

# COMMERCIAL BANKS LISTED ON THE HO CHI MINH CITY STOCK EXCHANGE: AN ANALYSIS OF DIVERSIFICATION, HUMAN CAPITAL, AND PERFORMANCE

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Received: November 21, 2023

Accepted: November 30, 2023

Published: December 25, 2023

DOI: 10.52932/jfm.vi6.460

## Appendix 1. Items and Hypothesis

No		Items	Mesuaure	Reference	Hypothesis (Expectation)
<b>Dependent variable</b>					
1	ROA	Return on assets	Total profit after tax/total assets (%)	Lee & Kim (2013); Yang, Li, Ma & Chen (2018); Lê Hà Diễm Chi (2022)	
<b>Independent variables</b>					
2	HHI	Herfindahl-Hirschman Index	$HHI = 1 - [(NNI/NOI)^2 + (NNI/NOI)^2]$	Kim & Kim, 2020; Alouane, Kahloul & Grira 2022; Addai, Tang & Agyeman, 2022; Radojičić & Marinković, 2023	H <sub>1</sub> (+)
3	HC	Human capital	Total labor expenditure/total operating expenditure (%)	Yusuf (2013); Yen, Lee & Arokiasamy (2019); Rosita et al (2020); Johan & Hapsari (2020); Widarni & Bawono (2022)	H <sub>2</sub> (-)
<b>Control variables</b>					
4	EAR	Equity ratio	Equity/total assets (%)	Batten & Võ (2016), Phạm Quốc Việt & Phạm Trần Quang Phúc (2020), Phan et al. (2022), Githaiga (2022)	H <sub>3</sub> (+)
5	LAR	Loan balance ratio	Total outstanding loans to customers/total assets (%)	Hafidiyah & Trinugroho (2016), Phạm Quốc Việt & Phạm Trần Quang Phúc (2020), Phan et al. (2022), Githaiga (2022)	H <sub>4</sub> (+)
6	CIR	Cost effective	Operating expenses/operating income (%)	Hafidiyah & Trinugroho (2016), Phạm Quốc Việt & Phạm Trần Quang Phúc (2020), Phan et al. (2022)	H <sub>5</sub> (-)
7	NPL	Overdue debt rate (bad debt)	Total outstanding debt of groups 3,4 & 5/total outstanding debt (%)	Lee, Hsieh & Yang (2014), Khan et al. (2020), Githaiga (2022)	H <sub>6</sub> (-)
8	SIZE	Size	Return on total assets	Nguyễn Thị Thu Trang & Hoàng Anh Thư (2019), Octavio & Soesetio, 2019, Phan et al. (2022)	H <sub>7</sub> (+)

Source: Author's Summary and Suggestion (2023)

**Appendix 2.** Statistical results

Criteria	Unit	Mean	Min	Max	SD
Return on assets (ROA)	%	1.0697	0.0267	3.2380	0.6865
Herfindahl-Hirschman Index (HHI)		0.2882	0.0198	0.4472	0.1040
Human capital (HC)	%	-0.4766	-0.9222	-0.1773	0.1478
Equity ratio (EAR)	%	8.6562	4.0618	16.9732	3.0407
Loan balance ratio (LAR)	%	58.7639	22.0052	78.8060	11.6548
Cost-effectiveness (CIR)	%	44.6934	14.4730	86.8137	12.8732
Non-performing loans (NPL)	%	2.4224	0.4705	35.2993	3.0753
Bank size (SIZE)	Billions dong	410.207	18.3284	2120.6090	421.1995

Source: Author's Summary and Suggestion (2023)

**Appendix 3.** Correlation Matrix and VIF coefficient

	ROA	HHI	HC	EAR	LAR	CIR	NPL	VIF
ROA	1							
HHI	0.0680	1						1.60
HC	-0.4560*	-0.0257	1					1.80
EAR	0.4185*	0.2715*	-0.1076	1				1.95
LAR	0.1814*	-0.3622*	-0.2746*	-0.4198*	1			2.32
CIR	-0.5848*	-0.1026	0.5620*	-0.3288*	-0.1625*	1		1.78
NPL	-0.1235	-0.0616	0.0127	0.2552*	-0.2184*	-0.1059	1	1.26
SIZE	0.2476*	-0.0214	-0.4251*	-0.4699*	0.6632*	-0.2235*	-0.3948*	3.19

Note: Sign \*\*\*, \*\*, and \* respectively for meaning 1%, 5%, and 10%.

Source: Author's Summary and Suggestion (2023)

**Appendix 4.** Check for autocorrelation and heteroskedasticity

The phenomenon of heteroskedasticity	Chibar2	Prob > chibar2
Modified Wald test (chi2 (01))	174.39***	0,0000
Autocorrelation	Pesaran	Pr
Pesaran's test	27.30***	0,0000

**Appendix 5.** Introduction

According to Vu Cam Nhung et al. (2022), there has been a notable shift in the utilization of banking services by individuals and households following the pandemic. This transformation has been characterized by a more favorable trajectory, with significant advancements observed in the financial services offered by banks. These improvements can be attributed to the declining reliance on cash transactions. This situation presents an excellent opportunity for banks to augment their revenue streams through non-traditional means. The proposal suggests diversifying the income of banks by expanding non-interest income sources, specifically through financial services and investments (Alouane et al., 2022; Addai et al., 2022). Diversifying income sources is crucial for organizations, specifically commercial banks. Nevertheless, there is an ongoing dispute over the influence of income diversification on banks' profitability. The outcomes of experimental research have yet to produce a great degree of consensus. Several academic studies have supported that banks should diversify their income sources. These studies include the works of Hamdi et al. (2017), Meng et al. (2018), Nisar et al. (2018), Kim & Kim (2020), Alouane et al. (2022), as well as Addai, Tang, and Agyeman (2022). Specific

perspectives argue against income diversification, advocating for banks to specialize. Notable scholars that hold this view include Mercieca et al. (2007), Tashman et al. (2023), as well as Nguyen et al. (2023). According to Tashman et al. (2023), a perspective opposes diversification due to its perceived expenses, potential reduction in management's competitive advantage, and the potential increase in profit volatility. Simultaneously, it is worth noting that banks exhibit variations in their capital size, tangible assets, intangible assets, management capability, and economies of scale (Francis et al., 2018; Kim & Kim, 2020).

Diversification has recently emerged as a widely adopted strategy among corporations, particularly in emerging nations such as Vietnam. Administrators think implementing diversification strategies can increase profitability and improve overall business performance. The relationship between variety and performance is a complex issue that needs a consensus among scholars and researchers. The incongruous results regarding the correlation between income diversification and performance could be attributed to a need to consider crucial aspects that directly influence such a relationship (Addai et al., 2022). Diversification and operational efficiency are subject to several influences, encompassing industry-specific issues. There exist various forms of diversification, including income diversification, revenue diversification, asset diversification, deposit diversification, product diversification, and investment diversification. The research conducted by Obaro et al. (2022) concluded that different forms of diversity influence performance in varying ways, particularly emphasizing the effects of asset and revenue diversification. From 1999 to 2020, they had a beneficial influence on the performance of banks in Nigeria. However, it is essential to note that deposit diversification significantly adversely affected these institutions' performance.

Examining the influence of revenue diversification on the business performance of banks has garnered attention from scholars in Vietnam (Nguyen Thi Doan Trang, 2019; Nguyen Tran Trong Vinh, 2019). However, most studies primarily focus on the foundation of risk adjustment (Nguyen Quang Khai, 2016). According to Prastiwi & Anik (2020), the business performance of banks is influenced by income diversification, which varies across different stages of the economy, as well as changes in institutions and the economic environment. Limited emphasis has been given to examining the impact of revenue diversification on bank performance, particularly regarding human capital. Following the Covid-19 pandemic, there has been a notable inclination among banks in Vietnam to enhance their services, broaden their range of products and services, and expand their operational domains. Hence, this research addresses the existing literature vacuum and provides empirical support, enabling bank managers to make informed decisions and enhance operational efficiency.

Zouaoui & Zoghلامي (2023) assert that the association between income diversification and performance exhibits variations in empirical findings due to variations in the economic contexts of different regions (such as the US, Europe, and Asia) in which researchers conducted their studies, as well as discrepancies in the indicators employed to measure performance (such as ROA, ROE, ROS). In order to address the existing research gap about the relationship between income diversification and performance and to contribute to the body of empirical evidence on this topic, the present study focuses on the examination of the diversification, human capital, and operational efficiency of commercial banks listed on the Ho Chi Minh City Stock Exchange (HOSE). This study aims to address disparities in industry, geography, and diversity by examining research about the banking sector, with a particular emphasis on commercial banks publicly traded on the stock exchange. The primary objective of the Ho Chi Minh City Stock Exchange (HOSE) is to mitigate disparities arising from bank-specific attributes, as highlighted by Yildirim et al. (2021). Simultaneously, the existing research mainly concentrates on various income sources, namely income derived from interest and non-interest sources, while neglecting to investigate the numerous forms of revenue, assets, and deposits.