Non-traditional banking: Current state of knowledge and future research directions

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Abstract

The collapse of Silicon Valley Bank and First Republic Bank has raised many concerns over the overall strength of the banking system, one of which is the operational and market risk banks take through their non-traditional banking activities (NTBAs). This paper uses bibliometric citation analysis and content analysis to examine the literature on non-traditional banking activities (NTBA), focusing on its evolution, current influence, and future research directions. The analysis covers 309 articles published between 1986 and 2024 collected from the Web of Science database. The findings reveal two dominant research clusters: studies on the Glass-Steagall Act and universal banking and the post-Gramm–Leach–Bliley Act era. Within the latter cluster, seven sub-clusters are identified: profitability and insolvency risk, systemic risk, efficiency, market valuation, lending behaviour and liquidity creation, monetary policy, and digitalisation and fintech adoption. Despite the lessons learned from the Global Financial Crisis, the shift away from the traditional banking model has significantly increased banks' risk exposure. However, the recent hikes in interest rates to stem inflation may force banks to change their investment strategies. We argue that banks will need to transform in the next decade. This study provides the regulators, practitioners, and academics with an in-depth understanding of the NTBA research field.

Key words:

Non-traditional banking, Fee income, Investment income, Trading income, Bibliometric analysis, Content analysis

1 Introduction

Modern-day banking has shifted from its traditional business model that focused on earning interest income through deposit taking and lending towards a banking model that increasingly focuses on fee-generating activities and trading profit. Though earlier banking literature described banks as financial intermediaries engaged in deposit-taking and lending (Hyman, 1972; Melitz & Pardue, 1973; Pesek, 1970; Towey, 1974), banks have a long history of engaging in non-traditional banking activities (NTBA). Universal banking, a financial system in which banks offer an entire range of financial services, evolved in Belgium in the nineteenth century (Ugolini, 2010). However, income from NTBA, such as brokerage commissions, investment income, and corporate advisory fees, has become an increasingly prominent source of revenue for banks (DeYoung & Torna, 2013). This long-run shift towards non-traditional banking was influenced by deregulation (Kamani, 2019), lower interest rate regime (Landi, Sclip, & Venturelli, 2020), development in financial markets (Qin & Zhou, 2019; Samarasinghe, 2023), innovation in technology and finance (DeYoung & Torna, 2013), and competition from nonbank competitors (Meslier, Tacneng, & Tarazi, 2014). The repellent of the Glass-Steagall Act of 1933, which separated commercial and investment banking in the US, highly encouraged the modern banking industry to move towards NTBA. The Glass-Steagall Act was abolished through the enation of Gramm–Leach–Bliley Act of 1999, also known as Financial Services Modernization Act, which allowed US commercial banks to engage more freely in non-traditional activities. Though both acts were enacted in the United States, they have global implications as the United States is the most significant player in the world financial system. Gradually, non-traditional activities became a popular source of income for banks due to their higher profitability, and they do not tie up significant amounts of regulatory capital (Landi et al., 2020). As stated by Calmès and Théoret (2014), while banking

regulations all over the globe have focused on tightening capital standards and liquidity requirements, financial institutions have shifted towards a market-based business model.

The impact of different NTBA on banks' performance and risk exposure has sparked a contentious academic debate over the past two decades (Tran, Hassan, Girerd-Potin, & Louvet, 2020). However, whether diversification into NTBA positively or negatively impacts banks' performance and risk has remained undecided (Saghi-Zedek, 2016; Kevin J. Stiroh, 2010). Several studies, such as DeYoung and Roland (2001), K. J. Stiroh (2004), K. J. Stiroh and Rumble (2006), Mercieca, Schaeck, and Wolfe (2007), Lepetit, Nys, Rous, and Tarazi (2008a), Williams (2016) and Brunnermeier, Dong, and Palia (2020), demonstrated that higher non-traditional income is associated with a negative impact on bank profitability, risk and market valuation. Commentators have also blamed the Global Financial Crisis (GFC) on the over-reliance on non-traditional activity in the banking sector (Brunnermeier et al., 2020; DeYoung & Torna, 2013; Engle, Moshirian, Sahgal, & Zhang, 2014). On the contrary, other studies showed that non-traditional income sources positively impact banks' profitability, risk, and market valuation (Albertazzi & Gambacorta, 2009; Baele, De Jonghe, & Vennet, 2007; Elsas, Hackethal, & Holzhauser, 2010; Kohler, 2015; Saklain & Williams, 2024; Samarasinghe, 2023; Saunders, Schmid, & Walter, 2020). These contrary findings increase the relevance of studying this issue from different perspectives in different financial systems. Though, there are many review papers on similar aspects of banking, such as the banking crisis (Luc Laeven, 2011), credit risk (Zamore, Ohene Djan, Alon, & Hobdari, 2018), and systemic risk (Silva, Kimura, & Sobreiro, 2017), interestingly, to best of our knowledge no review paper was written on the NTBA research field. Evidence shows that banks typically respond to a decrease in interest income due to lower and negative interest rates by increasing their non-interest-generating activities (Boungou & Hubert, 2021; Lopez, Rose, & Spiegel, 2020). With the banking system worldwide entering a high interest regime along with the failures of Silicon

Valley and the First Republic Banks, the future, and the uncertainty of the NTBA will continue to be debated, making this paper timely and first of its kind. Against this backdrop, we attempt to synthesise the extant literature on the NTBA research field. A systematic approach is applied to explore and explain the review's significant findings, highlighting the literature gaps. Thus, it provides a pathway for future research in NTBA research. This literature review attempts to answer the following research questions – (1) How has NTBA research evolved? (2) What are this field's most influential journals, articles, and institutes in this field? and who are the most influential authors? (3) What are the major research clusters and sub-clusters? (4) What are the potential future research avenues?

The paper is organised as follows: Section 2 is devoted to the methodology and data extraction process. Section 3 describes the initial descriptive statistics and results of performance analysis employing bibliometric techniques, followed by scientific mapping revealing the major research clusters. Section 4 presents a detailed analysis of the major research clusters and sub-clusters of NTBA research field. Section 5 provides the theoretical underpinnings while Section 6 synthesis the research field. Finally, in Section 7, we summarise our conclusions.

2 Methodology

A review paper critically evaluates relevant literature to provide readers with a comprehensive understanding of a research area (Palmatier, Houston, & Hulland, 2018). Several qualitative and quantitative methods are available to conduct a review paper, such as traditional review, bibliometric review, structured literature review, and meta-analysis review. This paper follows bibliometric review procedures suggested by (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). Bibliometric analysis, introduced by Pritchard (1969), is a rigorous method for interpreting and mapping the intellectual structure of any scientific field by using statistical methods (Baker, Kumar, & Pandey, 2021b; Donthu et al., 2021; Hota, Subramanian, &

Narayanamurthy, 2020). A vital strength of the bibliometric analysis is it increases the reliability of literature review studies by reducing the subjective bias, mostly seen in traditional qualitative literature reviews, by analysing large amounts of data and employing a transparent, reproducible search and review process (Bretas & Alon, 2021; Goodell, Kumar, Lahmar, & Pandey, 2023; Vogel & Güttel, 2013). Bibliometric analysis is suitable when the scope of the review is broad and the dataset is large for the manual review process used in traditional qualitative review or structured literature review (Donthu et al., 2021). Bibliometric review is the most suitable method for this paper because we have a large dataset and a broad research scope. In addition to the statistical power of the bibliometric analysis, we want to add qualitative insights to our paper. So, we combine bibliometric analysis with content analysis, a method of examining document trends and patterns (Stemler, 2000). Both bibliometric analysis and content analysis has widely been used in combination to present a deeper understanding of a research field in management studies (García-Lillo, Seva-Larrosa, & Sánchez-García, 2023; Kent Baker, Pandey, Kumar, & Haldar, 2020; Kumar, Pandey, Lim, Chatterjee, & Pandey, 2021; Shome, Elbardan, & Yazdifar, 2023). Incorporating both qualitative and quantitative analysis makes this study more robust than other studies conducted with a single analytical approach.

The techniques for bibliometric analysis can be divided into performance analysis and science mapping (Donthu et al., 2021). Descriptive performance analysis examines the contributions of research constituents (e.g., authors, articles, universities, countries, and journals) to a given field. On the other hand, science mapping displays the relationships between research constituents. Different science mapping techniques, such as citation analysis, co-citation analysis, bibliographic coupling, and co-occurrence analysis, are available to present the intellectual structure of a research field (Baker, Kumar, & Pandey, 2021a; Donthu et al., 2021).

This paper uses the Bibliographic coupling analysis and keywords co-occurrence analysis to discover major research clusters and hot topics within the NTBA research field.

Bibliographic coupling operates with the assumption that if two publications share common references, they are similar in their content (Munim, Dushenko, Jimenez, Shakil, & Imset, 2020). For example, if five articles appear together in two scientific papers' reference lists, those two papers are connected with a coupling strength of five. A bibliometric coupling network map of the research field can be drawn by gathering all the coupling information for all relevant publications for the scientific field of interest (Budler, Župič, & Trkman, 2021). According to Boyack and Klavans (2010) bibliographic coupling captures a research field more accurately than other citation-based bibliometric science mapping techniques.

While bibliometric coupling focus on citing publications, keyword co-occurrence analyses keywords to examine the content of the actual publication (Donthu et al., 2021). Keyword co-occurrence analysis is a widely used method to discover the relationship between research articles and topics by counting the co-occurrence of keywords, and helpful in discovering research hotspots and central themes of a research field (Wan, Dawod, Chanaim, & Ramasamy, 2023; Xu, Wang, Wang, & Skare, 2021).

The appendix compares the different science mapping techniques and provides citation and co-citation science mapping analyses of our dataset. We employ VOSviewer software (Van Eck & Waltman, 2010) and the Biblioshiny package in the R software (Ahmi, 2022) for our analysis.

2.1 Sample selection and data collection

The paper follows a two-step data collection approach. First, we conducted a topic search, a combination of title, abstract, author keyword and keywords plus, on the Social Sciences Citation Index (SSCI) within the ISI Web of Science (WoS) academic journal database using

a set of keywords (Bahoo, Alon, & Paltrinieri, 2020; Linnenluecke, 2017; Zamore et al., 2018). Due to the absence of any previous review study and to capture the whole research field, we did not use any time restriction in our search or any preference for specific journals.

In the second part of our process, we examined the resulting articles in detail. First, we read the abstract of an article to ensure its appropriateness for the analysis (López-Fernández, Serrano-Bedia, & Pérez-Pérez, 2016). We retained the articles that explore the determinants of or the impacts of NTBA on individual banks or on the overall banking system or use NTBA as a part of a wider context. If the abstract fails to provide enough information to verify a paper's suitability for analysis, we read the complete work to confirm it (Bretas & Alon, 2021). While doing the relevance check, we also searched the reference list of all the selected articles to find out any relevant overlooked articles missed in the first search. In this process, 843 articles were removed from the initial dataset of 1136 and 16 articles were included, leaving 309 articles in the final dataset. The title, author name(s) and affiliation, journal name, number, volume, pages, date of publication, abstract and cited references were extracted from the WoS database for bibliometric analysis. Table 1. shows the sample selection process in detail.

Table 1. Sample selection process.

	Criteria	Articles
1	("Bank*" OR "Financial institution*" OR "financial intermedia*") AND ("Non traditional" OR "Non-traditional" OR "Nontraditional" OR "Non interest" OR "Noninterest" OR "Non-interest" OR "Universal" OR "Income Diversification" OR "Off-balance sheet" "fee income" OR "trading income" OR "Investment income" OR "Brokerage income") Web of Science – Social Science Index	1136
2	Refined by: Web of science categories: (economics or business finance or business or management)	740
3	Refined by: Document types: article only	700
4	Refined by: Languages: English only	687
5	After manual exclusion	293
6	After manual addition	309

3 Bibliometric analysis results

3.1 Initial data statistics

The 309 articles were written by 596 authors, published in 109 journals, and collectively cited 14266 times, with an average citation per document of 46.16. The first paper in our dataset is written by Eugene White from Rutgers University, published in Explorations in Economic History journal in 1986. Table 2. shows the summary statistics of our final dataset.

Table 2. Summary statistics of the final dataset.

Timespan	1986:2024
Articles	309
Journals	109
Authors	596
Annual Growth Rate %	7.19
Total Citations	14266
Average citations per doc	46.16
Author's Keywords	651
References	8721
Single-authored docs	78
Co-Authors per Doc	2.34
International co-authorships %	27.83

3.2 Publication and citations patterns

Figure. 1 illustrates the annual production of NTBA articles and yearly total citations received by those articles. The statistics show continuous growth in the literature, especially after the global financial crisis. Interestingly, the number of published articles in the NTBA research field has increased significantly from 2020, possibly due to the concern about the global financial stability due to COVID-19, Russia-Ukraine war, and rising inflation.

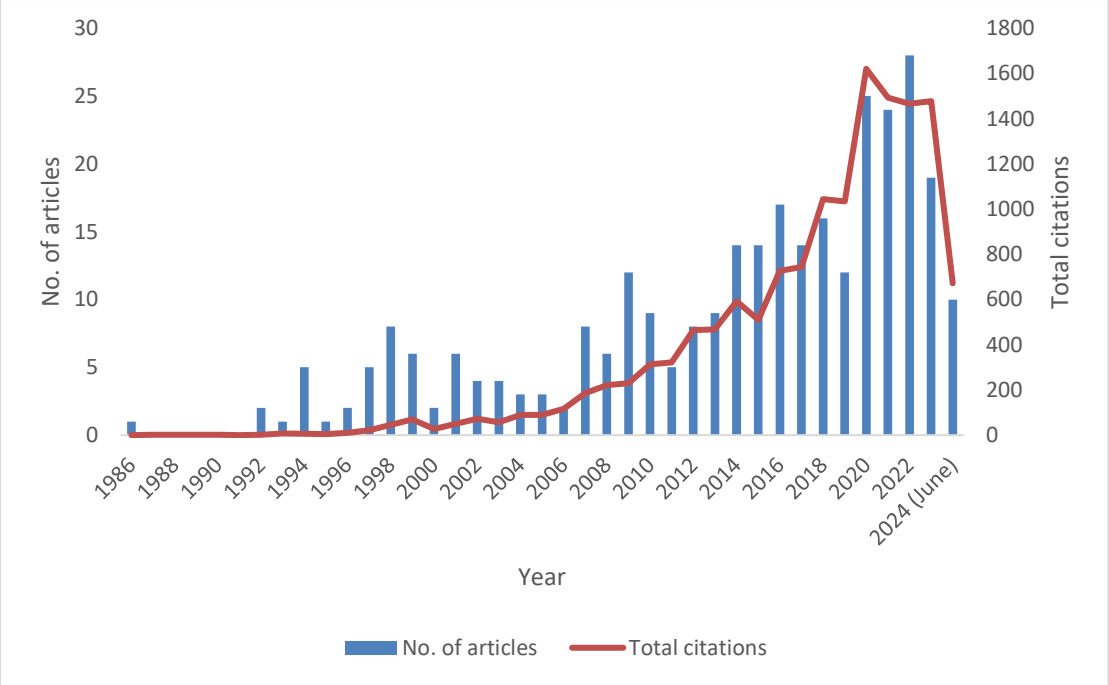

Figure 1. Yearly publications and total citations

3.3 Most relevant journals, articles, institutions, and authors

Table 3 lists the top twenty (20) journals that publish articles on NTBA along with their ABS ranking based on number of publications as well as total citations. Journal of Banking and Finance (44 articles) topped the list, followed by Research in International Business and Finance (13 articles), Journal of Financial Economics (12 articles) and Finance Research Letters (12 articles). Journal of Banking and Finance is also the most impactful journal with 4453 total citations, followed by the Journal of Financial Economics (1982), the Journal of Money Credit and Banking (1498) and Journal of Financial Intermediation (1329). The data reveals that articles published in the higher ABS ranked journals usually receive more citations.

Table 3. Most productive and impactful journals in NTBA research field

Journal (ABS ranking)	NP	FPY	Journal (ABS ranking)	TC	FPY
Journal of Banking & Finance (3)	44	1992	Journal of Banking & Finance (3)	4453	1992
Research in International Business and Finance (2)	13	2016	Journal of Financial Economics (4*)	1982	1996
Journal of Financial Economics (4*)	12	2017	Journal of Money Credit and Banking (4)	1498	1997
Finance Research Letters (2)	12	1996	Journal of Financial Intermediation (4)	1329	2001
Journal of International Financial Markets Institutions & Money (3)	9	2012	Journal of Financial Stability (3)	615	2009
Journal of Money Credit and Banking (4)	8	1997	Journal of Financial Services Research (3)	393	1999
Applied Economics (2)	8	2005	Journal of International Financial Markets Institutions & Money (3)	354	2012
Journal of Financial Services Research (3)	8	1999	Research in International Business and Finance (2)	272	2016
European Journal of Finance (3)	8	2011	Journal of Finance (4*)	222	2002
Journal of Financial Stability (3)	8	2009	American Economic Review (4*)	201	1994
Applied Economics Letters (1)	7	2011	Review of Financial Studies (4*)	193	1997
Pacific-Basin Finance Journal (2)	7	2013	Economic Policy (3)	177	2011
North American Journal of Economics and Finance (2)	6	2014	Finance Research Letters (2)	143	2017
Journal of Financial Intermediation (4)	5	2001	North American Journal of Economics and Finance (2)	136	2014
International Review of Economics & Finance (2)	5	2016	Economic Modelling (2)	131	2017
Emerging Markets Finance and Trade (2)	5	2014	Explorations in Economic History (3)	109	1986
Journal of Finance (4*)	4	2002	Journal of Monetary Economics (4)	99	1997
Australian Economic Papers (1)	4	2015	International Review of Economics & Finance (2)	93	2016
Economic Modelling (2)	4	2017	Japan and The World Economy (1)	90	2008
Quarterly Review of Economics and Finance (2)	4	2019	Journal of Economic Perspectives (4)	84	1994

NP= Number of Publications, TC = Total Citations, FPY= first year of publication

Table 4 reports the 20 most cited articles with their journal name, total citations, research aim, research method, and findings. The review finds that Demirguc-Kunt and Huizinga (2010) is the most cited paper in this field, followed by K. J. Stiroh (2004) and K. J. Stiroh and Rumble (2006). The most cited articles focus mostly on the impact of non-traditional banking on the performance and risk exposure of individual banks.

Table 4. Top 20 most cited articles.

Author(s)	TC	Research aim	Method	Findings
Demirguc-Kunt and Huizinga (2010)	617	Examine the implications of bank activity and strategies for risk and return.	Panel regression	Expansion into NTBA offers diversification benefits, but banks relying highly on non-interest income are riskier.
K. J. Stiroh and Rumble (2006)	537	Do more diversified financial holding companies (FHCs) outperform more concentrated ones?	Panel regression	Diversification benefits are more than offset by increased exposure to riskier non-interest activities.
K. J. Stiroh (2004)	534	To examine the potential diversification benefits in the U.S. banking industry from the shift toward NTBA.	Vector autoregression (VAR) model	Greater reliance on non-interest income is associated with lower risk-adjusted profits and higher risk.
L. Laeven and Levine (2007)	534	To investigate the impact of diversification on the market valuation of financial conglomerates.	Panel regression	There is a diversification discount in terms of market valuation.
Demsetz and Strahan (1997)	452	To investigate the relationship between diversification, size and risk of bank holding companies.	Regression (OLS)	Large bank holding companies are better diversified than small ones. However, better diversification does not lead to reductions in risk.
Lepetit et al. (2008a)	411	To assess the risk implications of the changing structure of the European banking industry towards non-interest income generating activities.	Panel regression	Higher reliance on non-interest generating activities is associated with higher risk.

Author(s)	TC	Research aim	Method	Findings
DeYoung and Roland (2001)	397	What is the impact of the shifts toward non-interest income on the volatility of bank earnings?	Regression (OLS)	Non-traditional activities are associated with higher profitability and higher revenue volatility.
Baele et al. (2007)	306	Does diversified banks have a comparative advantage over their specialised competitors?	Panel regression	NTBA positively affects bank franchise value and systematic risk, while the effect on idiosyncratic risk is nonlinear.
Mercieca et al. (2007)	289	To examine the impact of shift towards NTBA on the performance of small European banks.	Regression (OLS)	No direct diversification benefits either within or across business lines.
DeYoung and Torna (2013)	281	Does NTBA contributed to the failures of US commercial banks during the financial crisis?	Multi-period logit	Probability of bank failure declined with pure fee-based non-traditional activities but increased with asset-based non-traditional activities.
De Jonghe (2010)	281	How diversification towards NTBA impacts systemic risk of banks, especially during a banking sector crash?	Panel regression	Shift to NTBA increases banks' systemic risk. Smaller banks and better capitalised banks perform better during extremely adverse conditions.
Berger, Hasan, and Zhou (2010)	235	Should banks diversify across different products and geographic regions?	Panel regression	More focused banks are associated with higher profit and cost efficiency. Lack of managerial experience is the reason for diversification discount.
Elsas et al. (2010)	234	How revenue diversification affects banks' market valuation?	Panel regression	Diversification increases bank profitability and market valuations.
DeLong (2001)	242	To compare the stockholders' gain from focus versus diversified bank mergers.	Standard event study methodology	Bank mergers focusing geography and activity diversification create value for shareholders.

Author(s)	TC	Research aim	Method	Findings
Albertazzi and Gambacorta (2009)	198	How the link between bank profitability and the business cycle is affected by institutional and structural characteristics?	Panel regression	NTBA contributes to the profit stabilisation of banks.
Kroszner and Rajan (1994)	197	Do the commercial bank affiliates influence public investor into investing in low quality securities?	Logistic regression	Commercial banks affiliates underwrote higher-quality and better performing issues than independent investment banks.
Valverde and Fernandez (2007)	196	How diversification impact the relationship between bank margins and market power for European banks?	Multi-output model	Market power increases as output becomes more diversified towards NTBA
John H. Boyd, Graham, and Hewitt (1993)	191	To examine whether bank holding companies (BHCs) should be allowed to engage in nonbanking activities?	Simulation study	Mergers of BHCs with insurance firms may reduce risk, but that mergers of BHCs with securities firms or real estate firms would increase risk.
Puri (1996)	179	To compare the pricing of securities underwritten by commercial and investment banks to examine the concern of conflicts of interest associated with the Glass-Steagall act.	Regression (OLS), Probit regression	No evidence in favour of the Glass-Steagall act. Investors are willing to pay a higher price for bank-underwritten corporate securities.
Vennet (2002)	184	To analyse the cost and profit efficiency of European universal banks and specialised banks.	Stochastic frontier analysis	Universal banks are more revenue efficient than the specialised banks.

Table 5 ranks the top 20 institutes that publish in the field of NTBA, with Tilburg University (10 articles) leading the list, followed by Xi'an Jiaotong University (9 papers), Federal Reserve Bank (7 papers) and Ghent University (7 papers). The list contains 15 institutions from developed countries (USA, Netherlands, Belgium, Australia, France, and Germany) and five institutions from emerging and developing countries (Taiwan, China, and Vietnam).

Table 5. Most productive institutions.

Rank	Affiliations	Articles	Country
1	Tilburg University	10	Netherlands
2	Xi'an Jiaotong University	9	China
3	Federal Reserve Bank	7	USA
4	Ghent University	7	Belgium
5	National Sun Yat-sen University	6	Taiwan
6	University of Quebec	6	Canada
7	Monash University	5	Australia
8	University of Limoges	5	France
9	University of Pennsylvania	5	USA
10	Feng Chia University	4	Taiwan
11	National Chengchi University	4	Taiwan
12	New York University	4	USA
13	Texas A&M University	4	USA
14	University of Minnesota	4	USA
15	Ho Chi Minh University of Banking	3	Vietnam
16	Boston College	3	USA
17	California Institute of Technology	3	USA
18	International Monetary Fund	3	USA
19	Florida Atlantic University	3	USA
20	Goethe University	3	Germany

Table 6 lists the most productive and most cited authors in this field; Amine Tarazi, Maoyong Cheng, and Chiang C Lee jointly topped the list with 6 articles each followed by Caroline Fohlin (5 articles). However, Kevin J Stiroh is the most cited author (1271 citations), followed by Amine Tarazi (845 citations) and Olivier De Jonghe (701 citations).

Table 6. Most productive and most cited authors.

Authors	NP	FYP	Authors	TC	FYP
Tarazi A	6	2008	Stiroh KJ	1271	2003
Lee CC	6	2014	Tarazi A	845	2008
Cheng MY	6	2014	DE Jonghe O	701	2007
Fohlin C	5	1998	Deyoung R	689	2001
Dang VD	4	2020	Demirgüç-Kunt A	616	2010
DE Jonghe O	4	2007	Huizinga H	616	2010
Stiroh KJ	4	2003	Lepetit L	577	2008
Théoret R	4	2010	Nys E	577	2008
Williams B	4	2013	Rous P	577	2008
Boyd JH	3	1993	Levine R	538	2007
Calmès C	3	2010	Rumble A	537	2006
Deyoung R	3	2001	Laeven L	533	2007
Gambacorta L	3	2009	Wolfe S	456	2007
Hackethal A	3	2001	Demsetz RS	452	1997
Lin YJ	3	2018	Strahan PE	452	1997
Perera S	3	2012	Gambacorta L	428	2009
Puri M	3	1994	Roland KP	397	2001
Saunders A	3	1997	Puri M	341	1994
Tran DV	3	2020	Boyd JH	324	1993
Walter I	3	1997	Baele L	306	2007
Wolfe S	3	2007	Vennet RV	306	2007
Molyneux P	3	2018	Vander Vennet R	293	2002
Nguyen M	3	2012	Mercieca S	289	2007
Zhao H	3	2014	Schaeck K	289	2007
Zhou MM	3	2010	Torna G	286	2013
Chen PF	3	2014	Hackethal A	284	2001
Zeng JH	3	2014	Zhou MM	275	2010

NP= Number of Publications, TC = Total Citations, FPY= first year of publication

3.4 Science mapping and content analysis

Figure 2 shows the bibliographic coupling network within the NTBA research field. The figure is constructed with 89 most cited articles selected with a criterion of 30 or more total citations. In this network mapping, nodes represent the articles, and the size of the nodes corresponds to the total number of citations for each article, whereas the edges illustrate the bibliographic relationship among the papers. The figure depicts that the NTBA research field is dominated by two major research clusters.

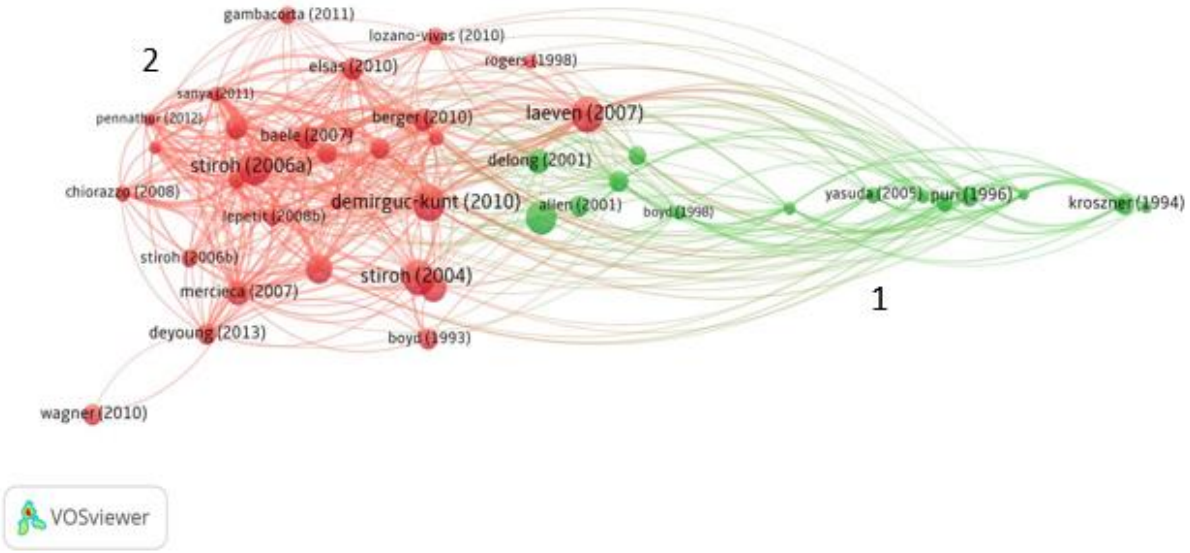

Figure 2. Bibliometric coupling showing linkage among articles.

We conducted a keyword co-occurrence analysis to understand the area of research covered by these two major research clusters and to find out some potential sub-clusters within the two major research clusters. First, we conduct a keyword co-occurrence analysis (Fig 3) with all authors' keywords and keyword plus (1017 keywords) to find the hot spots in the NTBA research field. The figure shows the major hot spots in this research field are related to risk, profitability, efficiency, bank stability, universal banking, the Glass-Steagall Act, and monetary policy.

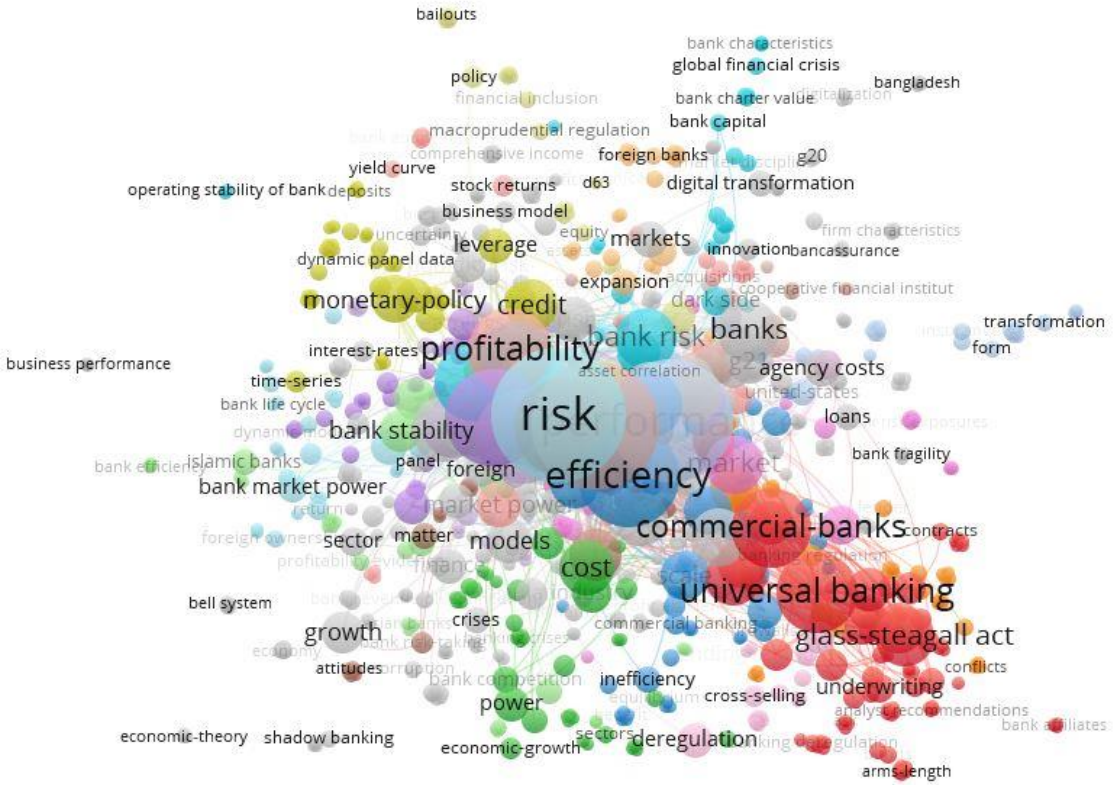

Figure 3. Keyword co-occurrence analysis

Following the bibliographic coupling network mapping and keyword co-occurrence analysis, we conducted a detailed content analysis of all the selected articles. First, we selected 89 highly cited articles using a criterion of thirty or more total citations. These articles are used to form the bibliometric coupling in this paper. Then, we selected another set of recent articles by following two criteria: published on or after the year 2000 and published in ABS 2 or above ranked journal, 75 articles met the criteria. We add the second set of articles to capture any recent trends in the NTBA literature that are not captured by the analysis of the top cited articles, as articles require time to receive citations (Linnenluecke, 2017). We then conducted a detailed assessment of the articles and developed a content analysis matrix using MS Excel. Following the content analysis coding protocol suggested by (Gaur & Kumar, 2018), we have included the following information in our matrix: title, authors, year of publication, research themes (indicated in science mapping), purpose and research questions, data type, data source, methodology, theories, key findings, and suggested future research directions. We divide the

first set of articles (89 articles) between two significant clusters from the bibliometric coupling. Then, we try to make sense of those clusters in the view of the research hot stops given by the keyword co-occurrence analysis. Then, we add the second set of articles (75 articles) to our content analysis matrix to find out which cluster they belong to and if there is any recent trend.

Based on the content analysis of the articles, we name the first cluster (Cluster 1 in the figure 2) as the Glass-Steagall Act & universal banking studies and the second cluster (Cluster 2 in the figure 2) as the post-Gramm–Leach–Bliley Act studies. The first research cluster, 'Glass-Steagall Act and universal bank studies', is relatively small while the second cluster, 'post-Gramm-Leach-Bliley Act' studies is much larger and broader in variety of research focus. Based on the main subject of study, we found seven sub-clusters within the post-Gramm-Leach-Bliley Act studies cluster a) profitability and insolvency risk, b) systemic risk, c) efficiency, d) market valuation e) lending behaviour and liquidity creation, f) monetary policy, and g) digitalisation and fintech adoption. These themes are discussed in the next section.

4 Major research clusters

Research on NTBA has changed quite differently over time and has been motivated by several significant historical events. For instance, most of the early studies in this field were focused on the relevance and the implication of the Glass-Steagall Act of 1933 on the US banking sector. The corresponding literature emphasised the justification of the Act by empirically examining the allegation that US banks' engagement in underwriting business before the enaction of the act is responsible for raising conflict of interest and banking sector instability. However, after the repellent of the Act, the research focus shifted to the impact of NTBA on the performance and risk-taking of individual banks. The corresponding literature concentrated more on the banks' increasing trends toward NTBA and took different angles to measure their impact on respective banks' profitability, efficiency, and default risk. Another

major event in NTBA research is the Global financial crisis of 2008/09. Scholars concentrate on the banking sector's systemic risk and individual banks' default risk post-crisis. Researchers also showed interest in the impact of non-traditional banking on banks' lending channels and liquidity creation function during and after the crisis period.

4.1 Glass-Steagall Act and Universal bank studies

This cluster covers articles that focus on the justifications for the enaction of the Glass-Steagall Act, which strictly prohibits US commercial banks from engaging in securities market activities, the possible impacts of repellent of the act and introduction of a universal banking system may have, especially on the US economy.

The Glass-Steagall Act of 1933 was enacted with the belief that combining traditional lending and securities businesses may raise conflict of interest and destabilise the financial system (Kroszner & Rajan, 1994; Puri, 1996). However, White (1986) finds that the conventional banks that engaged in a security affiliate in the pre-Glass Steagall period had a lower probability of default. Ang and Richardson (1994), Puri (1994, 1996), Kroszner and Rajan (1994), and Gande, Puri, Saunders, and Walter (1997) all examine the argument that bank securities affiliates intentionally influenced the public to invest in low-quality security issues before the Glass-Steagall Act period but find no significant evidence in favour of this conflict-of-interest argument and suggest that the act should be repealed. Moreover, Kroszner and Rajan (1994) and Puri (1994) both find that the bank affiliates underwrote higher-quality issues than the independent investment banks. Additionally, Puri (1996) finds that investors consider banks as better certifiers and are willing to pay higher prices for securities underwritten by banks than those supported by investment houses. Steinherr and Huveneers (1994) find that universal banks of 18 OECD countries achieve a better risk-return trade-off than the specialised banks. Finally, Benston (1994) argued that the Glass-Steagall Act was a misguided reaction to

the financial crisis of the 1930s and should be repealed as the universal banking system can provide considerable benefits for the US economy.

On the contrary, Mester (1992) suggests that it is efficient for banks to specialise either in non-traditional or traditional banking activities and advocates for maintaining firewalls between commercial banking activities and investment banking activities if the Glass-Steagall Act is repealed. J. H. Boyd, Chang, and Smith (1998) stated that universal banks gain at the expense of their borrowers and the deposit insurer, Boot and Thakor (1997) demonstrate that banks lack the motivation to innovate in a universal banking setting as the benefits gained by one division erode those of the others. Das and Nanda (1999) state that the difference between commercial banking and investment banking is functional and inherent in those activities, which are unlikely to change with the removal of the Glass- Steagall Act.

The most important finding of this cluster is, though some of the conceptual papers supported the separation of conventional lending business and securities market operations on the ground of intensifying moral hazard and agency problem, most of the empirical works failed to find strong evidence in favour of The Glass-Steagall Act.

4.2 Post Gramm–Leach–Bliley Act studies

After the repellent of the Glass-Steagall Act in 1999, the research focus shifts on examining different NTBAs' impact on banking system. We find a lack of consensus within almost all the sub-clusters, especially profitability, insolvency risk, efficiency, market valuation, and systemic risk. Those conflicting results can be due to differences in the sample period, sample country/region, and measurement of variables and for using a wide variety of econometric analysis techniques. Those six sub-clusters within the post-Gramm-Leach-Bliley Act studies are described below -

4.2.1 Profitability and insolvency risk

The first sub-cluster within the Post Gramm–Leach–Bliley Act studies cluster covers the studies investigating how different NTBA influence individual banks' profitability and risk. This sub-cluster produces the highest number of articles but posts highly conflicting findings. DeYoung and Roland (2001) and Demirguc-Kunt and Huizinga (2010) find that a higher ratio of non-interest to interest income is associated with higher profitability but greater bank risk. K. J. Stiroh (2004), finds a positive correlation between net interest income and noninterest income growth due to the bank's cross-selling strategies, which could expose different business lines to the same shock, thus increasing the insolvency risk. Similarly, K. J. Stiroh and Rumble (2006) and K. J. Stiroh (2006) conclude that gains from diversification into non-traditional activities are offset by the increased exposure to more volatile non-traditional activities. DeYoung and Torna (2013) show that the probability of bank failure declined with pure fee-based non-traditional activities but increased with asset-based non-traditional activities. However, they also find Williams (2016) finds that noninterest income positively relates to bank risk, while Lepetit et al. (2008a) show that higher risk is strongly correlated with commission and fee income than trading income.

On the contrary, Chiorazzo, Milani, and Salvini (2008), Albertazzi and Gambacorta (2009), Sanya and Wolfe (2011), M. Nguyen, Skully, and Perera (2012), Elsas et al. (2010), Kohler (2015) and Saunders et al. (2020) all show a significant positive relationship between banks' reliance on non-traditional income and profitability. Sanya and Wolfe (2011) and Saunders et al. (2020) find no evidence that higher non-interest income increases bank insolvency risk, while, Edirisuriya, Gunasekarage, and Perera (2019) found diversification into non-interest income has no impact on bank risks. J. Nguyen (2012) finds that non-traditional activities are negatively correlated with risk-adjusted profitability measures between 1997 and 2002 but positively correlated for the subsequent period.

Studies also focused on bank-level variables that may influence the relationship between NTBA and bank performance and risk. For instance, DeYoung and Torna (2013) indicate banks' risk-taking culture as they found banks with higher non-traditional activities also tend to take more risk in their traditional lines of business. Saghi-Zedek (2016) found banks with institutional controlling shareholders enjoy diversification benefits while banks with more family or/and state shareholders experience diversification discounts. Pennathur, Subrahmanyam, and Vishwasrao (2012) report that higher fee income and fee-based income significantly reduce the risk for public sector banks but increase the risk for private sector banks. Ahamed (2017) finds that banks with lower asset quality benefit more from income diversification than those with higher asset quality. Lee, Yang, and Chang (2014) find that non-interest activities raise bank risk in high-income countries while increasing profitability or reducing risk in middle- and low-income countries. Similarly, Li and Zhang (2013) show that the marginal benefit of diversification decreases with the increase in noninterest income, which is the case in high-income developed countries. Finally, Saklain and Williams (2024) find that a higher level of diversification into non-interest income generating activities improves profitability and reduces bank risk in countries with low regulatory restrictions and a more market-based financial structure.

This subcluster is dominated mainly by research articles from developed economies; however, scholars have recently focused more on emerging and developing countries. Studies found the problem of over-diversification of the developed economies while emerging and developing countries often suffer under-diversification and managerial inexperience, making their banks less cost-efficient. Papers within this sub-cluster used many variables to measure bank profitability and insolvency/default risk. However, return on assets (ROA) and return on equity (ROE) have emerged as the most used measures of profitability, while Z score is the most used measure for insolvency risk.

4.2.2 Systemic risk

The second sub-cluster, which emerged very strongly after the global financial crisis, covers articles that examine the impact of NTBA on systemic risk and banking sector stability. For example, the conceptual work of Wagner (2010) argues that diversification reduces individual banks' probability of failure, making banks more similar and increasing the risk of systemic failure in the banking industry. Among the empirical studies De Jonghe (2010) and Brunnermeier et al. (2020) find that non-traditional income positively correlated with systemic risk for European and US banks, respectively, during the global financial crisis. However, Saunders et al. (2020) and Weiß, Bostandzic, and Neumann (2014) find no evidence of statistically significant positive relationship between noninterest income and systemic risk using a US bank dataset and a global dataset, respectively.

De Jonghe, Diepstraten, and Schepens (2015) show that the effect of non-interest income on systemic risk exposures varies with bank size and a country's institutional setting. They suggest that noninterest income decreases the systemic risk exposure of large banks and increases the same for small banks. The diversification benefit of large banks disappears in countries with more private and asymmetric information, corruption, and concentrated banking markets. Additionally, Kamani (2019) find trading activities increase small banks' exposure to systemic risk, whereas commissions and fees activities only increase large banks' exposure to systemic risk. Moreover, Qin and Zhou (2019) argue that the impact of NTBA on systemic risk exposure is higher in a market-based economy compared to a bank-based economy. They argue that uniform international standards should not be imposed in the same way in different economies, as advocated by the international organisations like the Basel committee. On the contrary, Samarasinghe (2023) finds as stock market liquidity increases, banks diversify more into non-traditional activities, thereby increasing overall banking stability, and these effects are more pronounced in countries with developed financial markets and high investor protection.

Research papers based on developed economies heavily dominate this subcluster. These studies use several measures of systemic risks, however, two of the most widely used are Marginal Expected Shortfall (Acharya, Engle, & Richardson, 2012) and ΔCoVaR (Adrian & Brunnermeier, 2016).

4.2.3 Bank efficiency

This sub-cluster covers studies that explore how different NTBA influence bank efficiency in terms of cost, revenue, and profit. For example, Vennet (2002) finds that European financial conglomerates with diversified products are more revenue efficient than their more specialised competitors. While, Rime and Stiroh (2003) find no evidence of substantial efficiency gains, both cost and profit, for the largest universal banks in Switzerland. Similarly, Berger et al. (2010) find more focused banks are associated with higher yields and cost-efficiency. Furthermore, Lozano-Vivas and Pasiouras (2010) find, on average, cost efficiency increases with non-interest income but post mixed results concerning profit efficiency. Among the more recent studies, Beccalli and Rossi (2020) empirically document that the separation of lending and investment activities generates economic inefficiencies in costs but efficiencies in revenues and profits, while Doan, Lin, and Doong (2018) find that increased diversification tends to improve bank efficiency, state ownership diminishes the impact of diversification on efficiency in both developed and developing countries, while foreign ownership amplifies the effect of diversification on efficiency in developing countries. Most of the studies within this subcluster use Stochastic Frontier Analysis (SFA) or Data Envelope Analysis (DEA) techniques for calculating bank efficiency scores.

4.2.4 Market valuation

This sub-cluster covers studies that explore how different NTBA influence the market valuation of commercial banks. For example, L. Laeven and Levine (2007), using a dataset of global banks, examine the impact of diversification on the valuation of financial conglomerates

and find a diversification discount. Schmid and Walter (2009) find similar results using a large dataset of US banks: however, they find combinations between commercial and investment banking activities exhibit a significant valuation premium. On the contrary, Elsas et al. (2010), using bank data from nine developed economies, find that diversification increases banks' profitability and stock market valuation and the positive impact held even during the global financial crisis. Similarly, Baele et al. (2007) and Van Lelyveld and Knot (2009) post that a higher share of non-interest income in total income positively affects banks' franchise values for European banks.

4.2.5 Lending behaviour and Liquidity creation

This sub-cluster focuses on studies that examine the impact of NTBA on banks' lending behaviour and liquidity creation function. For example, Lepetit, Nys, Rous, and Tarazi (2008b) find that the banks that are more reliance on non-traditional activities usually under-price lending products to cross-sell non-traditional products. This strategy can increase insolvency risk of the banks even after earning higher income from non-traditional activities. On the contrary, Abedifar, Molyneux, and Tarazi (2018) find no adverse influence of different NTBA on loan quality and bank credit risk of US commercial banks, interestingly not even in the case of systemically important banks and distressed banks. However, they also find evidence of cross-subsidisation between several non-traditional activities and lending businesses. However, they conclude that large banks benefit from joint production of non-interest income and lending, even after charging lower interest rates on loans. Similarly, Neuhann and Saidi (2018) conclude that universal banks finance firms with higher volatility but with higher total factor productivity. On the other hand, Torna (2018) find that large US banks holding more significant amounts of risky non-traditional banking assets gravitate their loan portfolios away from business and consumer loan sectors, significantly restraining business and consumer lending.

Both Hou, Li, Li, and Wang (2018) and Dang (2020) indicate that diversification between net interest income and non-traditional bank activities reduces liquidity creation. However, Hou et al. (2018) find that increased bank diversification within non-traditional activities leads to increased liquidity creation. On the other hand, Berger, Guedhami, Kirimhan, Li, and Zhao (2024) report universal banking increases bank liquidity creation. Tran (2020) finds evidence of lower liquidity creation for more diversified US banks during normal times but more liquidity during times of crisis. On the contrary, Vinas (2021) finds that universal banks and commercial banks had similar credit supply in France before the global financial crisis; however, universal banks had a strongly lower credit supply during the crisis.

4.2.6 Monetary policy

This sub-cluster covers studies that explore how different monetary policies impact banks' non-traditional activities. For example, Landi et al. (2020) investigate the impact of the Federal Reserve's decision to maintain a lower interest regime and show that a prolonged period of lower interest rates deteriorates the interest income margins of US banks and forces them to shift towards noninterest sources of revenues to maintain the targeted performance. Furthermore, Lopez et al. (2020) and Boungou and Hubert (2021) investigate the impact of negative policy rates on banks' profitability using global datasets and both papers find that banks attempt to offset their interest income losses with gains from non-traditional activities. Likewise, Albertazzi and Gambacorta (2009) found similar results for banks from 10 industrialised countries and Molyneux, Reghezza, Torriero, and Williams (2021) for Italian banks.

4.2.7 Digitalisation and fintech adoption

This is the newest research theme in the NTBA research field that mostly studies the impact of digitalisation and fintech adoption on banks' non-traditional banking activities. Interestingly, this subcluster is mostly focused on China and other emerging countries. Analysing 101 banks

in China between 2011 and 2021, Tang, Hu, Corbet, Hou, and Oxley (2024) find a strong and positive association between Fintech adoption and income diversification of banks. Q. T. T. Nguyen, Ho, and Nguyen (2023) report similar results for Vietnamese banks. Similarly, He, Song, and Chen (2023) examine the effect of 36 Chinese listed banks' fintech adoption on bank risk-taking to report how fintech adoption effectively reduces banks' risk-taking, especially for those with a high share of non-interest income. On the contrary, using bank-level data from 29 Asian banks, Khattak, Ali, Azmi, and Rizvi (2023) find diversification into non-traditional activities makes banks risky and fragile in the presence of digital transformation, whereas in banks with lower level of diversification, digital transformation tends to enhance stability.

5 Theoretical underpinnings

The main theories applied by the highly cited studies in the field of non-traditional banking are the theory of financial intermediation (Mester, 1992; Schmid & Walter, 2009; White, 1986), modern portfolio theory (John H. Boyd et al., 1993; Demsetz & Strahan, 1997; K. J. Stiroh, 2004; K. J. Stiroh & Rumble, 2006) and agency theory (Ang & Richardson, 1994; Kroszner & Rajan, 1994; Puri, 1996; Steinherr & Huveneers, 1994). Several studies refer to more than one theory (De Jonghe et al., 2015; Mester, 1992; Williams, 2016). Apart from these theories, Kanatas and Qi (1998) use contract theory. Additionally, Mester (1992) mentions an information-theoretic explanation of banking, and Boot and Thakor (1997) explore financial innovation.

Most studies in this field focus on the modern portfolio theory that suggests diversification into NTBA provides banks with a risk separation and reduction effect. However, other studies relied on agency theory. They argued that diversification into complex, opaque, and non-traditional activities might raise moral hazard and agency problems, especially if bank managers have excessive management power and significant free cash flows.

Earlier papers (Mester, 1992; White, 1986) relied on the seminal works by Benston and Smith (1976), Campbell and Kracaw (1980) and Diamond (1984) for theoretical reasoning. All these works are around the theory of financial intermediation and find income diversification reduces client's marginal transportation cost, inconvenience cost for services, probability of bankruptcy (Benston and Smith, 1976), monitoring cost (Diamond, 1984); increases information production efficiency (Campbell and Kracaw 1980), economies of scale and economies of scope (Benston and Smith, 1976); overcomes the problem of asymmetric information and improves the overall efficiency of the financial intermediary (Diamond, 1984).

Theories of financial intermediation assume that diversification within the intermediary is vital to the possible net advantage of intermediation (Campbell & Kracaw, 1980; Diamond, 1984). Diversified banks sell multiple financial products, both traditional and non-traditional, to the same line of customers. As a result, banks can obtain superior private information about their clients while selling different non-traditional products and use that information to reduce the uncertainty associated with their lending business. Access to such non-public information can reduce banks' client acquisition costs, monitoring cost and overall risk. The theory of financial intermediation also assumes that mixing traditional and non-traditional activities can help banks achieve operational synergies, scope, and scale economics by spreading the fixed costs and managerial overheads over various product lines and generating income from weekly sources correlated.

On the other hand, studies that deal with the efficiency of universal banking and the justification of the Glass-Stegall Act, such as Kanatas and Qi (1994), Puri (1994, 1996), Kroszner and Rajan (1994a,b), and Rajan (1993), relied on agency theory and raised a crucial debate on whether there is a conflict of interest and moral hazard problem when banks act as underwriters for new debt and equity issues to a firm they have also made loans to.

Most recent studies on NTBA use the theoretical lenses of both modern portfolio theory and agency theory to examine how bank income diversification impacts banks' performance and risk-taking (Stiroh, 2004; Stiroh and Rumble, 2006; DeYoung and Torna, 2013; Tran et al., 2017). Modern portfolio theory assumes that concentrated revenue streams can adversely impact banks' revenue volatility; thus, income diversification into non-traditional activities could decrease banks' revenue volatility by generating cash flows from no or weak correlated sources. Therefore, diversification into NTBA improves banks stability by reducing their idiosyncratic risk. On the other hand, agency theory assumes that diversification of activities might enhance the ability of insiders to expropriate financial institution resources for private gain and thereby lower the bank's market value. Generally, these studies point out that due to no or weak correlation between NTBA and traditional interest-generating activities, diversification into NTBA leads to a more stable revenue stream and reduction in insolvency risk, as suggested by modern portfolio theory, but this comes with the cost of heightened agency problems, leading to inefficient use of resources and reduces stability. So, the extent of these risk diversification benefits depends on the co-movements of the incomes from these risky non-traditional activities and the agency costs that arise from engaging in different complex activities.

6 A Synthesis of non-traditional banking literature

Figure-4 presents a synthesis of the NTBA research field, outlining the antecedents, theories applied, significant control variables, data sources and analysis methods.

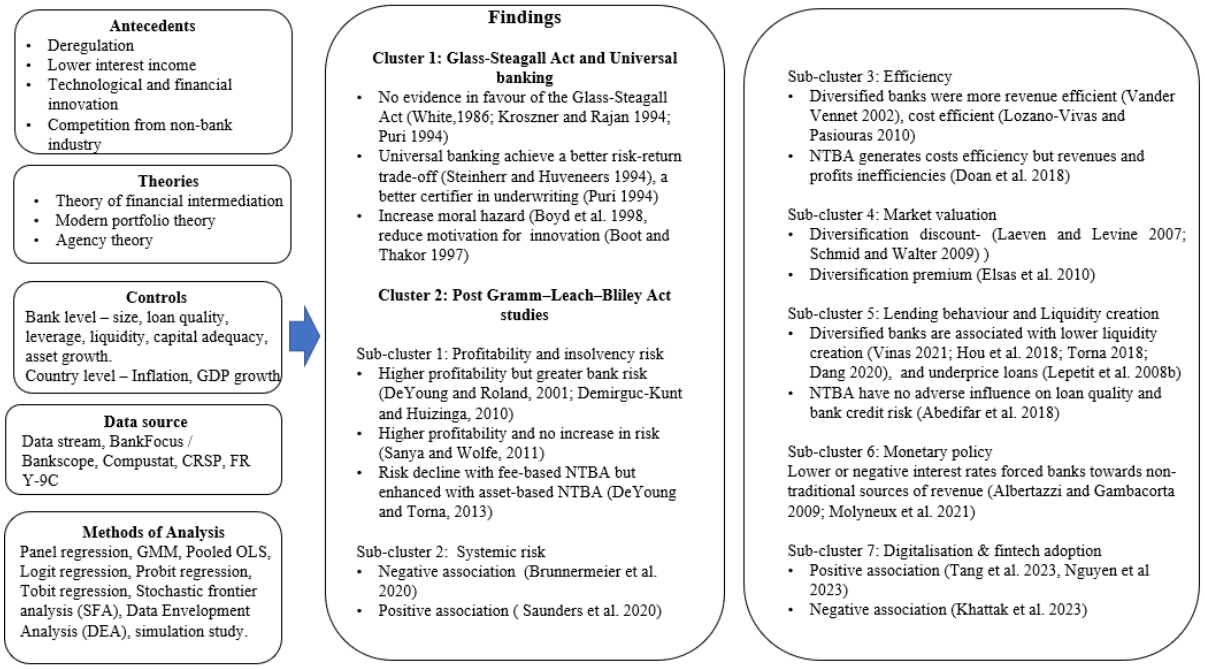

Figure 4. A synthesis of the literature on NTBA.

7 Future research directions

The extant literature has created an extensive knowledge repository on NTBA across different research clusters and sub-clusters. However, empirical evidence from developed countries is ambiguous in this research field, while empirical evidence from emerging and developing economies is limited. This suggests the research field has many potentials and avenues to grow. In addition, there is a lack of consensus in almost every aspect, as seen in the major research cluster section. Through content analysis of the most influential articles, this research has tried to find the future research directions suggested by scholars and the most important ones are briefly discussed below under each research cluster.

7.1.1 Glass-Steagall Act and Universal bank studies

Kroszner and Rajan (1994) raised an important question concerning the political motivations behind the Glass-Stegall Act. Why was it passed if the evidence did not support the arguments favouring the Glass-Steagall Act of 1933? Scholars interested in the history of political economy might try to answer this question in future. Puri (1999) suggests future research to

test the rationales of The Glass-Steagall Act in countries where commercial banks are allowed to engage in underwriting activities. After seeing that commercial banks are gradually being able to engage in some form of investment banking activities, Gande et al. (1997) suggest that future research should investigate the impact of the repellent of the Glass-Stegall Act on the underwriting business of commercial banks.

7.1.2 Profitability and insolvency risk

As diversification towards NTBA has become an integral part of the banking business model worldwide, K. J. Stiroh (2004) suggests that future research should focus on maximising gains from revenue diversification. Similarly, Williams (2016) encourages future studies to investigate the optimal mix between size, risk, and revenue diversification. According to Chiorazzo et al. (2008), future research should focus on the relationships between the degree of cross-selling of different products between traditional and non-traditional banking activities and profitability. Sanya and Wolfe (2011) suggest investigating how bank-specific idiosyncrasies, such as managerial capacity and experience, corporate governance mechanism, and ownership structure, determine banks' portfolio choices. Pennathur et al. (2012) suggest future research should focus on investigating how banks with different ownership structures maximise their gains from a diversified portfolio in different emerging economies, while De Jonghe et al. (2015) suggest exploring how ownership structure and internal governance mechanisms influence the risk and return relationship among non-traditional banking activities, conflicts of interest and risk in large banking groups. On the other hand, Ahamed (2017) wants future research to explore which ownership groups benefit more from income diversification.

7.1.3 Systemic risk

J. Nguyen (2012) believes it would be interesting to examine in future research whether the banks that are financially constrained and more involved in non-traditional activities are more likely to fail than other banks. He also encourages future research to study the herding

behaviour of banks in relation to traditional and non-traditional banking activities during the global financial crises. On the other hand, De Jonghe et al. (2015) want future research to explore which specific non-traditional source of revenue is most affected by exogenous state-level regulatory changes in the US market. Qin and Zhou (2019) assume that non-traditional activities will become an important trigger for systemic risk contribution in bank-based economies, so future research should focus more on bank-based economies. Two recent studies, Brunnermeier et al. (2020) and Saunders et al. (2020) investigated the impact of NTBA on bank profitability and systemic risk, after contradictory results. Future research might examine the reasons for the conflicting results between similar studies.

7.1.4 Lending behaviour and liquidity creation

Lepetit et al. (2008b) suggest future research should investigate the impact of non-traditional banking services on interest margins and loan pricing using individual borrower-level data for loan pricing and default. On the other hand, Abedifar et al. (2018) find that larger banks cross-subsidize lending products from their non-interest activities, so they are curious to know why banks with high spreads also have high service charges. Valverde and Fernandez (2007) suggest that future research investigates the impact of bundling different traditional and non-traditional banking products on bank lending and credit risk, considering the contestability of banks and other non-price factors. Hou et al. (2018) believe it would be interesting to investigate whether the relationship between bank diversification and liquidity creation changes across heterogeneous banks considering other variables such as capitalisation, size, and liquidity position of banks.

7.1.5 Bank Efficiency

Vennet (2002) suggests that future research should examine the sources of the efficiency differences between universal and specialised banks. Berger et al. (2010) observes that foreign ownership and conglomerate affiliation tend to mitigate the diseconomies of diversification in

Chinese banks and thinks it might be beneficial to investigate the impact of foreign banks' entry in other emerging markets.

7.1.6 Market valuation

After finding significant evidence of a diversification discount on the valuation of financial conglomerates, Schmid and Walter (2009) ask why, given the evidence of a significant conglomerate discount, the management and boards of such banks persist in diversification strategies. In this note, we suggest future studies can empirically compare the results of the studies focused on NTBA and changes in banking model strategies.

7.1.7 Monetary policy

Landi et al. (2020) report since the outbreak of the global financial crisis, the ECB has taken massive unconventional monetary policy measures to stimulate the Eurozone economy, which shifted Euro area banks towards noninterest income activities, and within noninterest activities banks shift from investment banking activities to asset management and distribution of investment products. According to them, assessing how these business changes in the context of negative interest rates affect banks' profitability and risk can be an important future research agenda (Landi et al., 2020). Similarly, Lopez et al. (2020) encourage future research to investigate whether the gains from higher non-interest activities due to the negative rate regime are sustainable over a longer period.

7.1.8 Digitalisation and fintech adoption

He et al. (2023) suggest future studies focus on the effects of adopting different types of fintech technologies and different fintech business models in risk management on NTBA. Future research can also focus on potential liquidity shortages and over-diversification caused by market competition and adaptation of new technology (Tang et al., 2024).

8 Conclusion

This paper investigates the influential perspectives and the intellectual structure of non-traditional banking activities research by systematically reviewing a sample of 309 articles published between 1986 and 2024 using bibliometric and content analysis methods. To the best of our knowledge, this is the first review paper on NTBA research field. This paper contributes to the banking literature by capturing the historical evolution of the NTBA research field, grouping NTBA research articles into major thematic clusters, compiling and analysing the key findings and providing avenues for future research. The sample dataset shows that many prominent scholars from reputed institutes have contributed to this research field and the research works have been published in higher-ranked journals. In terms of authors' contribution, Amine Tarazi, Maoyong Cheng and Cheiang C Lee are jointly most productive, while Kevin J Stiroh is the most cited. The Journal of Banking and Finance is the most productive journal and while Tilburg University is the most productive institute. The content analysis of the highly cited NTBA research articles revealed two main clusters: Glass-Steagall Act and Universal banking studies and post-Gramm–Leach–Bliley Act studies and seven subclusters within post-Gramm–Leach–Bliley Act studies: a) profitability and insolvency risk, b) systemic risk, c) efficiency, d) market valuation, e) lending behaviour and liquidity creation, f) monetary policy, and g) digitalisation and fintech adoption.

This study finds the NTBA research field is highly concentrated on the banks from developed economies, especially the US. Very few studies focus on emerging and developing economies. For instance, there is very little research on the Middle East, South Asia and East Asian region and NTBA research on South American banks is non-existent. Due to regulatory and governance differences, generalisation of the developed country results may not be appropriate in developing economies. So, future studies in this field should focus more on emerging and developing countries. We suggest future NTBA research based on developing and emerging

countries may focus on the differences in institutional quality, such as government effectiveness, political stability, regulatory quality and control of corruption, mainly because institutional quality can have a complementary relationship with bank regulations and supervision.

Broadly, the NTBA research field can be viewed as an empirical and conceptual endeavour to generate new knowledge by investigating how banks deal with adversity during different important real-world events that have significant economic impacts. It is likely that future studies to focus more on the consequences of significant recent events, developments, and crises, such as BREXIT, COVID-19, war in Ukraine and rising inflation around the world. The consequence of the war in Ukraine and the pandemic has impacted the global economy through higher inflation. Most central banks are exercising monetary policies through hikes in interest rates to control inflationary pressure. Higher interest rates are likely to motivate banks to switch to traditional lending activities. However, if this high interest rate regime persists for a longer period of time, a crisis might be seen in the housing market which has may negatively impact banks' lending business. Therefore, we assume this research field will likely be dominated by research papers on the impact of higher interest rates on NTBAs.

This study is not free from any bias or limitation. The bibliometric analysis assumes that highly cited articles are more important and influential. But it takes time for a research article to be recognised for its true potential. So, in a bibliometric study, more recent articles might not show their true potential. We recommend future research should repeat the study once a decade to understand the important changes in the NTBA research field. This paper studies the entire NTBA research field; in contrast, future research may wish to study a specific section of the NTBA research field by conducting a structured literature review or a meta-analysis review. Our paper categorised the articles based on the science mapping techniques and by the main area of study, however, future research may also attempt to categorise the articles differently,

such as, by study types, research objectives, and methods used. Our paper is based on all the NTBA papers indexed in the Social Science Index within the WoS database; another approach can be a literature review of the articles published only in the top finance journals.

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Appendix

Table AP 1. Comparison between different science mapping techniques.

Technique	Assumption	Usage	Unit of analysis
Citation analysis	Intellectual linkages between publications are formed when one publication cites the other.	To analyses the relationships among most influential publications in a research field.	Documents
Co-citation analysis	Publications that are cited together frequently are similar thematically.	To analyses the relationships among cited publications to understand the development of the foundational themes in a research field.	Documents
Bibliographic coupling	Two publications sharing common references are also similar in their content.	To analyses the relationships among citing publications to understand the present development of themes in a research field.	Documents
Keyword co-occurrence analysis	Words that frequently appear together have a thematic relationship with one another.	To explore the relationships among topics in a research field by focusing on the main content of the publication.	Key words

Source: Adopted from Donthu et al,. (2021)

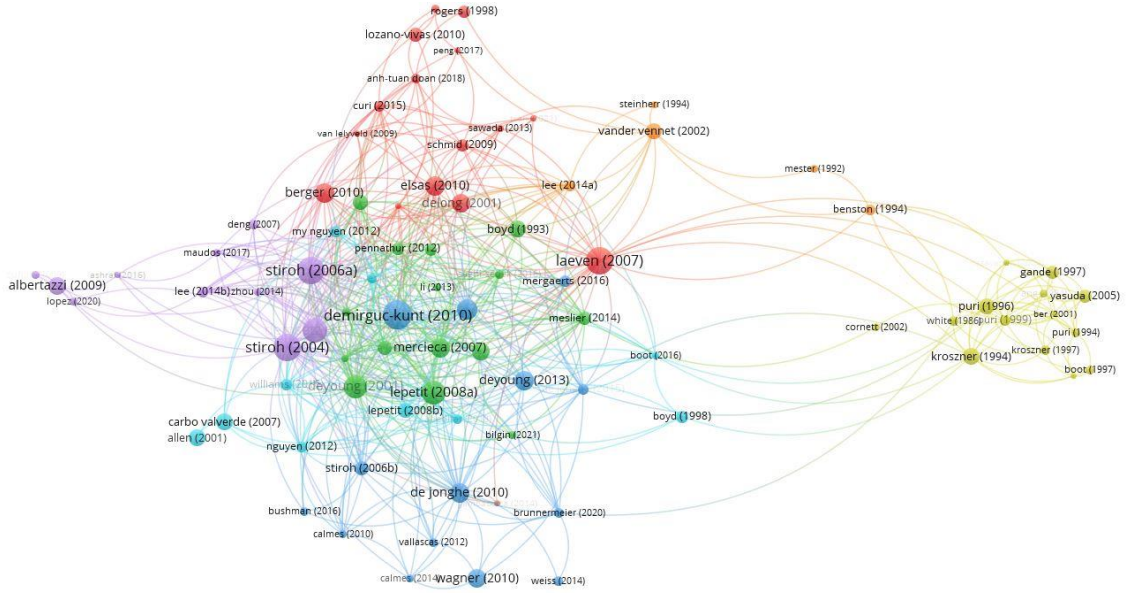

Figure AP.1. Citation analysis of NTBA research field

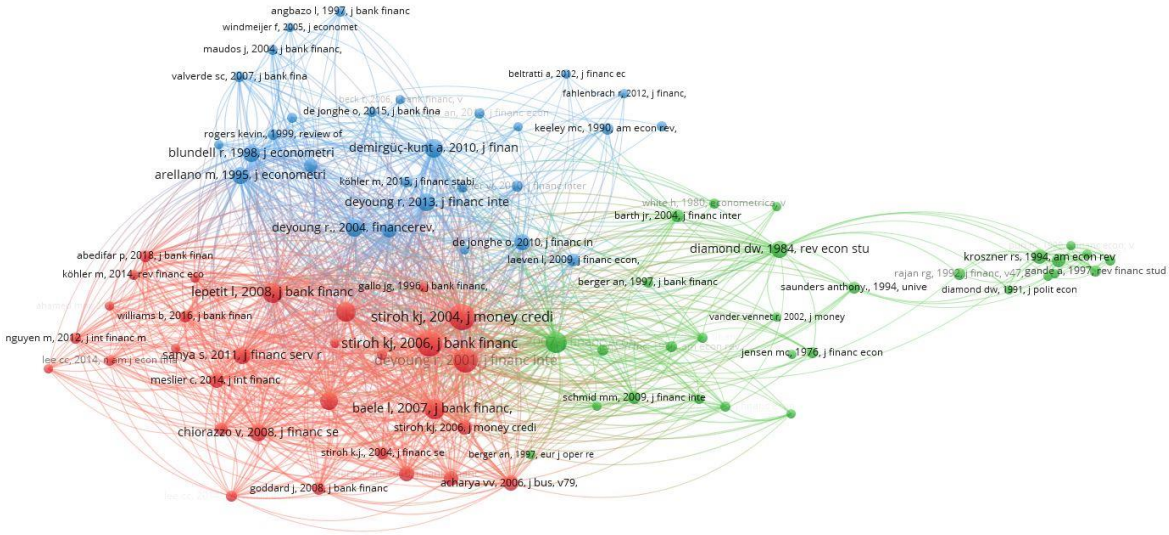

Figure AP. 2. Co-citations analysis of NTBA research field.