss provision (LLP), measured by the ratio of loan loss provisions to total assets, is used as a proxy for credit risk (Ammar & Boughrara, 2019; Le, 2017). A high level of credit risk may cause banks to search for other revenue streams to compensate for possible default risk (Nguyen, 2012; Pennathur et al., 2012), while a low level indicates better bank risk mitigation brought by diversification (Sawada, 2013). A LLP of total loans was used by Alhasan (2015), Moudud-Ul-Huq et al. (2020) and Ovi et al. (2014) as an alternative measure of bank risk, where a high ratio expresses low loan quality and higher inefficiency.

Deposit ratio (DR), measured as the share of deposits to total assets, is an indicator of a bank's conservative funding choices (Lee et al., 2014b; Trujillo-Ponce, 2013). Deposits constitute an inexpensive and stable financial resource, having the most stabilizing effect on bank revenues compared with other alternatives (Luu et al., 2020). Moreover, depositors are bank core customers who will reluctantly change their institutions because of the high switching costs (DeYoung, Hunter, & Udell, 2004). Consequently, banks develop new financial products and services to retain their current customer base through cross-selling strategies in parallel with attracting new customers (Ammar & Boughrara, 2019). Market share (MS), measured as the ratio of a bank’s deposits to total deposits in

the industry, indicates a bank's market power (Meng et al., 2017). Larger banks are able to exercise their market power in pricing and pay lower rates for depositors, thus earning higher margins (Boamah et al., 2022; Le, 2017). Banks with greater market power generally benefit from economies of scale and scope through diversification (Ammar & Boughrara, 2019). Assets Growth Rate (AGR), measured as the annual growth rate of total assets, indicates the effects of the rapid growth on the bank's strategic choices (Lee et al., 2014a; Luu et al., 2020). AGR can be thought of as a proxy for bank risk-taking preference since managers usually prefer fast growth to more stable profits (Chiorazzo et al., 2008; Meslier et al., 2014). According to Abbas and Ali (2022), high growth leads to an increase in bank diversification, enhanced bank performance, and reduced insolvency risk, unless engaged in poor investments leading to high agency costs and resulting in low performance and high insolvency risk. However, AGR captures the managerial ability to reduce costs through improved quality and quantity of diversified bank products and services, igniting efficient exploitation of resources and achieving economies of scale and scope (Ammar & Boughrara, 2019; Elsas et al., 2010; Nguyen, 2012).

According to AlKhouri and Arouri (2019), Baek et al. (2018) and Isshaq et al. (2019), a higher GDP growth (GGR) level improves bank profitability and reduces its risk, while a high level of inflation (IR) is expected to deteriorate bank profitability and elevate bank risk. Financial intermediation (FI), measured as the ratio of banking assets to GDP, is considered a determinant of the diversification decision (Meng et al., 2017). The expansion of banking activities tends to thrive as banks embark upon new business lines and widen the functional scope of their products and services (Ammar & Boughrara, 2019). Income diversification (the dependent variable) is measured using the Herfindahl-Hirschman Index (HHI), widely used in the literature (Alhassan, 2015; Chiorazzo et al., 2008; Elsas et al., 2010; Gafrej & Boujelbene, 2022; Luu et al., 2020; Mercieca et al., 2007; Meslier et al., 2014; Nguyen & Nghiem, 2016; Nguyen & Pham, 2020; Vidyarthi, 2020). Diversification of income measures a diversity of incomes across two different sources: interest (traditional) and non-interest income (nontraditional). The following figure (1) demonstrates the conceptual framework adopted by the study:

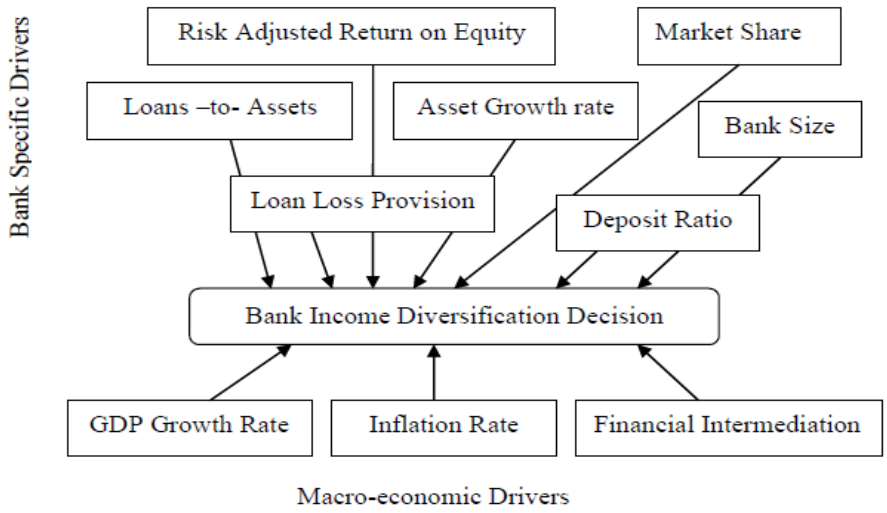

Figure 1: Conceptual Framework

3. THE EGYPTIAN BANKING CONTEXT

This section highlights the antecedents and importance of the period under research investigation from the year 2014 to 2021 with regard to the sequential milestones witnessed by the Egyptian Banking Sector (EBS). The EBS endorsed multiple changes through various revolutions and reforms, affecting its operations and ownership structure. In 2004, the Central bank of Egypt announced its restructuring plan for EBS for 2004–2008, covering four areas of interest: privatizations and mergers, non-performing loans, financial and managerial restructuring of state-owned banks, and enhancing the control and supervision sector of the CBE (Central Bank of Egypt [CBE], 2009). During the implementation of such an ambitious program, the global financial crisis started and had a negative impact on the Egyptian economy in general and its banking sector in particular (Jreisat et al., 2018). The CBE prepared a new phase of financial reform in order to limit the impact of the global financial crisis (CBE, 2010).

However, political turmoil was sparked by the revolution in January 2011, causing detrimental consequences for EBS, to name a few: accelerated volumes of non-performing loans, boosted values of allowances of loan losses, foreign currency appreciation, a 15%–30% increase in incurred administrative expenses, a

lowering of the credit ratings of the top five banks, and restrained procedures for letters of credit (CBE, 2012). In 2013, after the June 30th revolution, CBE declared several initiatives to enhance some economic sectors by exploiting financial and banking tools; moreover, in response to global banking evolutions, CBE embarked upon some Basel III regulations to be used as guiding indicators for 2015–2017 and binding in 2018[6]. In November 2016, a CBE decision was announced to liberate foreign exchange (FX) rates, aiming to enhance monetary stability and decrease stability (CBE, 2018). Such a decision granted appropriate flexibility to working banks in FX pricing, channeling FX trading into legitimate routes and diminishing black market operations (CBE, 2018). By June 2017, CBE reported the possession of 53.8 billion USD, while operating banks reported 34 billion USD, of which 22.5 were customer waivers and 11.5 were foreign portfolio investments (CBE, 2018). Subsequently, on July 6th, 2017, CBE proactively enforced an interim restrictive monetary policy attempting to counter inflationary pressures by announcing a 200 base point interest rate increase, which was later decreased by 100 points in each of two consecutive meetings of the monetary policy committee in February 15th and March 29th of 2018 (CBE, 2019). Moreover, on October 3rd, 2017, CBE announced the elevation of the reserve requirement from 10% to 14% and started on March 1st, 2018, adjusting deposit rates to the corridor framework (CBE, 2019).

In January 2020, the accelerating spread of the COVID pandemic caused severe economic deterioration either globally or domestically (CBE, 2021). The Egyptian real GDP growth rate decreased from 5.6% in 2018–2019 to 3.6% in 2019–2020, accompanied by an increase in unemployment rates from 7.5% to 9.6% and an increase in cost of production GDP from 2.5% to 5.1% for the same periods (CBE, 2021). In response, a 300 base point interest rate decrease was decided on March 16th, 2020, and on April 12th, 2020, CBE decided on a one-year exemption from the application of loan portfolio concentration limits for their biggest 50 clients while preserving sector and individual concentration requirements (CBE, 2021). Moreover, CBE issued several supervisory regulations, including extending the tourism support initiative for a one-year period ending December 2020, obligating banks to establish an independent financial inclusion department, deferring all credit dues for corporate and retail customers for a 6-month period

without imposing any late interest fees or additional fines for late payments, reducing cash transactions, and facilitating the use of electronic payment means (CBE, 2021).

4. METHODOLOGY

4.1 Research population and sample

According to the Central Bank of Egypt (CBE) annual report for the year 2020, 38 banks are operating in Egypt, with 4298 branches dispersed all over the country. However, according to the central bank and banking sector law of 194 for 2020, it might be inferred that all banks operating in Egypt are commercial banks, all of which might be categorized according to their ownership structure as public banks (owned and controlled by the government) and non-public banks (either privately owned and managed by natural or legal persons, or jointly owned and managed by the governments and persons).

However, the law identified the special activities of some banks in both categories, which were called specialized banks, defined as those licensed to conduct banking operations according to the law covenants. Dawood (2016) highlighted that specialized banks are those that were originally established to direct the financing of specific economic activities. Moreover, according to El-Nasharty (2007), some Egyptian banks offer banking services and products with a differentiated marketing mix that are generally proposed to the public as Islamic banking services and products (in compliance with the Islamic shari'a). In addition, some conventional banks provide such differentiated services in specific branches. However, by reviewing their issued financial statements, it might be concluded that these services are of immaterial relevance to the total portfolio of assets and liabilities since those statements are issued under the typical labeling of conventional banks.

Consequently, the research sample excluded the five specialized banks and the four Islamic banks. In addition, seven banks were excluded since their financial statements are consolidated and published in accordance with those of their foreign holding companies. Nevertheless, the researchers were unable to find any published financial statements of the three banks, which might be attributed to

the acquisition of the first by the second in 2020 and to the recurring ownership restructuring of the third. Moreover, two more banks were excluded for a lack of published statements for the year 2021 since their merger agreement in January 2021. Thus, the research investigation covered the remaining 17 banks, which exhibited continuing operations from 2014–2021, despite some changing their names during the period or changing their ownership structure after 2021.

4.2 Variables and Measurements

The following table (1) presents the acronyms and the methods of calculation of the research variables:

Table 1: Research Variables and measurements

Research Variables "Where i = 1, 2, … n (bank unit), and t (time period) = 1,2, …t"			
Independent variables			
1. Risk-adjusted return on assets		Acronym	**RAROE** $_{it}$
Calculation	The ratio of the average ROE to the standard deviation of ROE (Addai et al. 2022; Lee et al., 2014a, 2014b; Lin et al., 2012).		
2. Bank Size		Acronym	**BS** $_{it}$
Calculation	Natural logarithm of total assets (Alkhouri & Arouri, 2019; Meslier et al., 2014; Nguyen & Nghiem, 2016; Thakur & Arora, 2024).		
3. Loans to assets		Acronym	**LTA** $_{it}$
Calculation	The ratio of the total loans to total assets (Alhassan, 2015; Ammar and Boughrara, 2019; Ovi et al., 2014; Pennathur et al., 2012).		
4. Loan loss provision		Acronym	**LLP** $_{it}$
Calculation	The ratio of loan loss provisions to total assets (Le, 2017; Moudud-Ul-Huq et al., 2020; Nguyen, 2012; Sawada, 2013).		
5. Deposits Ratio		Acronym	**DR** $_{it}$
Calculation	The ratio of deposits to total assets (Ammar & Boughrara, 2019; Lee et al., 2014b; Luu et al., 2020; Trujillo-Ponce, 2013).		
6. Market Share		Acronym	**MS** $_{it}$
Calculation	The ratio of a bank's deposits to total deposits in the industry (Boamah et al., 2022; Le, 2017; Meng et al., 2017).		
7. Assets growth rate		Acronym	**AGR** $_{it}$
Calculation	The annual growth rate of total assets (Abbas & Ali, 2022; Ammar & Boughrara, 2019; Chiorazzo et al., 2008; Elsas et al., 2010; Lee et al., 2014a; Nguyen, 2012).		
8. GDP Growth Rate		Acronym	**GGR** $_{it}$
Calculation	As extracted from the related source (AlKhouri & Arouri, 2019; Baek et al., 2018; Isshaq et al., 2019; Thakur & Arora, 2024).		

9. Inflation rate		Acronym	IR_{it}
Calculation	As extracted from the related source (AlKhouri & Arouri, 2019; Baek et al., 2018; Isshaq et al., 2019; Thakur & Arora, 2024).		
10. Financial intermediation		Acronym	FI_{it}
Calculation	The ratio of the total banking assets to GDP (Ammar & Boughrara, 2019; Meng et al., 2017).		
Dependent Variable			
Income diversification		Acronym	HHI_{it}
Calculation	Measured by the Herfindahl-Hirschman Index (HHI)		

$$HHI_{it} = 1 - \left(\frac{\text{Traditional}_{it}}{\text{Total Income}_{it}}\right)^2 + \left(\frac{\text{Non-Traditional}_{it}}{\text{Total Income}_{it}}\right)^2$$

If *HHI* = zero, therefore the bank's income structure is concentrated (shows no diversification).
If *HHI* = one, therefore the bank's income structure is fully diversified.
(Alhassan, 2015; Chiorazzo et al., 2008; Elsas et al., 2010; Gafrej & Boujelbene, 2022; Luu et al., 2020; Mercieca et al., 2007; Meslier et al., 2014; Nguyen & Nghiem, 2016; Nguyen & Pham, 2020; Vidyarthi, 2020).

4.3 Data Sources

The research data set was extracted from the published financial statements (balance sheets, income statements, and footnotes) for 2014–2021 of the sampled banks. Specifically, items extracted from the balance sheets were total equity, total customers loans', total customer deposits, and total assets. Net interest income was explicitly available in each bank's income statement; however, for research purposes, net noninterest income included the following income statement items: net fees and commissions, dividend income, and net trading income. Finally, financial statement footnotes were resorted to for identifying the amounts of loan loss provisions. Annual total industry deposits were obtained from the CBE annual report. Data on macro-economic variables (annual inflation rate, annual GDP, and annual GDP growth rate) were taken from the World Bank indicators. For banks whose financial statements are issued in USD, official exchange rates were retrieved and accounts were translated to Egyptian pounds for dates of issuance by calculating the average of bid and ask prices.

5. DATA ANALYSIS AND RESULTS

Our empirical analysis began with summary statistics for all variables, including dependent and independent variables. Table (2) demonstrates the summary statistics for the research variables, including the mean, median, standard deviation, minimum, and maximum values. Skewness, kurtosis, and Jarque-Bera. The average of the underlying variables over the study period is referred to as the mean values. The standard deviation measures the variability of a variable around its mean. The minimum and maximum values are the lowest and highest values, respectively.

Table 2: Summary Statistics

	HHI	RAROE	LTA	BS	AGR	DR	LLP	IR	GGR	FI	MS
Mean	0.35	0.41	1.95	1.03	3.69	0.16	0.42	3.21	2.26	0.05	2.53
Max.	0.44	4.30	4.38	1.64	7.03	0.32	4.30	6.43	4.42	2.42	5.18
Min.	0.25	-2.47	-0.48	0.55	0.98	0.06	-2.47	0.54	-1.34	-2.92	-0.01
Std Dev.	0.03	1.21	0.98	0.26	1.12	0.05	1.21	1.05	1.05	0.95	0.96
Skewness	0.03	0.12	-0.04	0.12	0.16	0.43	0.10	0.08	-0.35	-0.21	-0.08
Kurtosis	3.23	3.08	2.60	2.27	2.96	3.19	3.10	2.88	3.16	3.15	3.05
Jarque-Bera	0.32	0.36	0.96	3.33	0.61	4.35	0.29	0.22	2.87	1.13	0.15
Probability	0.85	0.84	0.62	0.19	0.74	0.11	0.86	0.90	0.24	0.57	0.93

As shown in the previous Table (2), the average HHI for the sample was around 0.35, with a range of 0.25 to 0.44. The standard deviation of 0.03 indicates that HHI in the study doesn't differ much. RAROE showed an average of 0.41 and a range of -2.47 to 4.30. The standard deviation of 1.21 indicates that there is a significant difference in the average level of RAROE among the banks studied. LTA recorded 1.95 on average, with values ranging from -0.48 to 4.38. The standard deviation of 0.98 indicates that there is a significant difference in the average level of LTA among the banks studied. BS recorded an average value of 1.03 with a range of 0.55 to 1.64, implying a greater ability to diversify banking income. The standard deviation of 0.26 suggests that the size of the banks in the study doesn't differ much. The AGR showed an average of 3.69 and a range of 0.98 to 7.03. The standard deviation of 1.12 indicates that there is a significant difference in the average level of AGR among the banks studied. This is a great value that demonstrates how quickly a bank has been increasing its assets. DR showed an average value of 0.16 with a range of 0.06 to 0.32, implying greater

ability to diversify banking income. The standard deviation of 0.05 suggests that the DR of banks in the study doesn't differ much. LLP has an average value of 0.42 with a range of -2.47 to 4.30. The standard deviation of 1.21 suggests that the LLPs of the banks in the study differ greatly. IR recorded a high average value of 3.21 with a range of 0.54 to 6.43 and a standard deviation of 1.05. GGR showed a high average value of 2.26, with a range of -1.34 to 4.42 and a standard deviation of 1.05. FI recorded an average value of 0.05 with a range of 2.42 to -2.92. The standard deviation of.95 suggests that the FI of the banks in the study differs greatly. MS also showed a high average value of 2.53, with a range of -0.01 to 5.18, indicating high profitability with a high level of efficiency. The standard deviation of 0.96 suggests that the MS of banks in the study doesn't differ much.

Skewness values indicated that all variables were skewed to the right, and only four were skewed to the left. Similarly, since the kurtosis of seven variables was above 3, their distributions were leptokurtic, while only four variables had a platykurtic distribution. The Jarque-Bera test determined whether or not the data was normally distributed. According to its null hypothesis, a series is normally distributed if the probability associated with the test is higher than the chosen significance level (i.e., 1%, 5%, or 10%). In this case, the Jarque-Bera test showed that all variables of interest were normally distributed at 5% (Batrancea & Management, 2021).

Table 3: Correlation among the variables of the study

	HHI (dependent)	RAROE	LTA	BS	AGR	DR	LLP	IR	GGR	FI	MS
HHI (dependent)	1.000										
RAROE	0.647	1.000									
LTA	0.568	0.194	1.000								
BS	0.587	0.526	0.511	1.000							
AGR	0.168	-0.005	0.046	-0.164	1.000						
DR	0.754	0.655	0.431	0.605	-0.030	1.000					
LLP	-0.311	0.075	-0.159	-0.294	0.081	0.038	1.000				
IR	0.174	0.052	-0.081	0.019	-0.001	0.037	0.065	1.000			
GGR	0.053	0.169	0.049	0.138	0.080	0.212	-0.073	-0.341	1.000		
FI	0.002	0.217	0.086	0.310	0.102	0.201	-0.210	0.489	0.139	1.000	
MS	0.098	-0.003	0.027	0.247	-0.511	0.034	-0.244	-0.070	-0.008	-0.184	1.000
Correlation is significant at the 0.05 level											

Table (3) presents the correlation analysis, which is used to examine the initial relationship between the variables and also to explore the traces of multicollinearity among the independent variables of the study. The value of the correlation coefficient can range from -1 to +1. The absolute value closer to 1 indicates a strong link between the variables, and 0 means no relationship at all. The sign indicates the direction of the relationship (Gujarati and Porter, 2009), suggesting that a correlation coefficient value above 0.80 indicates severe problems with multicollinearity. The correlation matrix here doesn't contain any value greater than 0.85, as all of the remaining values are below 0.80, suggesting that there is no issue of significant multicollinearity in the data set. For more confirmation, the variance inflation factor (VIF) statistics for the pooled regression model were calculated, which are used to quantify the severity of multicollinearity in the model (Batrancea, 2021). Because the VIF statistics are within the specified range, the tests do not suggest that any variables be removed from the regression (Ashraf, Nazir, U-Din, Yaqoob & Shahzad, 2023). According to the results presented in the previous Table (3), the highest correlation of the independent variables was registered between RAROE and Deposit Ratio (r = 0.655), while the lowest correlation was registered between the variables RAROE and Market share (r = -0.003).

The Hsiao homogeneity test was employed to determine whether or not to use panel data analysis, and the findings revealed that the pooled regression model is the best fit (Hsiao, 2022; Khouiled, 2018). In addition, the following tests were performed: The study data was analyzed using the Redundant Fixed Effects Test, Hausman Test, and Lagrange Multiplier Tests for Random Effects, indicating that the pooled regression model was the most suitable (Baltagi, Feng, & Kao, 2012; Breusch and Pagan, 1980; Sheytanova, 2015). The following Table (4) clearly shows that the panel is completely homogeneous; therefore, the appropriate model is the pooled regression model.

Table 4: Hsiao Homogeneity Test

Hsiao Tests		
H_1=Null Hypothesis: panel is homogeneous,vs Alternative Hypothesis:H_2 H_2=Null Hypothesis: H_3VS Alternative Hypothesis:panel is hetrogeneous H_3=Null Hypothesis: panel is homogeneous,vs Alternative Hypothesis panel is partially homogeneous		
Hypothesis	F-Statistic	P-value
H_1	5.69	0.00
H_2	0.95	0.64
H_3	2.36	0.18

Levin, Lin, Chu, and ADF-Fisher Chi-square stationarity tests were conducted using the EViews 12 program to evaluate the stability of the research data set. The results shown in Table (5) indicated consistency since their significance levels are less than 0.05, indicating the absence of unit roots and thereby concluding data stationarity.

Table 5: Stationarity Tests

Panel Unit Root Tests				
Variables	Levin. Lin and Chu t		ADF – Fisher Chi-square	
	level		level	
	Statistic	sig	Statistic	sig
HHI	-3.0715	0.001	53.9555	0.0162
RAROE	-21.7974	0.003	255.799	0.0000
LTA	-5.6928	0.000	66.3228	0.0007
BS	-48.8364	0.000	107.704	0.0000
AGR	5.1196	0.000	151.964	0.0000
DR	-7.9068	0.000	52.8669	0.0206
LLP	-3.5888	0.000	58.5166	0.0056
IR	-9.6922	0.000	66.1935	0.0008
GGR	-9.6876	0.000	65.3154	0.0000
FI	-11.1124	0.000	91.1383	0.0000
MS	-9.4948	0.000	67.2026	0.0006

When time series are nonstationary, cointegration tests are used to assess whether they have a stable, long-run relationship. Because the time series cross section (panel data) in this study is stationary, cointegration analysis was not done according to the results in Table (5) (Birkel, 2014; Pedroni, 2004).

Three approaches to panel data analysis—pooled effect model (PRM), fixed effect model (FEM), and random effect model (REM)—were employed to

estimate the research model. PRM is generally used to analyze section data where it is assumed (since time and individual dimensions are ignored) that the behavior of c is estimated using the ordinal least squares (OLS) technique. Therefore, the PRM equation had the same form as an OLS equation, as follows:

$$y_{i,t} = \alpha_i + ß_i x_{i,t} + \varepsilon_{i,t}$$

Where i = 1, 2, ...n (number of individuals or cross-sections), t (the number of time periods) = 1, 2,... t, and ß is the estimated coefficient. Such a model generates n x t equations, which are equal to T equations of cross section and as many N equations of coherent time or time series (Zulfikar and STp, 2018). FEM assumes that the individual differences (cross-section) can be accommodated by different intercepts, as expressed in the following equation resembling the above:

$$yi,t = \alpha i + ßi\ xi,t + \varepsilon i,t$$

Where i = 1, 2,... n (number of individuals or cross-sections), t (the number of time periods) = 1, 2,... t, and ß is the estimated coefficient. REM acknowledges that interference variables may be linked across time and across individuals, where the difference between intercepts is accommodated by the error terms of each bank. REM has the advantage of eliminating heteroscedasticity and is expressed by the following equation:

$$yi,t = \alpha i + ßi\ xi,t + ui,t + \varepsilon i,t$$

Where i = 1, 2, ... n (number of individuals or cross-sections) and t (the number of time periods) = 1,2, ...t, ß is the estimated coefficient, εi,t is the total residual, where the residual is a combination of cross-section and time series, and ui,t is the individual residual, which is the random characteristic of the i-t hand that remains constant at all times.

These models were employed after accounting for the first difference in the natural logarithm of the study variables and based on the analysis of the results of the panel data. 136 observations were recorded for the period 2014–2021, however, due to the presence of autocorrelation between residuals (where the Durbin Watson statistic in the three models was less than 1.5), the first difference

method was used, thereby reducing the number of study observations to 119. As a result, the program relied on analyzing the results of 119 observations from 2015 to 2021.

Table (6) displays the PRM, REM, and FEM empirical estimation results, where the results of the Fisher's statistic (F-test) indicated that the three models are statistically significant at 5%. However, FEM showed the lowest F-statistic value with the highest coefficient of determination (R-squared) value of 0.84. BS and MS were the only insignificant drivers of bank income diversification decisions in Egypt at a level of significance of 0.05 in the three models. Moreover, in each of the three models except for the inflation rate, all variables appear to have the correct signs. Further, the researchers conducted a comparison between the three panel models to determine the best approach to data analysis. The redundant fixed effect test (RFET) was used to determine the significance of effects when comparing FEM and PRM. As shown in Table (7), the probabilities of the cross-section F and cross-section Chi-square were statistically insignificant at a significant level of 0.05, implying the superiority of PRM for estimating panel data over FEM. Moreover, since panel analysis dictates that the chosen model should be based on information about the individual specific components and the exogeneity of the independent variables, the Hausman test was conducted to distinguish between FEM and REM as it identifies the presence of endogeneity in the explanatory variables (Sheytanova, 2015). The probability value of the Hausman test presented in Table (8) was greater than 0.05, indicating the superiority of REM. Finally, Lagrange multiplier tests for random effects were used to compare PRM and FEM. As shown in Table (9), the p-value was greater than 0.05, concluding the significance of PRM. Thus, according to the results of the three comparative tests shown in Table (10), PRM is the best model to be employed based on the panel least squares method.

Table 6: Regression results for HHI (at significant level of 0.05)

Models	PRM	REM	FEM	Sig.
Variable	coefficient Std. Error	coefficient Std. Error	coefficient Std. Error	
C	-0.0033 0.0020	-0.0033 0.0020	-0.0033 0.0020	Non-significant
RAROE	0.0248 0.0040	0.0248 0.0040	0.0243 0.001	Significant
LTA	-0.0002 0.0230	-0.0002 0.0230	-0.0002 0.001	Significant
BS	0.0040 0.0030	0.0040 0.0030	0.0045 0.0030	Non-significant
AGR	0.1696 0.0226	0.1696 0.0226	0.1720 0.0240	Significant
DR	0.1635 0.0350	0.1635 0.0350	0.1518 0.0370	Significant
LLP	-0.0199 0.0760	-0.0199 0.0740	-0.0198 0.0780	Significant
IR	0.1049 0.0160	0.1049 0.0170	0.1054 0.0170	Significant
GGR	0.3161 0.1420	0.3161 0.1470	0.3162 0.1470	Significant
FI	0.3964 0.0040	0.3964 0.0040	0.3825 0.0040	Significant
MS	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	Non-significant
R-squared	0.83	0.83	0.85	
Adjusted R-squared	0.81	0.81	0.81	
F- statistic	52.94	52.94	19.52	
Prob (F-statistic)	0.00	0.00	0.00	
Durbin-Watson stat (after fixing the autocorrelation problem)	1.66	1.66	1.75	
No. of observation	119	119	119	

Table 7: Redundant Fixed Effect Tests

Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.598923	(16,92)	0.8772
Cross-section Chi-square	11.79115	16	0.7582

Table 8: Correlated Random Effects – Hausman Test

Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	10	1.0000

Table 9: Lagrange Multiplier Tests for Random Effects

	Cross-section	Time	Both
Breusch-Pagan	1.392829	48.05207	49.4449
Sig. (p-value)	0.2379		

Heteroskedasticity is commonly referred to as non-constant error variance, or the idea that after the predictors are included in the regression model, the remaining residual variability changes as a function of something that is not in the model. If the model errors were not purely random, more action is required to understand or correct this source of dependency. This dependency can be easily identified in some cases, such as the presence of clustering within a multilevel modeling framework or in repeated measures analysis. In each case, an extraneous feature of the research design makes each observation more related to others than would otherwise be the case.

To ensure the model's validity, the data were subjected to the stability of variance (homoskedasticity) and the autocorrelation of errors tests. As shown in Table (11), the probability value of the heteroskedasticity LR test was less than the significant value of 0.05, implying that residuals were not homoskedastic. While the p-value of the Breusch-Godfrey serial correlation LM test in Table (12) was less than 5%, indicating that there was a serial correlation problem of random residues at the level The Panel EGLS method was employed to address the issue of heteroscedasticity and autocorrelation in the residuals, as they were not homoskedastic and had a serial correlation problem (Adeboye & Agunbiade, 2017).

Table 10: Summary of model comparison

Specification Test	P-value	Tested	Selection
RFET	0.8772	FEM/PRM	PRM
Hausman Test	0.9820	FEM/REM	REM
Lagrange Multiplier Test	0.2379	REM/PRM	PRM

Table 11: Panel Cross-section Heteroskedasticity LR Test

	Value	df	P-value
Likelihood ratio	30.73480	17	0.0215

Table 12: Test of Autocorrelation

Test	Breusch-Godfrey Serial Correlation LM Test
Statistics	95.6717
P-value	0.0000

Table 13: Goodness-of-fit of Pooled Regression Model

Tests	Jarque-Bera	Breusch-Godfrey Serial Correlation Lagrange Multiplier	Lagrange Multiplier White
Statisttics	3.831	0.2454	11.0313
P-value	0.148	0.6203	0.4406

The panel EGLS yielded the same estimates as the PRM; however, the confidence interval and prevailing significance of the coefficients were changed. To examine the goodness-of-fit of PRM after fixing the heteroscedasticity and autocorrelation problems, the Jarque-Bera and the Breusch-Godfrey Serial Correlation Lagrange Multiplier tests were conducted as presented in Table (13). Standardized residuals showed a normal distribution where the Bera-Jarque test had a probability value greater than 0.05, indicating the normality of the data. While the probability value of the Breusch-Godfrey Serial Correlation Lagrange Multiplier test was greater than 0.05 after resolving the autocorrelation problem using the first difference for all of the study variables, therefore concluding the absence of serial correlation, Moreover, the probability value of the LM White Test was greater than 0.05 after processing data using panel EGLS to fix the problem of heteroscedasticity, therefore stating homoskedasticity, i.e., equal variance in residuals.

Consequently, PRM was deployed to determine how the independent variables (RAROE, LTA, BS, AGR, DR, LLP, IR, GGR, FI, and MS) explain or capture the derivation of Egyptian banks income diversification decisions. Panel EGLS was used in the model's estimation since it generates new standard errors that are more effective. The variance inflation factor (VIF) statistics were used to assess the degree of multicollinearity in the PRM model. VIF statistics were within the specified range, thereby suggesting that no variables should be removed from the regression (Ashraf et al., 2023). The pooled regression equation depending on Panel EGLS is:

$$\Delta ln\text{HHI}_{it} = \text{-}0.0036 + 0.0253*\Delta ln\text{RAROE}_t - 0.0002*\Delta ln\text{Loans to Asset}_t + 0.1795*\Delta ln\text{Assets Growth Rate}_{t\text{-}1} + 0.1863*\Delta ln\text{Deposit ratio}_t - 0.0186*\Delta ln\text{ Loan Loss Provision}_t + 0.1130*\Delta ln\text{Inflation}_t + 0.3001*\Delta ln\text{GDP Growth Rate}_t + 0.3997*\Delta ln\text{Financial Intermediation}_t$$

The preceding equation depicts the significant independent variables influencing HHI; in other words, it represents the drivers of the bank's income diversification decision in Egypt. Among the estimated coefficients of PRM-Panel EGLS presented in Table (14), the F-test p-value was zero, indicating that the dataset captured sufficient evidence to conclude that the deployed panel model fitted the data better than the model without independent variables. The Durbin Watson revealed the absence of autocorrelation of random variables, implying that the econometric model's efficiency was not affected. The independent variables explicitly included in the model explain 83% of the variation in the diversification decision since the R-squared recorded a value of 0.84. Furthermore, the significantly adjusted R-squared of 0.81 has further consolidated the goodness of the model, resulting in its econometric significance and reliability. The critical value of Durbin-Watson was 1.74, stating that there is no autocorrelation in the PRM.

Table 14: Pooled Regression Model results using Panel EGLS (Cross-section weights)

Dependent Variable HHI				
Sample (adjusted): 2015 2021 – Cross sections included:17				
Total panel(balanced) observations: 119				
Linear estimation after one-step weighting matrix				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0036	0.001353	-2.6475	0.0093
RAROE	0.0253	0.002885	8.7525	0.0000
LTA	-0.0002	6.86E-05	-2.1871	0.0309
BS	0.0014	0.002873	0.4843	0.6292
AGR	0.1795	0.018885	9.5069	0.0000
DR	0.1863	0.03125	5.9618	0.0000
LLP	-0.0186	0.003345	-5.5484	0.0000
IR	0.1130	0.012957	8.7186	0.0000
GGR	0.3001	0.110646	2.7122	0.0078
FI	0.3997	0.076057	5.2551	0.0000
MS	0.000	1.07E-09	-0.0189	0.9850
R-squared	0.84			
Adjusted R-squared	0.82			
F-statistic	56.38			
Prob (F-statistic)	0.0000			
Durbin-Watson stat.	1.74			

The constant coefficient of PRM had a statistically significant t-value of -0.0036 which means that the expected value of dependent variable (HHI) will be less than 0 in the absence of the independent variables. The independent variables: RAROE, LTA, AGR, DR, IR, LLP, GGR, and FI had statistically significant positive coefficients, while BS and MS coefficients MS were statistically insignificant. RAROE coefficient had a significant positive value of 0.0253 indicating 2.53% HHI increase for every RAROE. AGR coefficient had a significant positive value of 0.1795 indicating 17.95% HHI increase for every 1% increase in AGR. DR coefficient had a significant positive value of 0.1863 indicating 18.63% HHI increase for every 1% increase in DR. IR coefficient had a significant positive value of 0.1130 indicating an 11.30% HHI increase for every 1% increase in IR. GGR coefficient had a significant positive value of 0.3001 indicating 30.01% HHI increase for every 1% increase in GGR. FI coefficient had a significant positive value of 0.3997 indicating 39.97% HHI increase for every 1% increase in FI. LTA coefficient had a significant negative value of -0.0002

indicating 0.02% HHI decrease for every 1% increase in LTA. LLP coefficient had a significant negative value of -0.0186 indicating 1.86% HHI decrease for every 1% increase in LLP

6. DISCUSSION OF THE RESULTS

The results of the conducted analyses shed light on the derivation of income diversification decisions concluded by Egyptian banks over the period of 2014 to 2021. Results showed conformity with theoretical postulations, however, with varying impacts. Specifically, FI (Ammar & Boughrara, 2019; Meng et al., 2017), GGR (AlKhouri & Arouri, 2019; Baek et al., 2018; Isshaq et al., 2019), DR (Ammar & Boughrara, 2019; Lee et al., 2014b; Luu et al., 2020; Trujillo-Ponce, 2013), AGR (Abbas & Ali 2022; Elsas et al., 2010; Luu et al., 2020; Nguyen, 2012b), IR (AlKhouri & Arouri, 2019; Baek et al., 2018; Isshaq et al., 2019), and RAROE (Ammar & Boughrara, 2019; Lee et al., 2014a; 2014b; Lin et al., 2012) significantly derived HHI, respectively.

Nevertheless, it is worth mentioning that IR was partially inconsistent with the theoretical postulations since it showed unexpectedly positive signs. According to Hakimi, Hamdi, and Djelassi (2012), Hsieh, Chen, Lee, and Yang (2013), and Isshaq et al. (2019), a high level of inflation is expected to subject banks to higher risk levels and to be detrimental to bank profitability.

Inconsistent with theoretical postulations, research findings unexpectedly showed a statistically insignificant impact of BS and MS on the Egyptian diversification decision (AlKhouri & Arouri, 2019; Ammar & Boughrara, 2019; Le, 2017; Meng et al., 2017; Meslier, 2014). Theories such as the market power theory and the efficient structure theory (Boamah et al., 2022) suggest dynamic engagement between bank size and diversification. However, research on bank size, diversification, and performance nexus showed inconclusive evidence, as Chiorazzo et al. (2008), Mercieca et al. (2007) and Trujillo-Ponce (2013) provided that diversification benefits fluctuated conversely with bank size. Further, Moudud-Ul-Huq et al. (2020) found that in Bangladesh, large banks are greatly diversified, less stable, and less performed, while small banks have enjoyed more benefit from portfolio diversification with a higher bank's stability, whereas large

South African banks get more benefit from bank diversification with greater stability over small-sized banks.

Moreover, LTA and LLP were concluded to have significantly inconsistent negative values with the decision taken by Egyptian banks to diversify. Gafrej and Boujelbéne (2022) highlighted that LTA has a significant influence on bank diversification. According to Le (2017), specialization in lending could enable banks to avoid technological and learning costs associated with diversification; however, the safety perspective hypothesis predicts that such specialization exposes banks to greater risk levels. Alhassan, 2015; Le, 2017; Moudud-Ul-Huq et al., 2020, indicated that a higher ratio of LLP indicates the bank's ability to absorb losses from total loans and advances and lower bank risk.

7. CONCLUSIONS AND RECOMMENDATIONS

The study's primary goal is to pinpoint the macroeconomic and bank-specific factors that influence revenue diversification choices made by Egyptian banks between 2014 and 2021. Financial intermediation, deposit ratio, asset growth rate, inflation rate, and risk-adjusted return on equity were found to have a substantial impact on Egyptian banks' decisions on revenue diversification, respectively. Nonetheless, because the inflation rate displayed a few surprisingly positive signals, it partially supported the theoretical hypotheses. These results could lead one to assume that banks continued to try to take advantage of new revenue streams even though Egypt's macroeconomic environment has been weakened by high rates of inflation.

Furthermore, research results unexpectedly revealed that bank size and market share had no statistically significant influence on the decision to diversify in Egypt. Although the inconsistent results may be due to period data unreliability rather than model problems, the model cannot be completely rejected because the equation did not match the goal well, thus care must be taken when evaluating the given results.

Additionally, with the choice made by Egyptian banks to diversify, loans to assets and loan loss provisions were shown to have significantly negative values. Over the course of the examination, Egyptian banks appear to have focused on non-

material matters, as indicated by a negative loan-to-assets ratio. Yet, since banks that provide high-quality loans and incur little loss are ostensibly keen to enter new markets, a negative loan loss provision value suggests that risk mitigation strategies should be reviewed.

Prudent law is also necessary to force banks to diversify and to reinforce supervision over banks that engage in nontraditional operations, as FI had the biggest influence on the Egyptian diversification decision. Egyptian banks, however, ought to take a balanced approach to risk-taking since too much risk-taking can reduce profitability and increase the chance of a bank failing, while too little risk-taking can be detrimental to a bank's capacity to survive. Therefore, to make successful strategic shifts, investments in top-notch risk management techniques and managerial knowledge, together with the deployment of effective incentive schemes and the execution of good business practices, are vital.

Moreover, our results highlight significant strategic implications for bank managers. Managers of Egyptian banks with high profitability should be encouraged to diversify income to alleviate their credit risk levels. Managers of large Egyptian banks should integrate and manage new business lines. Such integration enables creating synergies among new business lines that generate non-interest income and leads to lowered levels of operational costs.

The findings raise serious concerns regarding the need for Egyptian authorities to closely monitor banks that engage in non-traditional business practices, particularly in light of the research's apparent discrepancies with the relevant literature. It is surprising that larger Egyptian banks were unable to effectively diversify their revenue streams by leveraging their economies of scale and scope, operational synergies, and stronger market strength. To maximize the benefits of diversification, bank management must effectively take into account the inherent and lost investment opportunities.

Further, regulators of the Egyptian banking sector should promote more competition and modernization of banking operations taking advantage of the technological advancements in the Egyptian information and technology communications that has been reinforced and emphasized by the state. Such frameworks should encourage Egyptian banks to monitor and evaluate the key

findings of determinants investigated in this research in order to efficiently yield the benefits of diversification of income streams, therefore amplifying performance. This implies ambidextrous bank efforts for invading new business segments and cross selling while recognizing bank-specific controllable factors such as investment in up-to-date technology, management of operating expenses and bank's idiosyncratic risk.

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التفاعل بين الدخل من الفوائد والدخل من غير الفوائد: هل للعوامل الخاصة بالوحدات المصرفية والعوامل الاقتصادية أهمية؟

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ملخص البحث باللغة العربية

تهدف الدراسة إلى التحقق من عددٍ من العوامل الموجهة لقرار تنوع الدخل بالبنوك المصرية والتى تنوعت بين العوامل الخاصة بكل وحدة مصرفية أو العوامل الاقتصادية. واعتمدت الدراسة التطبيقية على استخدام تحليل السلاسل الزمنية للبيانات المجمعة من عدد 17 بنك تجارى من البنوك العاملة بالقطاع المصرفى المصرى للفترة من 2014 إلى 2021. وأوضحت نتائج الدراسة أن لكلٍ من الوساطة المالية، الناتج المحلى الإجمالى، الودائع، الأصول، التضخم، والعائد على الملكية المعدل بالمخاطر أثرٌ إيجابي ذو دلالة إحصائية على قرار تنوع الدخل بالبنوك المصرية. كذلك، أن لكلٍ من نسبة القروض للأصول ومخصص الخسائر الائتمانية المتوقعة أثرٌ سلبى ذو دلالة إحصائية على ذات القرار، كما أوضحت النتائج عدم دلالة كلٍ من حجم البنوك والحصة السوقية على قرار تنوع الدخل.

الكلمات الدالة: تنوع الدخل، البنوك، مصر، تحليل panel data، العوامل الخاصة بالوحدات المصرفية، العوامل الاقتصادية.

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